

# ALACHUA COUNTY HOUSING AUTHORITY OFFICE CONVERSION COMMISSION #: 21088.00

DECEMBER 23, 2021 Revised April 25, 2022

7901 4<sup>th</sup> Street North, Suite 200 • St. Petersburg, Florida 33702 (727) 894-4453 • (727) 896-8662

## ALACHUA COUNTY HOUSING AUTHORITY OFFICE CONVERSION PROJECT MANUAL

# TABLE OF CONTENTS

## December 23, 2021

## **DIVISION 0 – DOCUMENTATION – HUD PROJECTS**

00100 -1	Instructions to Bidders	12/23/2021
00110 -1	Supplementary Instructions to Bidders	12/23/2021
4	HUD-5369 Instructions to Bidders for Contracts	
00210 –1	Drawing List	
00300 -7	Bid Proposal Form	12/23/2021
00310 -2	Sworn Statement under Section 287.133(3)(A)	12/23/2021
00320 -1	Representations, Certifications & Other Statements	12/23/2021
3	HUD 5369ARepresentations, Certifications and Other Statements	
00330–1	Form of Non-Collusive Affidavit	12/23/2021
00340–1	Previous Participation Certificate	12/23/2021
4	HUD Form 2530 Previous Participation Certificate	
00500–2	Agreement Between Owner and Contractor	
39	AIA A201-2017 - General Conditions	
00600 -1	Insurance & Bonds	12/23/2021
00701-7	AIA A101-2017 – Exhibit A	
00702-5	Supplementary Conditions to AIA A201-2017	12/23/2021
00710-19	HUD 5370 General Conditions for Construction Contracts	
00711-5	Supplementary General Conditions to HUD Form 5370	12/23/2021
00720-4	HUD 2554 Supplementary Conditions of Contract for Construction	ו
00800-1	Wage Determination	
5	General Decision BY COUNTY - SEE	07/09/2021
	www.beta.SAM.gov FOR CURRENT RATES	
DIVISION 1	– GENERAL DATA	
01010 - 2	Summary of Work	12/23/2021
01020 - 2	Allowances	12/23/2021
01026 - 2	Unit Prices	12/23/2021
01030 - 2	Alternates	12/23/2021
01035 - 3	Modification Procedures	12/23/2021
01039 - 3	Coordination and Meetings	12/23/2021
01040 - 3	Coordination	12/23/2021
01045 - 4	Cutting and Patching	12/23/2021
01200 - 2	General Provisions	12/23/2021
01300 - 6	Submittals	12/23/2021
01301 -11	Project Management & Coordination	12/23/2021
	AIA G716	
	RFI Evaluation Form	
01302 - 9	Construction Progress Documentation	12/23/2021
01303 - 3	Photographic Documentation	12/23/2021

 01303 - 3
 Photographic Documentation
 12/23/2021

 01304 - 5
 Product Requirements
 12/23/2021

 01400 - 3
 Quality Control
 12/23/2021

 01421 - 22
 Reference Standards & Definitions
 12/23/2021

 01503 - 10
 Execution
 12/23/2021

01600 - 3	Materials & Equipment	12/23/2021
01631 - 3	Substitutions	12/23/2021
- 2	Proposed Equal Substitution Form	
01650 - 2	Starting of Systems	12/23/2021
01700 - 4	Contract Closeout	12/23/2021
01730 - 4	Operation and Maintenance Data	12/23/2021
01731 - 3	Project Record Documents	12/23/2021
01732 - 6	Demonstration & Training	12/23/2021
01740 - 2	Warranties & Bonds	12/23/2021
01805 - 2	Cleaning Up	12/23/2021
DIVISION 2 -	SITE CONSTRUCTION	
02070 - 8	Selective Demolition	12/23/2021
DIVISION 3 –	CONCRETE – Not Used	
DIVISION 4 -	MASONRY – Not Used	
DIVISION 5 -	METALS – Not Used	
DIVISION 6 -	WOOD & PLASTICS	
06100 – 17	Rough Carpentry	12/23/2021
06101 - 6	Sheathing	12/23/2021
06401 – 11	Exterior Architectural Woodwork	12/23/2021
DIVISION 7 -	THERMAL PROTECTION & MOISTURE	
07210 - 8	Building Insulation	12/23/2021
07212 - 3	Weather Barriers	12/23/2021
07250 - 9	Weather Resistant Barriers	12/23/2021
07620 - 4	Sheet Metal Flashing and Trim	12/23/2021
07900 - 4	Joint Sealers	12/23/2021
DIVISION 8 –	DOORS & WINDOWS	
08141 - 4	Flush Waad Doors	12/23/2021
08143 - 5	Stile and Rail Wood Doors	12/23/2021
08710 - 14	Door Hardware	12/23/2021
08800 - 17	Glazing	12/23/2021
DIVISION 9 -	FINISHES	
09290 - 12	Gynsum Board Assemblies	12/23/2021
09200 - 6	Painting and Coating	12/23/2021
09912 - 8	Interior Paint and Coatings	12/23/2021
DIVISION 10 -	- SPECIALTIES – Not Used	
10306 - 5	Fire Extinguisher Cabinets	12/22/2021
10307 - 3	Fire Extinguishers	12/23/2021
10307 - 3	The Extinguishers	12/23/2021

DIVISION 11 – EQUIPMENT – Not Used

DIVISION 12 – FURNISHINGS – Not Used

DIVISION 13 – SPECIAL CONSTRUCTION – Not Used

DIVISION 14 – CONVEYING SYSTEMS – Not Used



## **DIVISION 15 – MECHANICAL**

15010 - 17	General Mechanical Provisions	12/23/2021
15800 - 13	HVAC Air Distribution	12/23/2021
15990 - 7	Testing Adjusting Balancing for HVAC	12/23/2021



## **DIVISION 16 – ELECTRICAL**

16010 - 7	Supplementary General Conditions	12/23/2021
16047 - 4	Electrical Demolition	12/23/2021
16110 - 4	Raceways	12/23/2021
16120 - 6	Conductors and Cables	12/23/2021
16131 - 2	Junction and Pull Boxes	12/23/2021
16134 - 5	Boxes	12/23/2021
16140 - 9	Wiring Devices	12/23/2021
16160 - 7	Identification for Electrical Systems	12/23/2021
16450 - 4	Grounding	12/23/2021
16501 - 6	Lamps, Drivers and Ballasts	12/23/2021
16510 - 8	Interior Lighting	12/23/2021
16740 - 1	Telephone Systems	12/23/2021
16742 - 6	Voice/Data Network Cable Systems	12/23/2021
16950 - 6	Occupancy Sensors	12/23/2021

## SECTION 00100 INSTRUCTIONS TO BIDDERS

## PART 1- GENERAL

## **DESCRIPTION OF WORK**

HUD Form 5369 "Instruction to Bidders for Contracts – Public and Indians Housing Programs," pages 1 through 4, dated Oct. 2002 follow this Section and are incorporated into the Contract Documents.

See Section 00110 "Supplementary Instructions to Bidders" for modifications to HUD Form 5369.

**END OF SECTION** 

## SECTION 00110 SUPPLEMENTARY INSTRUCTION TO BIDDERS

## PART I – GENERAL

## 1.01 SCOPE

- A. This Section sets forth the modifications and additions to Section 00100 "Instructions to Bidders" HUD Form 5369.
- B. In those instances that a clause is amended, modified, voided, or superseded, the provisions of such Clause not specifically amended, modified, voided or superseded shall remain in effect. Should a conflict exist between the provisions of the Agreement, and those of the Specifications, the requirements of the Agreement shall apply.

## 1.02 MODIFICATIONS AND ADDITIONS

- Clause 2, add the following subclause (C): "(C) Contractor must submit questions concerning interpretations and bidding in writing to: Bessolo Design Group, Contact: Project Architect, 7901 4<sup>th</sup> Street North, Suite 200., St. Petersburg, FL 33702 (727.894.4453)/ph or (727) 896-8662 fax).
- B. Clause 12, Indian Preference Requirements: Delete Clause 12 in its entirety.

**END OF SECTION** 

## ALACHUA COUNTY HOUSING AUTHORITY - OFFICE CONVERSION

## SECTION 00210 DRAWING LIST

## ARCHITECTURAL

COVER SHEET

- G001 GENERAL INFORMATION
- AD101 DEMOLITION PARTIAL FIRST FLOOR PLAN
- AL101 LIFE SAFETY PARTIAL FIRST FLOOR PLAN
- A101 PROPOSED PARTIAL FIRST FLOOR PLAN
- AR101 PROPOSED REFLECTED CEILING PLAN & ELECTRICAL PLAN
- A701 WALL TYPES

## ELECTRICAL

ED101 DEMOLITION REFLECTED CEILING PLAN & ELECTRICAL PLAN

## MECHANICAL

- MD101 DEMOLITION MECHANICAL PLAN
- M101 PARTIAL MECHANICAL FIRST FLOOR PLAN

## **SECTION 00300**

## **BID PROPOSAL FORM**

PROPOSAL FORM

(Submit in quadruplet on Contractor's Letterhead)

DATE: TIME:

For: project

Gentlemen:

The undersigned, hereinafter called "Bidder," having visited the site of the proposed project and familiarized himself with the local conditions, nature and extent of the Work, and having examined carefully the Drawings, Specifications, the Form of Agreement, and other Contract Documents with the Bond requirements therein, proposes to furnish all labor, materials, equipment and other items, facilities, and services for the proper execution and completion of \_\_\_\_\_\_\_, in full accordance with the Advertisement for Bid, Invitation to Bid, Instructions to Bidders, and all other documents relating thereto, on file in the office of \_\_\_\_\_\_\_ and, if awarded the Contract, to complete the said Work within the time limits specified or stipulated herein for the following Bid price.

Base Bid: \_\_\_\_\_

Dollars \$ \_\_\_\_\_

With foregoing as a Base Bid, the following cost of alternate proposals are submitted in accordance with the drawings and specifications.

The Bidder hereby agrees that:

- a. The above proposal shall remain in full force and effect for a period of ninety (90) calendar days after the time and date of receipt of Bids and that this Bidder will not revoke or cancel this proposal or withdraw from the competition within the said ninety (90) calendar days.
- b. In case he be notified in writing by mail, telegraph, or delivery of the acceptance of this proposal within ninety (90) days after the time set for the opening of bids, the undersigned agrees to execute within ten (10) days a formal written contract for the work for the above stated compensation and at the time to furnish and deliver to the Owner a Performance Bond and a Payment Bond in accordance with the requirements of the Supplementary General Conditions of the Contract, both in an amount equal to 100% of the contract sum or shall assure completion per Clause 10 of HUD- Form 5369. The premium for such bond will be paid by the Prime Contractor.
- c. The undersigned agrees to commence actual physical work on the site with an adequate force and equipment within ten (10) calendar days of the date of receipt of written notice to commence and to complete fully all work within consecutive calendar days from and including said date.
- d. Enclosed herewith is a bid bond in the amount of \_\_\_\_\_\_ Dollars (\$) (being not less than 5% of the Base Bid). The undersigned agrees that the above stated amount is the proper measure of liquidated damages, which the Owner will sustain by the failure of the undersigned to execute the contract and to furnish the Performance Bond and Payment Bond in case this proposal is accepted, and further agrees to the following: \*If this proposal is accepted within ninety (90) after the date set for the opening of bids and the undersigned fails to execute the contract within ten (10) days after notice of such acceptance or if he fails to furnish both Performance Bond and Payment Bond, and proper insurance, the obligation of the bid bond will remain in full

BID PROPOSAL FORM SECTION 00300 - 1 force and effect and money payable thereon shall be paid into the funds of the Owner as liquidated damages for such failures; otherwise, obligation of the Bond will be null and void.

\*If the Contractor should fail, for reasons other than enumerated in General Condition HUD Form 5370, Clause 32, "Default" and other applicable clauses subsequently determined as nonjustifiable by the Owner to complete the project by the stipulated time, then the Contractor shall hereby agree as condition on this contract to pay to the Owner, amounts in accordance with the following, not as a penalty but as liquidated damages for such breach of contract, for each calendar day that the Contractor shall be in default after stipulated date.

## LIQUIDATED DAMAGES

The above amount is agreed upon as a proper measure of liquidated damages which Owner will sustain per day, by failure of Contractor to complete work at stipulated time and is not construed in any penalty.

Attached is a fully and truthfully executed form HUD-5369, "Representation, Certifications, and other Statements of Bidders – Public and Indian Housing Programs."

Attached is an affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this proposal or any other proposals for the contract for which this proposal is submitted. Attached is a Sworn Statement Pursuant to Section 287.133 (3)(a), <u>Florida Statues</u>, on Public Entity Crimes.

Note: The penalty for making false statements in offer is prescribed in 18 U.S.C. 1001.

This total base price includes all sitework and general construction, electrical and mechanical work shown and called for by the drawings and specifications.

## LUMP SUM PRICE BREAKDOWN:

The undersigned further states that the Guaranteed Maximum Price noted above, when broken down, is comprised of the following costs for the \_\_\_\_\_\_ (does not include any of the Alternate Prices), which are not for the addition to or deletion from the Base Bid. The breakdown is required for the bid to be considered complete.

DIVISION 1 – GENERAL CONDITIONS (Provide separate detail page)		\$
DIVISI	DN 2 – SITEWORK	
02070 02110 02282 02511 02520 02743 02744 02900	Selective Demolition Site Clearing Termite Control Hot Mixed Asphalt Paving Portland Cement Concrete Paving Handicap Ramps Pavement Striping & Signage Landscaping Other Division 2 Work (provide detail page) <b>DIVISION 2 – TOTAL</b>	\$ \$ \$ \$ \$ \$ \$ \$
DIVISI	DN 3 – Concrete – Not Used	\$
DIVISI	DN 4 – Masonry – Not Used	\$
DIVISI	DN 5 – Metals – Not Used	\$
DIVISI	DN 6 - Wood & Plastics	
06001 06101 06153 06401	Carpentry Sheathing Miscellaneous Rough Carpentry Exterior Woodwork Other Division 6 Work (provide detail page)	\$ \$ \$ \$
	DIVISION 6 – TOTAL	¢
		Φ
DIVISI	DN 7 – Thermal & Moisture Protection	\$
DIVISIO 07210 07212 07250 07620 07900	DN 7 – Thermal & Moisture Protection Building Insulation Weather Barriers Weather Resistant Barriers Sheet Metal Flashing & Trim Joint Sealers Other Division 7 Work (provide detail page)	\$ \$ \$ \$ \$

## DIVISION 8 – Doors & Glass

08141 08143 08710 08800	Flush Wood Doors Stile & Rail Wood Doors Door Hardware Glazing Other Division 8 Work (provide detail page)	\$ \$ \$ \$
	DIVISION 8 – TOTAL	\$
DIVISI	ON 9 – Finishes	
09290 09912	Gypsum Board Assemblies Interior Paint and Coatings Other Division 9 Work (provide detail page)	\$ \$ \$
	DIVISION 9 – TOTAL	\$
DIVISI	ON 10 – Specialties	
10306 10307	Fire Extinguisher Cabinets Fire Extinguishers Other Division 10 Work (provide detail page)	\$ \$ \$
	DIVISION 10 – TOTAL	\$
DIVISI	ON 11 – Equipment – Not Used	
DIVISI	ON 12 – Furnishings – Not Used	
DIVISI	ON 13 - Special Construction - Not Used	
DIVISI	ON 14 – Conveying Systems – Not Used	
DIVISI	ON 15 – Mechanical (Sections 15010-15860)	
	Common Work for Plumbing Plumbing excluding fixtures Plumbing Fixtures Plumbing Piping Systems Other Division 15 Work (provide detail page)	\$ \$ \$ \$
	DIVISION 15 – TOTAL	\$
DIVISI	ON 16 – Electrical	
16010 16110 16120 16131 16136 16142 16289 16420 16441 16450	Supplementary General Conditions Raceways Conductors and Cables Junction and Pull Boxes Wireway Electrical Connections for Equipment Surge Protection Device Service Entrance Load Centers Grounding	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$
	Other Division 16 Work (provide detail page)	\$

BID PROPOSAL FORM SECTION 00300 - 4

DIVISION 16 – TOTAL	\$
FEE	\$
INSURANCE	\$
PAYMENT AND PERFORMANCE BOND	\$
TOTAL LUMP SUM BASE BID	\$

#### ALTERNATES

The Undersigned proposes the following alternate prices for work more fully described in the Contract Documents. It is understood that the Owner shall accept or reject the alternates as his own best interests shall determine. All alternates noted with "(Price Required): are to be completed for the Bid Proposal to be considered complete. None of the alternate Prices are to be included in the Lump Sum Base Bid Price. All alternate prices are to include full compensation for the work including overhead and profit.

ALTERNATE NO. 1: (Price Required)

The additional cost to provide and install a ducted return air for the air conditioning system for each residence. The cost for the ducted return shall not be included in the base bid price.

ALTERNATE NO. 2: (Price Required)

Cost to provide and install underground electric service to each residence in lieu of the overhead service shown. The cost for the underground electric service is not to be included in the Base Bid.

ALTERNATE NO. 3: (Price Required)

ADD/DEDUCT \$\_\_\_\_\_

ALTERNATE NO. 4: (Price Required)

## ADD/DEDUCT \$\_\_\_\_

BID ACCEPTANCE:

In submitting this proposal, the undersigned understands that the right is reserved by the Architect to reject any and all bids or parts thereof and to waive any informalities, defects or irregularities in the bids, as may be deemed in its best interest. If written notice of acceptance of this proposal is mailed, telegraphed, faxed, or delivered to the undersigned within forty-five (45) days after the opening thereof, or at any time thereafter before this Proposal is withdrawn, the undersigned agrees to execute and deliver the Contract in the prescribed form and furnish a Performance and Payment Bond, each in a sum equal to 100% of the total contract price, and the policies of insurance within seven (7) days after the Contract is executed by the Owner.

TIME OF COMPLETION:

BID PROPOSAL FORM SECTION 00300 - 5

## ALACHUA COUNTY HOUSING AUTHORITY - OFFICE CONVERSION

We, the undersigned agree to commence with construction within \_ calendar days after signing a Contract, and to complete the project within \_\_\_\_\_\_ calendar days after Notice To Proceed from the Owner. Contract includes \_\_\_\_\_\_ days of inclement weather. Time is of the essence in this project, and the contract will provide that if the contractor fails to commence work and complete the project in the time frame stated above, or an approved extension thereof, the contractor shall pay to the Owner as fixed, agreed and liquidated damages, but not as a penalty, the sum of \$300.00 for each calendar day of delay.

We, the undersigned, acting through its authorized officers and intending to be legally bound, agree that this Bid Proposal shall constitute an offer by the undersigned to enter into a contract with the acts and things therein provided, which offer shall be irrevocable for a period of 60 calendar days from the date of the opening hereof and that the Owner may accept this offer at any time during said period by notifying the undersigned of the acceptance of said offer. To the extent the period specified herein is in excess of any period specified by law for award of contract, submissions of this Proposal constitute the written consent of the undersigned to an extension of time for award of the contract to the end of such period.

## ADDENDA:

The undersigned agrees that the following addenda, which have been issued during the bidding period, have been received and have been considered both before and in the preparation of this proposal.

Addendum No.	dated	
Addendum No.	dated	

Addendum No. \_\_\_\_\_dated \_\_\_\_\_

## CONTRACTOR'S STATEMENTS OF BID QUALIFICATION:

## ADDRESS, LEGAL STATUS AND SIGNATURE OF BIDDER:

The undersigned Bidder does hereby designate the address given below as the legal address to which all notices, directions, or other communications shall be served or mailed.

The undersigned in submitting this proposal to Bessolo Design Group, Inc., and in consideration of receipt and consideration of this proposal by Bessolo Design Group, Inc., intends to be legally bound by this proposal.

The undersigned Bidder does hereby declare that the Bidder has the legal status checked below:

Partnership

Corporation incorporated under the laws of \_\_\_\_\_\_

## ALACHUA COUNTY HOUSING AUTHORITY - OFFICE CONVERSION

See M.B.E. Utilization Summary 00711, page 4.

Florida Construction Industries Licensing Board Certification.

(Name of Holder)

(Certificate no.)

In witness whereof, the bidder has hereunto set this signature and affixed his seal this \_\_\_\_\_day of \_\_\_\_\_\_, 202 \_\_\_\_AD.

(CORPORATE SEALED IF BIDDER IS A CORPORATION)

BIDDER: \_\_\_\_\_\_\_\_NAME

BY: \_\_\_\_\_

NAME

TITLE

Witness (Secretary's Attest) if Bidder is Corporation

## **SECTION 00310**

## SWORN STATEMENT UNDER SECTION 287.133(3)(A), FLORIDA STATUTES, ON PUBLIC ENTITY CRIMES

(To be signed in the presence of notary public or other officer authorized to administer oaths)

## **DESCRIPTION:**

STATE OF	

COUNTY OF \_\_\_\_\_

Before me, the undersigned authority, personally appeared \_\_\_\_\_\_ who, being by me first duly sworn, made the following statement:

1. The business address of \_\_\_\_\_\_ (name of offeror or business) is

2. My relationship to: \_\_\_\_\_\_(name of offeror or business) is

(relationship such as sole proprietor, partner, president,

vice president).

- 3. I understand that a public entity crime as defined in Section 287.133 of the Florida Statutes includes a violation of any state or federal law by a person with respect to and directly related to the transaction of business with any public entity in Florida or with an agency or political subdivision of any other state or with the United States, including, but not limited to, any proposal or contract for goods or services to be provided to any public entity or such an agency or political subdivision and involving antitrust, fraud, theft, bribery, collusion, racketeering, conspiracy or material misrepresentation.
- 4. I understand that "convicted" or "conviction" is defined by the <u>Florida Statutes</u> to mean a finding of guilty or a conviction of a public entity crime, with or without an adjudication of guilt, in any federal or state trial court of record relating to charges brought by indictment or information after July 1, 1989, as a result of a jury verdict, non-jury trial, or entry of a plea of guilt or <u>nolo contendere</u>.
- 5. I understand that "affiliate" is defined by the <u>Florida Statutes</u> to mean (1) a predecessor or successor of a person or a corporation convicted of a public entity crime, or (2) an entry under the control of any natural person who is active in the management of the entity and who has been convicted of a public entity crime, or (3) those officers, directors, executives, partners, shareholders, employees, members, and agents who are active in the management of an affiliate, or (4) a person or corporation who knowingly entered into a joint venture with a person who has been convicted of a public entity crime in Florida during the preceding 36 months.
- 6. Neither the offeror or contractor, nor any officer, director, executive, partner, shareholder, employee, member or agent who is active in the management of the offeror or contractor has been convicted of a public entity crime subsequent to July 1, 1989.

## SWORN STATEMENT UNDER SECTION 287.133(3)(A) SECTION 00310 - 1

12/23/2021

## ALACHUA COUNTY HOUSING AUTHORITY - OFFICE CONVERSION

(Draw a line through paragraph 6 if paragraph 7 below applies.)

7. There has been a conviction of a public entity crime by the offeror or contractor, or an officer, director, executive, partner, shareholder, employee, member or agent of the offeror or contractor who is active in the management of the offeror or contractor or an affiliate of the offeror or contractor. A determination has been made pursuant to Section 287.133(3) by order of the Division of Administrative Hearings that it is not in the public interest for the name of the convicted person or affiliate to appear on the convicted vendor list. The name of the convicted person or affiliate is

A copy of the order of the Division of Administrative Hearings is

attached to this statement.

(Draw a line through paragraph 7 if paragraph 6 above applies.)

(Signature)

(Print name)

STATE OF

COUNTY OF \_\_\_\_\_

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_,

\_\_\_\_\_ by \_\_\_\_\_, who is personally known to me or who has produced

as identification and who did take an oath.

Notary Public My Commission expires:

## SECTION 00320 REPRESENTATIONS, CERTIFICATIONS AND OTHER STATEMENTS OF BIDDERS

## PART I – GENERAL

## DESCRIPTION OF WORK:

HUD Form 5369-A "Representations, Certifications, and other Statements of Bidders – Public and Indian Housing, " pages one through three inclusive, dated November 1992 follow this Section and are hereby included in the Project Manual and are incorporated into the Contract Documents.

Bidders shall include a fully and truthfully executed original of this form, along with the specified number of conformed copies, with the bid package. Failure to do so may be grounds for rejection of the bid as being non-responsive. Bidders must fill in the appropriate information in the blank spaces of the form and check the appropriate boxes where applicable. Bidders are hereby informed that certain clauses may or may not be applicable to this solicitation, based upon the dollar value of the bid proposal being submitted. Bidders shall be solely responsible for determining the applicable clauses where the contract dollar amount (amount of the bid proposal) is the deciding factor. Where the contract amount may be affected by bid alternates, Bidders shall complete the form based upon the highest possible dollar value.

For purposes of this solicitation, bidders are hereby informed that Clause 8 of the following Form HUD-5369-A is not applicable.

**END OF SECTION** 

## SECTION 00330 FORM OF NON-COLLUSIVE AFFIDAVIT

STATE OF FLORIDA COUNTY

\_\_\_\_\_\_\_, being first duly sworn, deposes and says that he is \_\_\_\_\_\_\_, (A partner or officer of the firm of, etc.) the party making the foregoing proposal or bid, that such proposal or bid is genuine and not collusive or sham; that said bidder has not colluded, conspired, connived or agreed, directly or indirectly, with any bidder or person, to put in a sham bid or to refrain from bidding, and has not in any manner, directly or indirectly, sought by agreement or collusion, or communication or conference with any person, to fix the bid price or affiant or of any other bidder, or to fix any overhead, profit, or cost element of said bid price, or of that of any other bidder, or to secure any advantage against \_\_\_\_\_\_ Housing Authority or any person interested in the proposed Contract; and that all statements in said Proposal or Bid are true.

Signature of Bidder, if Bidder is an individual

Signature of Partner, if Bidder is a Partner

Signature of Officer, if Bidder is a corporation (Corporate seal required if Corporation)

Subscribed and sworn to before me this \_\_\_\_\_ Day of \_\_\_\_\_ 20\_\_\_.

Notary Public

My Commission expires \_\_\_\_\_

## **END OF SECTION**

## FORM OF NON-COLLUSIVE AFFIDAVIT SECTION 00330-1

12/23/2021

## SECTION 00340 PREVIOUS PARTICIPATION CERTIFICATE

## PART I - GENERAL

HUD Form 2530, "Previous Participation Certificate", pages one and two inclusive; and "Instructions for Completing the Previous Participation Certificate, HUD Form 2530," pages one and two inclusive are included herein on the following pages. These forms may be submitted as part of the bid package. If not submitted as part of the bid package, the successful bidder shall submit a fully and truthfully executed certificate within three (3) working days of the bid opening. Failure to submit the certificate by that date may render the bid non-responsive. No contract award will be made without a properly executed certificate which has been reviewed by HUD and based upon that review, a HUD authorization to award has been received by the Owner.

The Bidder shall indicate whether or not this document is included with the bid package at Clause 12 of form HUD-5369-A, "Representation, Certifications, and other Statement of Bidders – Public and Indian Housing Programs" include in this Project Manual at Section 00320.

**END OF SECTION** 

## SECTION 00500 AGREEMENT BETWEEN OWNER AND CONTRACTOR (AIA Document A101-2017)

THIS AGREEMENT

made this \_\_\_\_\_\_ day of \_\_\_\_\_\_ in the year Two thousand \_\_\_\_\_\_

**BY AND BETWEEN** 

\_\_\_\_\_ Housing Authority

hereinafter called the OWNER, and

(Contractor's Name, Address & Federal Tax ID No.) hereinafter called the CONTRACTOR

The Owner and the Contractor agree as set forth below.

ARTICLE 1. THE CONTRACT DOCUMENTS – The Contract Documents consist of this Agreement, the Contractor's proposal, conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda issued prior to execution of this Agreement and all Modifications issued subsequent thereto. These form the Contract, and all are as fully a part of the Contract as if attached to this Agreement or repeated herein. An enumeration of the drawings, specifications and addenda is a follows:

DRAWINGS: (PROJECT NUMBER, PROJECT TITLE, NUMBER OF PAGES OF DRAWINGS & WHO PREPARED BY)

SPECIFICATIONS: (PROJECT NUMBER, PROJECT TITLE & WHO PREPARED BY)

ADDENDA: (EACH ADDENDUM NUMBER, DATE & NUMBER OF PAGES)

In event of conflict in the provision of said Contract Documents, or any of them, the provisions of the basic Agreement which immediately precedes the Signatures of the parties shall control over the Specifications, the General Conditions and Supplementary General Conditions, and the Supplementary General Conditions shall control over the General Conditions of said Standard Form A201 of the American Institute of Architects. The General Conditions of Contract will control over all the other parts of the contract documents. In the event of a conflict between the Specifications and the Drawings the Specifications will control.

ARTICLE 2. The Contractor shall perform all the work required by the Contract Documents for items as specified in the (BASE BID & ALTERNATE NOS.).

ARTICLE 3 CONTRACT SUM – The owner shall pay the Contractor for the performance of the work, subject to additions and deductions by Change Order as provided in the Conditions of the contract, in current funds, the Contract Sum of (Amount of Contract in Alphabetical Terms

AGREEMENT BETWEEN OWNER AND CONTRACTOR SECTION 00500-1

21088.00

Followed By Amount in Numerical Terms.)

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

CONTRACTOR	OWNER
APPROVED:	APPROVED:
By Corporate President's Signature	By Owner's Signature
ATTEST:	AS WITNESSED:
By Corporate Secretary's Signature	By Witness's Signature
AS WITNESSED:	
By Witness's Signature	APPROVED AS TO FORM AN LEGALITY:

CORPORATE SEAL

AND

By Office of the General Counsel

AGREEMENT BETWEEN OWNER AND CONTRACTOR SECTION 00500-2

## SECTION 00600 INSURANCE AND BONDS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02. BONDS

- A. PERFORMANCE AND PAYMENT BONDS shall be furnished to the Owner, by the Contractor, in an amount equal to 100 percent of the Contract sum as security for the faithful performance of the Contract and the payment of all persons performing labor and furnishing materials in connection with the Contract. Said payment bond shall also be executed in statutory bond and filed in the office of the Clerk of the District Court of the county in which the Project is located. Contractor shall provide the Owner with a certified copy of said statutory bond as so filed.
- B. BONDS FURNISHED shall be written by a SURETY approved by the US. Treasury Department and licensed to do business in the State in which the Project is located. No work shall be commenced until bonds are in force.
- C. FORM OF BOND shall be AIA Document A312, 2010 edition, issued and approved by the American Institute of Architects.
- D. POWER OF ATTORNEY for the surety company agent must accompany each bond issued, and must be certified to include the date of the bonds.
- E. PROVIDE TRIPLICATE COPIES of the bond forms and power of attorney.

## 1.03. INSURANCE

A. See AIA A101-2017 Exhibit A for required coverage.

## PART 2 - MATERIALS

Not Used

## PART 3 - EXECUTION

Not Used

## END OF SECTION

## SECTION 00701 GENERAL CONDITIONS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Section 00702 for the amendments to these General Conditions.

## 1.02 CONTRACTS

A. The Standard Form AIA Document No. A201, "General Conditions for the Contract for Construction", 2017, are hereby made a part of this specification to the same extent as they are herein written out in full.

## PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

Not Used

## **END OF SECTION**

# ORAFT AIA<sup>°</sup> Document A101<sup>™</sup> - 2017 Exhibit A

# Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year «2021» (In words, indicate day, month and year.)

for the following **PROJECT**: (Name and location or address)

Alachua County Housing Authority Office Conversion 703 NE 1<sup>st</sup> Street Gainesville, FL

THE OWNER: (Name, legal status and address)

Ron Hall

Alachua County Housing Authority 703 NE 1<sup>st</sup> Street Gainesville, FL

THE CONTRACTOR: (Name, legal status and address)

## TBD

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 **OWNER'S INSURANCE**
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

#### ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201<sup>TM</sup>–2017, General Conditions of the Contract for Construction.

#### ARTICLE A.2 **OWNER'S INSURANCE**

## § A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

#### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An Additions and Deletions Report that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with ATA Document A201™-2017, General Conditions of the Contract for Construction. Article 11 of A201<sup>™</sup>-2017 contains additional insurance provisions.





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1

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## § A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

## § A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sublimits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss

Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows: (Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

## § A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

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2

## § A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[ « »] § A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

« »

[ « »] § A.2.4.2 Ordinance or Law Insurance, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

« »

[ « »] § A.2.4.3 Expediting Cost Insurance, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

« »

[ « »] § A.2.4.4 Extra Expense Insurance, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

« »

[ « »] § A.2.4.5 Civil Authority Insurance, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

« »

[«»] § A.2.4.6 Ingress/Egress Insurance, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

« »

[ « »] § A.2.4.7 Soft Costs Insurance, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.



## § A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

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(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to *the description(s) of selected insurance.)* 

[ « »] § A.2.5.1 Cyber Security Insurance for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. (Indicate applicable limits of coverage or other conditions in the fill point below.)

« »

[«»] § A.2.5.2 Other Insurance

(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage Limits

#### ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

## § A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or selfinsured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

## § A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below: (If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

## § A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than (\$2,000,000) each occurrence, (\$4,000,000) general aggregate, and « » (\$ « » ) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- personal injury and advertising injury; .2

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- .3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property:
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- Claims by one insured against another insured, if the exclusion or restriction is based solely on the .1 fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees .4 of the insured.
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- Claims related to roofing, if the Work involves roofing. .8
- Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior .9 coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the Work involves such hazards.
- Claims related to explosion, collapse and underground hazards, where the Work involves such .11 hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than (\$1,000,000) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than (\$1,000,000) each accident, « » (\$ « ») each employee, and « » (\$ « » ) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than  $\ll (\$ \ll )$  per claim and  $\ll (\$ \ll )$  in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than « » (\$ « » ) per claim and « » (\$ « » ) in the aggregate.

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§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than « » (\$ « » ) per claim and « »  $(\$ \ll )$  in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than  $(\$ \otimes )$  per claim and  $(\$ \otimes )$  in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than ( \* ) (\$ ( \* ) ) per claim and ( \* ) (\$ ( \* ) ) in the aggregate.

## § A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the *expiration of the period for correction of Work, state the duration.*)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the *appropriate fill point.*)

[ « »] § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2,3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below: (Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

« »

- [ « »] § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than « » (\$ « » ) per claim and « » (\$ « ») in the aggregate, for Work within fifty (50) feet of railroad property.
- [ « »] § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than « » (\$ « » ) per claim and « » (\$ « » ) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- ( « » ) § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- [ « » ] § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

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6

## [«»] § A.3.3.2.6 Other Insurance

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits	Π	
§ A.3.4 Performance Bond and Payment Bon The Contractor shall provide surety bonds, from in the jurisdiction where the Project is located, (Specify type and penal sum of bonds.)	d n a company or companies la as follows:	wfully authorized to issue surety bonds	
Туре	Pe	nal Sum (\$0.00)	
Payment Bond	1	00% of contract value	
Payment and Performance Bonds shall be AIA Document A312 <sup>TM</sup> , Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312 <sup>TM</sup> , current as of the date of this Agreement.			
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7

## SECTION 00702 SUPPLEMENTARY CONDITIONS

The following supplements modify, amend or delete articles of "General Conditions". Where a portion of the General Conditions is amended, modified or deleted by these Conditions, the unaltered portions of that article, paragraph, subparagraph, or clause shall remain in effect.

## **ARTICLE 1 - GENERAL PROVISIONS**

- 1.2 Correlation and Intent
- 1.2.1.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities:
  - 1. The Agreement.
  - 2. Addenda, with those of later date having precedence over those of earlier date.
  - 3. The Supplementary Conditions.
  - 4. The General Conditions of the Contract for Construction.
  - 5. Specifications
  - 6. Working Drawings, wherein precedence shall be large-scale drawings, over small scale, figured dimensions over scaled dimensions, and noted materials over graphic indications.

## ARTICLE 2 - OWNER

Whenever the term "Owner" is used in the Specification, it shall refer to the Alachua County Housing Authority, 703 NE 1<sup>st</sup> Street, Gainesville, FL 32601.

Any papers delivered to, or notice to or demand upon Owner shall be sufficiently given to the above mentioned address.

## 2.3.6 Delete Subparagraph 2.3.6 and substitute the following:

The Contractor will be furnished PDF files of the Construction Drawings and Specifications project manual. It is the Contractor's responsibility to make all prints required for the project and his subcontractors at no cost to the Owner.

## ARTICLE 3 CONTRACTOR

3.2.2 Supplement Subparagraph 3.2.2 as follows:

The Contractor shall give written notice to the Architect of any materials, equipment or design features which he believes inadequate or unsuitable; in violation of laws, ordinances or rules and regulations of all authorities having jurisdiction over the work; and of any necessary items or work omitted from the Drawings or Specifications.

Should conflict occur between the Contract Documents, the Contractor is deemed to have based his bid on the more costly method unless a specific written interpretation has been made by the Architect prior to the contract execution.

SUPPLEMENTARY CONDITIONS SECTION 00702-1

## 3.4 Labor and Materials

- 3.4.2.1 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set in the General Requirements (Division 1 of the Specifications).
- 3.4.2.2 By making requests for substitutions based on Subparagraph 3.4.3 above, the Contractor
  - 1. represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
  - 2. represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified;
  - 3. certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently becomes apparent; and
  - 4. will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
- 3.4.2.3 Not later than thirty (30) days from the Contract date, the Contractor shall submit for approval, a list showing the name of the manufacturer and /or suppliers and installers proposed to be used for each of the products, equipment and materials that are proposed for use in the project.
- 3.4.2.4 The Architect will reply in writing to the Contractor stating whether the Owner or the Architect, after due investigation, has reasonable objection to any such proposal. If adequate data on any proposed manufacturer or installer is not available, the Architect may state that action will be deferred until the Contractor provides further data. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents, and all products furnished by the listed manufacturer must conform to such requirements.

## 3.5 Warranty

## Add the following subparagraph:

- 3.5.1.1 "Unless otherwise stipulated in the specifications, the Contractor shall guarantee all materials, workmanship, and equipment for a period of one (1) year from the date of final acceptance of the complete project by the Owner."
- 3.6 <u>Taxes</u>

Add the following to 3.6:

Upon completion of the work, contractors shall furnish the Owner with a certified statement to the effect that all sales and use taxes due the Federal Government, State, County and/or Municipality Government have been paid.

#### **ARTICLE 5 - SUBCONTRACTORS**

5.2 Award of Subcontracts and Other Contracts for Portions of the Work.

Add the following to Subparagraph 5.2.1

## SUPPLEMENTARY CONDITIONS SECTION 00702-2

- 5.2.1.1 The Owner reserves the right to require the Contractor to employ certain Subcontractors upon written confirmation.
- 5.2.1.2 Not later than 30 days after the date of commencement, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities proposed as manufacturers for each of the products identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor.

## Add the following to Subparagraph 7.1.4:

The following form shall be used to provide an itemized accounting of changes to the 7.1.4 Work.

#### WORK BY THE PRIME CONTRACTORS OWN FORCES: 1.

(a)	Materials	(itemized breakdown)	\$
(b)	Labor	(itemized breakdown) Sub-Total (1)	\$ \$
(C)	* <u>Rent of Equipment</u>	(itemized breakdown) Sub-Total (2)	\$ \$
(d)	Overhead & Profit	Total (1)	\$
2.	WORK BY SUB-CONTRACTOR (IF APPLICABLE):		
(a)	Materials	(itemized breakdown)	\$
(b)	Labor	(itemized breakdown) Sub-Total (3)	\$ \$
(C)	* <u>Rent of Equipment</u>	(itemized breakdown) Sub-Total (4)	\$ \$
(d)	Overhead & Profit		\$
		Sub-Total (5)	\$
(e)	Prime Contractor's Overhead and Profit		\$
		Total (2)	\$
(f)	Insurance (Workmen's Social Security or as ot Specified)	Compensation, herwise required and/or	\$

## (g) Guarantee Bond (on Totals 1 and/or 2 as applicable) Total (3)

• Rates not in excess of those prevailing in areas. (Note: The Architect shall carefully review the change orders for cost of materials and estimates

SUPPLEMENTARY CONDITIONS
SECTION 00702-3

For labor to insure that normal rental costs and times are used for work units established by Estimating guides generally applicable for the locality of the project.)

## ARTICLE 9 PAYMENTS AND COMPLETION

- 9.3 Application for Payment
- 9.3.1 The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet. Four copies shall be submitted.

All progress payment requests received by the Architect by the 25<sup>th</sup> day of the month and in satisfactory form for approval will be paid by the owner to the Contractor within 30 days.

9.4 <u>Certificates for Payment</u>

#### Add the following Subparagraph:

9.4.3 Certificates for payment will be issued for ninety percent (90%) of the value of the materials properly stored at the site and work done if in full compliance with the contract during the preceding calendar month, provided the progress made is such to indicate with the completion of all work done under the contract is within the specified time. The remaining ten percent (10%) shall be retained until the final completion of the contract and final acceptance by the Architect.

Retained percentages are held for the sole protection and benefit of the Owner, and no other person, firm or corporation shall have or assert any lien, claims, right of priority herein or thereto or be entitled to receive any part thereof. The retained funds will be released only if there are no sureties on the project that have been filed as of said time and provided further that all required lien releases under the Contract documents have been filed and furnished with the appropriate party.

## 9.8 Substantial Completion

## 9.8.1 Add the following Sentence:

Substantial completion will have been reached when, in the Architect's opinion, the Work is 100% complete with the exception of a few minor items delayed for reasons beyond the control of the Contractor. However, items late in completion because of the Contractor's negligence or lack of foresight will not be deemed valid exceptions. The project must have a valid, legal "Certificate of Occupancy".

#### 9.8.2 Add the following Sentence:

Upon execution of the Certificate of Substantial Completion, the Contractor is entitled to then submit an Application for Payment to increase the total payments to 100 percent (100%) of the Contract Sum, less such amounts, as the Architect shall determine for incomplete Work and unsettled claims.

## ARTICLE 11 INSURANCE AND BONDS

## 11.1 <u>Contractor's Insurance and Bonds</u>

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out
of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

## 11.1.2 Delete Subparagraph 11.1.2 and substitute the following:

The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100 percent of the Contract Sum.

11.1.2.1 The Contractor shall deliver the required bonds to the Owner not later than seven (7) Days, following the date the Agreement is entered into, or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

## SECTION 00711 SUPPLEMENTARY GENERAL CONDITIONS

## PART I – GENERAL

## 1.01 SCOPE

- A. This Section sets forth the modifications and additions to the General Conditions of the contract for Construction HUD-5370 (1/2014)
- B. In those instances that a Clause of the General Conditions is amended, modified, voided, or superseded by the Agreement, the provisions of such Clause not specifically amended, modified, voided or superseded shall remain in effect. Should a conflict exist between the provisions of the Agreement and those of the specifications, the requirements of the Agreement shall apply.

## 1.02 MODIFICATIONS AND ADDITIONS

- A. Article 1 Definitions
  - 1. Clause 1 (c) shall have the following added: The term Contracting Office refers to OWNER NAME & ADDRESS.
  - 2. Clause 1 (h) shall have the following added: The term \_\_\_\_\_ or Owner refers to the Housing Authority.
- B. Clause II Contractor's Responsibility for Work Add the following subclauses;
  - 1. The Contractor shall be responsible for cutting, fitting or patching, required to complete the Work or to make its parts fit together properly.
  - 2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Housing Authority or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Housing Authority or a separate contractor except with written consent of the Housing Authority and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Housing Authority or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.
- C. Clause 9 Specifications and Drawings for Construction: Paragraph (a) delete the sentence, "In case of discrepancies between drawing and specifications, the specifications shall govern."
- D. Clause 13 Health, Safety & Accident Precaution Add the following subclauses:
  - 1. To the fullest extent permitted by law, the contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including loss of use resulting therefrom, but only to the extent caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

## SUPPLEMENTARY GENERAL CONDITIONS SECTION 00711 -- 1

Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this subclause. The Contractor for and in consideration of ten (\$10) Dollars and other good valuable considerations shall provide aforementioned indemnification.

- 2. In claims against any person or entity indemnified under this subclause (f) by an employee of the Contractor, or Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this subclause shall not be limited by limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workmen's compensation acts, disability benefits acts or other employee benefit acts.
- 3. The obligations of the Contractor under this Clause shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architects, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.
- E. Clause 27 Payments Add the following subclause:
  - 1. The Architect may decide not to certify payment and may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if the Architect's opinion the representation to the Owner required by Clause 27 (i) cannot be made. The amount of the Application, the Architect will notify the Contractor and Owner. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also decide not to certify payment because of subsequently discovered evidence or subsequent observations may nullify the whole or part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss because of:
    - a. defective Work not remedied;
    - b. third party claims filed or reasonable evidence indicating probable filing of such claims;
    - c. failure of the Contractor to make payments properly to Subcontractors for labor, materials or equipment;
    - d. reasonable evidence that the Work cannot be completed for the unpaid balance of the contract Sum;
    - e. damage to the Owner or another contractor;
    - f. reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
    - g persistent failure to carry out the Work in accordance with the Contractor Documents.
- F. Clause 36 Insurance, subclause (b); delete last sentence. The Contractor is required to carry Builders Risk Insurance.

SUPPLEMENTARY GENERAL CONDITIONS
SECTION 007112

- G. Clause 38 Contractor/Subcontracting with Small and minority Firms, Women's Business Enterprise and Labor Surplus Area Firms add the following subclauses;
  - 1. CMBE Participation Goal 15% of Base of bid;
  - 2. Each bidder shall meet, exceed or demonstrate that it could not meet, despite its good faith efforts, the project goal of the Housing Authority.
  - 3. Attached to and hereby incorporated in the Contract Documents is a MBE Utilization Summary, which must be submitted with Contractor's bid. Award of the Contract shall be conditioned upon submission of the MBE participation information and upon satisfaction of the project goal or, if the goal is not met, upon demonstration that good faith efforts were made to meet the goals. Failure to satisfy these requirements shall result in the bid being deemed nonresponsive and rejected. If the Utilization Summary does not indicate the goal has been met, then the Contractor must dispatch for overnight delivery to the Housing Authority all documentation of good faith effort not later than two (2) working days after notification has not been met.
  - 4. If the apparent low bidder is determined not to have made a good faith effort, the Housing Authority will review the next lowest apparent responsive bid. This process will be repeated until a responsible bid is found.
- H. Clause 41, delete in its entirety.

# MINORITY BUSINESS ENTERPRISE (MBE) UTILIZATION SUMMARY

Prime Contractor \_\_\_\_\_

## PROJECT NAME

Base Bid \$

Total MBE Goal \$\_\_\_\_\_

Certified MBE Contractor's /Subcontractor's Name &	Trade	Dollar Amount
Address		

Total Dollar Amount Achieved for MBE Goal \$

MBE Percentage of Base Bid Achieved 15% (Percentage may be rounded to the nearest tenth %)

Note: If the Utilization Summary Form does not indicate that the goal has been met, then the prime contractor must dispatch for overnight delivery to the Housing Authority all documents of good faith effort not later than two (2) working days after notification that the goal has not been met.

Certified true and correct by:

Title

Date

## **SPECIFICATIONS**

## Part I General Conditions:

- A. General conditions of HUD Form 51915-A, shall form a part of these specifications.
- B. Contractor shall comply with all local licensing and registration regulations.
- C. Contractor shall maintain adequate casualty and workmen's compensation insurance.
- D. Job site shall be maintained in a neat and organized manner throughout the duration of this job.
- E. Contractor shall comply with all local and OSHA regulations.
- F. <u>General</u> contractor shall submit a "Partial Release of Lien" to Housing Authority at the time of each draw and a full "Release of Lien" prior to or at the time of final payment to render the project free of any liens.
- G. Contractor to give 48 hour notice to Housing Authority before entering any unit.
- H. <u>General contractor agrees not to subcontract or assign any portion of this work without</u> Owner's written approval.
- Part ( ) Inspections:
  - A. Periodic, unannounced inspections may be made at any time by the appropriate Housing Authority representative. These inspections do not relieve the contractor from his responsibility of proper workmanship and specification compliance. Manufacturer does not warrant the contractor's workmanship, and our inspections do not guarantee that the job has been done correctly. If we discover deficiencies, the contractor will be informed and expected to take corrective action. The inspections are merely an attempt to reduce mistakes and provide a better chance for success of the system. Failures resulting from inadequate preparation, improper installation, or any other reason other than defect in the manufacturer used are not covered.

## Part ( ) Clean Up:

A. All building and grounds shall be left in the same state of cleanliness as was found before job commencement.

## SECTION 00800

## WAGE DETERMINATION

## PART I - GENERAL

## **DESCRIPTION OF WORK**

General Decision #FL20220052 dated February 25, 2022, of six (6) pages, follows this Section and is hereby included in the Project Manual and are incorporated into the Contract Documents.

Only Davis-Bacon Wage Rate issued by the U. S. Department of Housing & Urban Development are applicable. No State rates are applicable.

## **END OF SECTION**

WAGE DETERMINATION SECTION 00800-1 "General Decision Number: FL20220052 02/25/2022

Superseded General Decision Number: FL20210052

State: Florida

Construction Type: Residential

County: Alachua County in Florida.

RESIDENTIAL CONSTRUCTION PROJECTS (consisting of single family homes and apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	<ul> <li>Executive Order 14026 generally applies to the contract.</li> <li>The contractor must pay all covered workers at least \$15.00 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2022.</li> </ul>
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul> <li>Executive Order 13658 generally applies to the contract.</li> <li>The contractor must pay all covered workers at least \$11.25 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2022.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://www.dol.gov/agencies/whd/government-contracts.

Modification	Number	Publication	Date
0		01/07/2022	
1		02/25/2022	

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ENGI0925-008 06/01/2013

	Rates	Fringes
POWER EQUIPMENT OPERATOR: Crawler Cranes; Truck Cranes; Pile Driver Cranes; Rough Terrain		
Cranes; and Any Crane not otherwise described below Hydraulic Cranes Rated 100 Tons or Above but Less Than 250 Tons; and Lattice	.\$ 29.61	11.50
Boom Cranes Less Than 150 Tons if not described below Lattice Boom Cranes Rated at 150 Tons or Above; Friction Cranes of Any Size; Mobile Tower Cranes or Luffing Boom Cranes of Any Size; Electric Tower Cranes; Hydraulic Cranes Rated at 250 Tons or Above; and Any Crane Equipped with 300 Foot or More of Any Boom	.\$ 30.61	11.50
Combination Oiler	.\$ 31.61 .\$ 22.91	11.50 11.50
SHEE0435-004 04/01/2021		
	Rates	Fringes
SHEET METAL WORKER (Including HVAC Duct Installation)	.\$ 26.41	15.19
* SUFL2009-091 06/08/2009		
	Rates	Fringes
BRICKLAYER	.\$ 20.00	0.00
CARPENTER, Includes Cabinet Installation (Excludes Drywall Hanging)	.\$ 12.15 **	0.00
CEMENT MASON/CONCRETE FINISHER	.\$ 12.83 **	0.00
DRYWALL HANGER	.\$ 15.00	0.00
ELECTRICIAN	.\$ 11.47 **	0.00
INSULATOR: Batt and Blown	.\$ 10.04 **	0.00
IRONWORKER, STRUCTURAL, REINFORCING AND ORNAMENTAL	.\$ 9.00 **	0.00
LABORER: Common or General	.\$ 9.06 **	0.00
LABORER: Mason Tender - Brick		
	.\$ 11.51 **	0.00

4/25/22, 2:13 PM	SAM.gov	
LABORER: Pipelayer\$ 10.08 **	0.00	
LABORER: Roof Tearoff\$ 9.00 **	0.00	
LABORER: Landscape and Irrigation\$ 8.90 **	0.00	
OPERATOR: Asphalt Paver\$ 11.63 **	0.00	
OPERATOR: Backhoe Loader Combo\$ 17.04	0.00	
OPERATOR: Backhoe/Excavator\$ 12.72 **	0.00	
OPERATOR: Bulldozer\$ 12.40 **	0.00	
OPERATOR: Distributor\$ 11.41 **	0.00	
OPERATOR: Forklift\$ 17.50	0.00	
OPERATOR: Grader/Blade\$ 15.50	0.00	
OPERATOR: Loader\$ 12.28 **	0.00	
OPERATOR: Roller\$ 10.59 **	0.00	
OPERATOR: Screed\$ 10.93 **	0.00	
OPERATOR: Trackhoe\$ 15.68	0.00	
OPERATOR: Tractor\$ 10.20 **	0.00	
PAINTER: Brush, Roller and Spray\$ 11.28 **	0.00	
PLASTERER\$ 13.94 **	0.00	
PLUMBER\$ 11.61 **	0.00	
ROOFER, Includes Built Up, Modified Bitumen, and Shake & Shingle Roofs (Excludes Metal		
Roofs)\$ 9.77 **	0.00	
ROOFER: Metal Roof\$ 16.99	0.00	
TRUCK DRIVER: Dump Truck\$ 10.62 **	0.00	
TRUCK DRIVER: Lowboy Truck\$ 12.14 **	0.00	
WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.		

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$15.00) or 13658 (\$11.25). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this 4/25/22, 2:13 PM

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contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at

https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

\_\_\_\_\_

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

#### WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

> Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W.

#### Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

\_\_\_\_\_

END OF GENERAL DECISIO"

## SECTION 01010 SUMMARY OF WORK

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 DESCRIPTION OF WORK

- A. The project located at 703 NE 1<sup>st</sup> Street, Gainesville, FL 32601, consists of the following as noted below:
  - 1. Demolish walls, doors and fireplace to divide two open spaces into four private offices as indicated on drawings.
  - 2. Provide/reconfigure HVAC supply and return as indicated on the drawings.
  - 3. Provide additional power and data lines as indicated on the drawings.
  - 4. Owner is providing environmental test to confirm if any asbestos is within the unit.a. If asbestos is identified, Owner to separately contract for the asbestos removal prior to proceeding with this scope of work.
  - 5. Patch and repair existing walls, ceilings and floors to match existing as necessary
  - 6. Furniture to be provided by owner (NIC)

## 1.03 COMMENCEMENT OF WORK

A. Preparation: Properly prepare work to receive subsequent work or finish. Notify Architect if any work is unsatisfactory to receive subsequent work or finish and receive instruction before proceeding.

## 1.04 LAYOUT OF WORK

- A. Execution: The Contractor shall employ, or have in his employ, a competent Engineer who shall establish a permanent bench mark and general reference points, to which easy access may be had by all the Contractors and Subcontractors, for use in determining all levels, lines and grades and for verification from time to time during the progress of the work. It is the duty of each Contractor or Subcontractors to lay out his own work, take his own measurements, grades and levels, and be responsible for their proper correlation to the entire project, except that the Contractor shall lay out the partitions on the forms or rough floors as a guide to the Trades.
- B. Coordination: Report inconsistencies between the Drawings and the actual size to the Architect and receive instructions before commencing work.

## 1.05 USE OF SITE

A. Contractor may utilize the portion of the site designated by the Owner at the time of the pre-construction meeting.

## 1.06 WORK SEQUENCE

A. The various phases of the work shall be executed in the following sequence, unless the Architect receives express permission of the Owner to permit specific variations requested by the Contractor.

SUMMARY OF WORK SECTION 01010-1

## 1.07 OWNER FURNISHED ITEMS

- A. The following is a list of the items which shall be furnished by the Owner and installed by the Contractor:
  - 1. TBD.
- B. The following is a list of the items, which shall be furnished and installed by the Owner. Rough-ins and all final connections are by the General Contractor.1. TBD.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION Not used

## SECTION 01020 ALLOWANCES

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements governing allowances.
  - 1. Selected materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
  - 1. Lump-sum allowances.
  - 2. Unit-cost allowances.
  - 3. Contingency allowances.
  - 4. Inspection and testing allowances.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Modification Procedures" specifies procedures for submitting and handling Change Orders.
  - 2. Division 1 Section "Quality Control Services" specifies procedures governing the use of allowances for inspection and testing.

## 1.03 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise the Architect of the date when the final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At the Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by the Architect from the designated supplier.

## 1.04 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to show the actual quantities of materials delivered to the site for use in fulfillment of each allowance.

ALLOWANCES SECTION 01020 - 1

## 1.05 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed for the Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. The Contractor's related costs for products and equipment ordered by the Owner under the contingency allowance are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to the Owner by Change Order.

### 1.06 INSPECTION AND TESTING ALLOWANCES

- A. Inspection and testing allowances include the cost of engaging the inspection or testing agencies, the actual inspections and tests, and reporting the results.
- B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting upon failure of previous tests and inspections.
- C. Costs of services not required by the Contract Documents are not included in the allowance.
- D. At Project closeout, credit unused amounts remaining in the inspection and testing allowance to Owner by Change Order.

#### 1.07 UNUSED MATERIALS

- A. Return unused materials to the manufacturer or supplier for credit to the Owner, after installation has been completed and accepted.
  - When requested by the Architect, prepare unused material for storage by Owner where it is not economically practical to return the material for credit. When directed by the Architect, deliver unused material to the Owner's storage space. Otherwise, disposal of unused material is the Contractor's responsibility.

#### PART 2 - PRODUCTS - Not Used

#### **PART 3 - EXECUTION**

#### 3.01 EXAMINATION

A. Examine products covered by an allowance promptly upon delivery for damage or defects.

#### 3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

## 3.03 SCHEDULE OF ALLOWANCES

A. Allowance No. 1:

## END OF SECTION

## ALLOWANCES SECTION 01020 - 2

## SECTION 01026 UNIT PRICES

## PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Division 1 Section "Quality Control Services" for general inspection requirements.

## 1.03 **DEFINITIONS**

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

## 1.04 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, profit, and applicable taxes.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.
- D. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

## PART 2 – PRODUCTS - Not Used

## PART 3 - EXECUTION

## 3.01 UNIT PRICE SCHEDULE

A. Unit Price No. 1 -

UNIT PRICES SECTION 01026 - 1

- 1. Description: Remove and replace existing wood sub-flooring and replace with new 34 inch plywood sub-flooring.
- B. Unit Price No. 2 -
  - 1. Description:
  - 2. Unit of Measurement:
- C. Unit Price No. 3 -
  - 1. Description:
  - 2. Unit of Measurement:
- D. Unit Price No. 4 -
  - 1. Description:
  - 2. Unit of Measurement:
- E. Unit Price No. 5 -
  - 1. Description:
  - 2. Unit of Measurement:

## SECTION 01030 ALTERNATES

## PART I - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions and all other parts of this Specification Project Manual apply to the Work of this section.

## **1.02 DESCRIPTION OF REQUIREMENTS**

- A. Definition: An alternate is an amount proposed by the Bidders and stated on the Bid Form that will add to or deduct from the Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installations methods described in Contract Documents.
- B. Included as part of each alternate, all costs relative to the alternate including but not limited to overhead, insurances, permits, fees, labor, material, equipment, miscellaneous devices, appurtenances and all items incidental to or required for a complete alternate whether or not mentioned as part of the alternate.
- C. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted alternate is complete and fully integrated into the project.
- D. Schedule: A "Schedule of Alternates" is included at the end of this section. Specification sections referenced in the schedule contain requirements for materials and methods necessary to achieve the work described under each alternate.
- E. The Description herein for each alternate is recognized to be incomplete and abbreviated, but implies that each change must be complete for the scope of work affected. Refer to applicable specification sections (Division 1 through 16), and to applicable drawings for specific requirements of work, regardless of whether references are so noted in description of each alternate. Coordinate relative work and modify surrounding work as required to properly integrate the work of each alternate. It is recognized that descriptions of alternates are primarily scope definitions, and do not necessarily detail full range of materials and processes needed to complete the work as required.

## PART 2 - PRODUCTS - Not Used

## PART 3 - EXECUTION

## 3.01 SCHEDULE OF ALTERNATES:

A. ALTERNATE NO. 1: (Price Required)

The additional cost to provide a 100% Performance Bond, and a 100% Labor and Material Payment Bond as per Article 7 of the General Conditions. The cost for the bonds is not to be included in the Base Bid Price.

## ALTERNATES SECTION 01030-1

B. ALTERNATE NO. 2: (Price Required)

Cost to provide Builder's Risk Insurance per Article 11 of the General Conditions. The cost for the Builder's Risk Insurance is not to be included in the Base Bid.

# SECTION 01035 MODIFICATION PROCEDURES

## PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
  - 1. Multiple Prime Contracts: Provisions of this Section apply to the work of each prime contractor.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
  - 2. Division 1 Section "Unit Prices" for administrative requirements governing use of unit prices.
  - 3. Division 1 Section "Submittals" for requirements for the Contractor's Construction Schedule.
  - 4. Division 1 Section "Applications for Payment" for administrative procedures governing Applications for Payment.
  - 5. Division 1 Section "Product Substitutions" for administrative procedures for handling requests for substitutions made after award of the Contract.

## 1.03 MINOR CHANGES IN THE WORK

A. The Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on AIA Form G710, Architect's Supplemental Instructions.

## 1.04 CHANGE ORDER PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: The Architect will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal requests issued by the Architect are for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
  - 2. Within 20 days of receipt of a proposal request, submit an estimate of cost necessary to execute the change to the Architect for the Owner's review.
    - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.

MODIFICATION PROCEDURES SECTION 01035 - 1

- c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
- B. Contractor-Initiated Proposals: When latent or unforseen conditions require modifications to the Contract, the Contractor may propose changes by submitting a request for a change to the Architect.
  - 1. Include a statement outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.
  - 2. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Comply with requirements in Section "Product Substitutions" if the proposed change requires substitution of one product or system for a product or system specified.
- C. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

## 1.05 ALLOWANCES

- A. Allowance Adjustment: For allowance-cost adjustment, base each Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the final measurement of work-in-place. Where applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
  - 1. Include installation costs in the purchase amount only where indicated as part of the allowance.
  - 2. When requested, prepare explanations and documentation to substantiate the margins claimed.
  - 3. Submit substantiation of a change in scope of work claimed in the Change Orders related to unit-cost allowances.
  - 4. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or the Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. The Owner will reject claims submitted later than 21 days.
  - 1. Do not include the Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in Contract Documents.
  - 2. No change to the Contractor's indirect expense is permitted for selection of higher or lower-priced materials or systems of the same scope and nature as originally indicated.

## 1.06 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: When the Owner and the Contractor disagree on the terms of a Proposal Request, the Architect may issue a Construction Change Directive on AIA Form G714. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. The Construction Change Directive contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

## 1.07 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Proposal Request, the Architect will issue a Change Order for signatures of the Owner and the Contractor on AIA Form G701.

## PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

Not Used

## SECTION 01039 COORDINATION AND MEETINGS

## PART I - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 DESCRIPTION OF WORK

- A. Coordination
- B. Field Engineering
- C. Pre-Construction Conference
- D. Progress Meetings

## 1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs. A meeting amongst all trades, specifically fire, plumbing and mechanical contractors for the purpose of determining sequencing of tasks so as to not conflict with other installations is suggested and the sole responsibility of the General Contractor. See Mechanical specifications for further direction.
- D. In finished areas, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion.

## 1.04 FIELD ENGINEERING

- A. Contractor to employ a Land Surveyor registered in the State of Florida.
- B. Contractor to locate and protect survey control and reference points.
- C. Control datum for survey that is established by Owner provided survey.

- D. Contractor to provide field engineering services. Establish elevations, lines and levels, utilizing recognized engineering survey practices.
- E. Submit a copy of registered site drawing and certificate signed by the Land Surveyor that the elevations and locations of the work are in conformance with the Contract Documents.

## 1.05 CUTTING AND PATCHING (WHERE REQUIRED)

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written report in advance of cutting or altering elements which affects:
  - 1. Structural integrity of element.
  - 2. Integrity of weather-exposed or moisture-resistant elements.
  - 3. Efficiency, maintenance or safety of element.
  - 4. Visual qualities of sight exposed elements.
- C. Execute cutting, fitting and patching, including excavation and fill, to complete Work and to:
  - 1. Fit the several parts together, to integrate with other Work.
  - 2. Uncover Work to install or correct ill-timed Work.
  - 3. Remove and replace defective and non-conforming Work.
  - 4. Remove samples of installed Work for testing.
  - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods which will avoid damage to other Work, and provide surfaces to receive patching and finishing.
- E. Cut rigid materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify any hazardous substance or condition exposed during the Work to the Architect/Engineer for decision of remedy.

## **1.06 PRECONSTRUCTION CONFERENCE**

- A. Architect/Engineer will schedule a conference after Contract Negotiation is complete.
- B. Attendance Required: Owner, Architect/Engineer and General Contractor.
- C. Agenda:
  - 1. Submission of executed bonds and insurance certificates.
  - 2. Distribution of Contract Documents.
  - 3. Submission of list of Subcontractors, schedule of shop drawings, list of Products, schedule of values and progress schedule.

COORDINATION AND MEETINGS SECTION 01039-2

- 4. Designation of personnel representing the parties in Contract, Threshold Inspector and the Architect/Engineer.
- 5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
- 6. RFI procedure/process
- 7. Scheduling
- 8. Project Clean-up.
- 9. Project Coordination.

## 1.07 **PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work at bi-weekly intervals or as determined during the pre-construction meeting.
- B. Make arrangements for meetings, prepare agenda with copies of participants, preside at meetings, record minutes, and distribute copies to Architect/ Engineer, Owner, participants, and those affected by decisions made.
- C. Attendance Required: General contractor's job superintendent and project manager, Owner or owner's representative, Architect/Engineer, as appropriate to agenda topics for each meeting.
- D. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations.
  - 4. Identification of problems which impede planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Review of off-site fabrication and delivery schedules.
  - 7. Maintenance of progress schedule.
  - 8. Corrective measures to regain projected schedules.
  - 9. Planned progress during succeeding work period.
  - 10. Coordination of projected progress.
  - 11. Maintenance of quality and work standards.
  - 12. Effect of proposed changes on progress schedule and coordination.
  - 13. Other business relating to Work.

## PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

Not Used

**END OF SECTION** 

COORDINATION AND MEETINGS SECTION 01039-3

## SECTION 01040 COORDINATION

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
  - 1. General project coordination procedures.
  - 2. Conservation.
  - 3. Coordination Drawings.
  - 4. Administrative and supervisory personnel.
  - 5. Cleaning and protection.

## 1.03 **RELATED SECTIONS**

- A. Division 1 Section "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.
- B. Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
- C. Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
- D. Division 1 Section "Materials and Equipment" for coordinating general installation.
- E. Division 1 Section "Contract Closeout" for coordinating contract closeout.

## 1.04 COORDINATION

- A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
  - 3. Make provisions to accommodate items scheduled for later installation.
- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

COORDINATION SECTION 01040 - 1

- 1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of schedules.
  - 2. Installation and removal of temporary facilities.
  - 3. Delivery and processing of submittals.
  - 4. Progress meetings.
  - 5. Project closeout activities.
- D. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

## 1.05 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.
  - 1. Show the relationship of components shown on separate Shop Drawings.
  - 2. Indicate required installation sequences.
  - 3. Comply with requirements contained in Section "Submittals."
- B. Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
  - 1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

## PART 2 - PRODUCTS

Not Used

## **PART 3 - EXECUTION**

## 3.01 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

COORDINATION SECTION 01040 - 2

## 3.02 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading.
  - 2. Excessive internal or external pressures.
  - 3. Excessively high or low temperatures.
  - 4. Thermal shock.
  - 5. Excessively high or low humidity.
  - 6. Air contamination or pollution.
  - 7. Water or ice.
  - 8. Solvents.
  - 9. Chemicals.
  - 10. Light.
  - 11. Radiation.
  - 12. Puncture.
  - 13. Abrasion.
  - 14. Heavy traffic.
  - 15. Soiling, staining, and corrosion.
  - 16. Bacteria.
  - 17. Rodent and insect infestation.
  - 18. Combustion.
  - 19. Electrical current.
  - 20. High-speed operation.
  - 21. Improper lubrication.
  - 22. Unusual wear or other misuse.
  - 23. Contact between incompatible materials.
  - 24. Destructive testing.
  - 25. Misalignment.
  - 26. Excessive weathering.
  - 27. Unprotected storage.
  - 28. Improper shipping or handling.
  - 29. Theft.
  - 30. Vandalism.

## **END OF SECTION**

COORDINATION SECTION 01040 - 3

## SECTION 01045 CUTTING AND PATCHING

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 DESCRIPTION OF WORK

A. This Section includes administrative and procedural requirements for cutting and patching.

## 1.03 RELATED SECTIONS

- A. Division 1 Section "Coordination" for procedures for coordinating cutting and patching with other construction activities.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - 1. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 15 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

## 1.04 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures well in advance of the time cutting and patching will be performed if the Owner requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
  - 1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
  - 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
  - 3. List products to be used and firms or entities that will perform Work.
  - 4. Indicate dates when cutting and patching will be performed.
  - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out-ofservice. Indicate how long service will be disrupted.
  - 6. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
  - 7. Approval by the Architect to proceed with cutting and patching does not waive the Architect's right to later require complete removal and replacement of unsatisfactory work.

## 1.05 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.
  - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:
    - a. Foundation construction.

- b. Bearing and retaining walls.
- c. Structural concrete.
- d. Structural steel.
- e. Lintels.
- f. Timber and primary wood framing.
- g. Structural decking.
- h. Stair systems.
- i. Miscellaneous structural metals.
- j. Exterior curtain-wall construction.
- k. Equipment supports.
- I. Piping, ductwork, vessels, and equipment.
- m. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
  - 1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment.
    - b. Air or smoke barriers.
    - c. Water, moisture, or vapor barriers.
    - d. Membranes and flashings.
    - e. Fire protection systems.
    - f. Noise and vibration control elements and systems.
    - g. Control systems.
    - h. Communication systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.
  - 1. If possible retain the original Installer or fabricator to cut and patch the exposed Work listed below. If it is impossible to engage the original Installer or fabricator, engage another recognized experienced and specialized firm.
    - a. Processed concrete finishes.
    - b. Stonework and stone masonry.
    - c. Ornamental metal.
    - d. Matched-veneer woodwork.
    - e. Preformed metal panels.
    - f. Firestopping.
    - g. Window wall system.
    - h. Stucco and ornamental plaster.
    - i. Acoustical ceilings.
    - j. Terrazzo.
    - k. Finished wood flooring.
    - I. Fluid-applied flooring.
    - m. Carpeting.
    - n. Aggregate wall coating.
    - o. Wall covering.

- p. Swimming pool finishes.
- q. HVAC enclosures, cabinets, or covers.

#### 1.06 WARRANTY

A. Existing Warranties: Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

### PART 2 - PRODUCTS

### 2.01 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.
- B. Plaster: Comply with ASTM C 842.
  - 1. Base Coat: Ready-mixed, sand aggregate gypsum plaster base.
  - 2. Finish Coat: Ready-mixed gypsum finish plaster.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
  - 1. Before proceeding, meet at the Project Site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

#### 3.02 **PREPARATION**

- A. Temporary Support: Provide temporary support of work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

## 3.03 **PERFORMANCE**

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
  - 1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

- B. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
  - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamond-core drill.
  - 4. Comply with requirements of applicable Division 2 Sections where cutting and patching requires excavating and backfilling.
  - 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
  - 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
  - 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
  - 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
  - 4. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
- D. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats as indicated.
  - 1. Unless otherwise indicated, provide 3-coat work.
  - 2. Finish gypsum plaster to match existing adjacent surfaces. Sand lightly to remove trowel marks and arrises.
  - 3. Cut, patch, point-up, and repair plaster to accommodate other construction.

## 3.04 CLEANING

A. Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

## END OF SECTION

## SECTION 01200 GENERAL PROVISIONS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Examination of Site.
- B. Drawings and Specifications.
- C. Data and Measure.
- D. Cooperation of Trades.

## 1.03 EXAMINATION OF SITE:

A. Contractor is required to visit the site, compare the drawings and specifications with any work in place, and inform himself as to all conditions, including other work, if any, being performed. Failure to visit the site will in no way relieve the Contractor from necessity of furnishing any materials or performing any work that may be required to complete work in accordance with drawings and specifications without any additional costs to the Owner.

## 1.04 DRAWINGS AND SPECIFICATIONS

- A. These specifications are intended to supplement the drawings and it will not be the province of the specifications to mention any part of the work which the drawings are competent to fully explain in every particular and such omission is not to relieve the Contractor from carrying out portions indicated on the drawings only. Should items be required by these specifications or applicable code requirements and not indicated on the drawings, they are to be supplied even if of such nature that they could have been indicated thereon.
- B. In cases of disagreement between drawings and specifications, or within either drawings or specifications, the better quality or greater quantity of work shall be estimated and the matter referred to the Architect for a decision. Larger scale plans take precedence over smaller. Specifications take precedence over drawings.

## 1.05 DATA AND MEASURE

A. The data given herein and on the drawings is as exact as could be secured. Their absolute accuracy is not guaranteed, and the Contractor shall obtain exact locations, measurements, levels, etc., at the site and shall satisfactorily adapt to his work to the actual conditions of the building. Do not scale prints. Verify all dimensions with the Architect prior to commencing work. Only Architectural drawings may be utilized in calculation. Other drawings (Mechanical, etc.) are diagrammatic or schematic.

GENERAL PROVISIONS SECTION 01200-1

## 1.06 EQUIPMENT AND CONSTRUCTION METHODS

- A. The Contractor shall be responsible for the equipment and methods used in the erection of his work covered by the contract, but the Architect reserves the right to approve such equipment and methods.
- B. If, at any time, the Contractor's working force, in the opinion of the Architect, shall be inadequate for securing the necessary progress, as herein stipulated, the Contractor shall, if so directed, increase the work force or equipment to such extent as to give reasonable assurance of compliance with the schedule of progress, but the failure to make such demand shall not relieve the Contractor of his obligation to secure the quality, the safe conduct of the work, and the rate of progress required by the contract. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliance and methods.
- C. Quality workmanship will be expected. The good appearance of finished work shall be of equal importance with its mechanical efficiency. No makeshifts will be permitted anywhere in the work, and all portions of the work shall be so laid out and installed that the work as a whole is of uniform quality and appearance.

## 1.07 COOPERATION OF TRADES

A. It is the intention of the Contract Documents that the various trades engaged in the work shall cooperate in the execution of the work. The contractors will be expected and required at all times to require cooperation from all sub-contractors engaged in the work. The contractors shall plan the work in such a manner that all parts of the construction will fit in with other parts or sections in a proper manner and at the proper time.

## PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

Not Used
# SECTION 01300 SUBMITTALS

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

#### 1.02 SECTION INCLUDES

- A. Submittal Procedures and Schedule.
- B. Construction progress schedules.
- C. Proposed products list.
- D. Shop drawings.
- E. Product Data.
- F. Samples.
- G. Manufacturers' instructions.
- H. Manufacturers' certificates.
- I. Construction photographs.

#### 1.03 RELATED SECTIONS

- A. Section 01400 Quality Control: Manufacturers' field services and reports.
- B. Section 01700 Contract Closeout: Contract warranty and manufacturers' certificates Closeout certificates.

# 1.04 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form.1. Submit a schedule of submittals in accordance with Section 1.07.
- B. Sequentially number the transmittal forms. Resubmittals to have original number with Alphabetic sequence.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and Detail number(s), and specification Section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimension, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents. All submittals without this stamp of approval or which have not been checked, or only superficially checked, will not be considered and will be returned to the Contractor for resubmission.

SUBMITTALS SECTION 01300 - 1

- E. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.
- F. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed work.
- G. Provide space for Contractor and Architect/Engineer review stamps.
- H. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- I. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- J. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
    - a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
  - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
    - a. Allow 2 weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
    - b. If an intermediate submittal is necessary, process the same as the initial submittal.
    - c. Allow 2 weeks for reprocessing each resubmittal.
    - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- K. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
  - 1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
  - 2. Include the following information on the label for processing and recording action taken.
    - a. Project name.
    - b. Date.
    - c. Name and address of the Architect.
    - d. Name and address of the Contractor.
    - e. Name and address of the subcontractor.
    - f. Name and address of the supplier.

#### SUBMITTALS SECTION 01300 - 2

- g. Name of the manufacturer.
- h. Number and title of appropriate Specification Section.
- i. Drawing number and detail references, as appropriate.
- L. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.
  - 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

#### 1.05 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement for Architect/Engineer review. Include the anticipated amount of each monthly payment that will become due to the Contractor in accordance with the Progress Schedule/
- B. Revise and resubmit as requested by the Architect.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version. No application for payment will be approved until the initial or revised schedule has been received and approved by the architect.
- D. Submit a horizontal bar chart with separate line for each major section of Work, identifying first work day of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Indicate Submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner.

#### 1.06 PROPOSED PRODUCTS LIST

- A. Within 30 days after date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

#### 1.07 SUBMITTAL SCHEDULES

- A. After development and acceptance of the Contractor's Construction Schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for submittal of the Contractor's Construction Schedule.
  - 1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction Schedule.

#### SUBMITTALS SECTION 01300 – 3

- 2. Prepare the schedule in chronological order. Provide the following information:
  - a. Scheduled date for the first submittal.
  - b. Related Section number.
  - c. Submittal category (Shop Drawings, Product Data, or Samples).
  - d. Name of the subcontractor.
  - e. Description of the part of the Work covered.
  - f. Scheduled date for resubmittal.
  - g. Scheduled date for the Architect's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
  - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

#### 1.08 SHOP DRAWINGS

- A. Contractor shall prepare and submit to the Architect 30 days after award of the Contract a schedule of Shop Drawings and Submittals as required in the Contract Documents. Schedule shall fix dates for submission, and the lead time for each submittal as related to the requirements for return receipt. No work shall be fabricated by the Contractor, save at his own risk, until approval of the shop drawings has been obtained.
- B. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 Contract Closeout.
- C. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
  - 1. Dimensions.
  - 2. Identification of products and materials included by sheet and detail number.
  - 3. Compliance with specified standards.
  - 4. Notation of coordination requirements.
  - 5. Notation of dimensions established by field measurement.
  - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by II inches (215 by 280 mm) but no larger than 36 by 48 inches (890 by 1220 mm).
  - 7. Final Submittal: Submit 4 blue- or black-line prints and 2 additional prints where required for maintenance manuals, plus the number of prints needed by the Architect for distribution. The Architect will retain 1 print and return the remainder.
    - a. Alternately, submissions may be sent electronically except for samples for various materials and color selection.
  - 8. At contractor's option, electronic files may be submitted in lieu of hard copy prints. Electronic submittal shall be submitted with the same information as listed above and in Section 1.04 above.

SUBMITTALS SECTION 01300 - 4 9. Do not use Shop Drawings without an appropriate final stamp indicating action taken.

#### 1.09 PRODUCT DATA

- A. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect/Engineer.
- B. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- C. After review, distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 Contract Closeout.

#### 1.10 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors in custom colors, textures, and patterns for Architect/Engineer.
- C. Include identification on each sample, with full Project information.
- D. Submit the number or samples specified in individual specification sections; one of which will be retained by Architect/Engineer.
- E. Reviewed samples, which may be used in the Work, are indicated in individual specification Sections.

#### 1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, (start-up,) adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

#### 1.12 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification sections, submit manufacturers' certificate to Architect/Engineer for review, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

#### 1.13 ARCHITECT'S ACTION

A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.

#### SUBMITTALS SECTION 01300 – 5

- 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
  - 1. Final Unrestricted Release: When the Architect marks a submittal "No Exception Taken," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  - 2. Final-But-Restricted Release: When the Architect marks a submittal "Furnish as Corrected," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  - 3. Returned for Resubmittal: When the Architect marks a submittal "Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
    - a. Do not use, or allow others to use, submittals marked "Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
  - 4. Returned for Resubmittal: When the Architect marks a submittal "Rejected," do not proceed with any work covered by this submittal, including purchasing, fabrication, delivery or any other activity. This submittal does not comply with the Contract Documents or Specifications.
  - 5. Restricted Release: When the Architect marks a submittal "Submit Specified items," work covered by the submittal may proceed provided it complies with the Contract Documents and the Specifications are submitted for Architect review.
  - 6. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
- C. Unscheduled Submittals: The Architect will return unscheduled submittals to the sender without action.

#### 1.14 CONSTRUCTION PHOTOGRAPHS

- A. Each month submit photographs to Architect/Engineer with Application for Payment.
- B. Photograph: Prints; color; 8 x 10 inch; mounted on 8-1/2 x 11 inch soft card stock, with left edge binding margin for three hole punch.
- C. Take two (2) aerial site photographs from differing directions indicating the relative progress of the Work, ten (10) days maximum prior to submitting Application for Payment.
- D. Identify photographs with date, time orientation and project identification.

#### PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

#### **END OF SECTION**

SUBMITTALS SECTION 01300 - 6

# SECTION 01301 PROJECT MANAGEMENT AND COORDINATION

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General coordination procedures.
  - 2. Coordination drawings.
  - 3. Requests for Information (RFIs).
  - 4. Project Web site.
  - 5. Project meetings.
  - 6. Project photographs.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

#### 1.03 **DEFINITIONS**

A. RFI: Request from Owner, Construction Manager, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within seven days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### 1.05 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the

PROJECT MANAGEMENT AND COORDINATION **SECTION 01301 - 1** 

Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

- 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
- 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Pre-installation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

PROJECT MANAGEMENT AND COORDINATION SECTION 01301 - 2

#### 1.06 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  - 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - f. Indicate required installation sequences.
    - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
  - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
  - 2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
  - 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  - 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  - 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  - 6. Mechanical and Plumbing Work: Show the following:
    - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
    - b. Dimensions of major components, such as dampers, valves, diffusers,

# PROJECT MANAGEMENT AND COORDINATION

SECTION 01301 - 3

access doors, cleanouts and electrical distribution equipment.

- c. Fire-rated enclosures around ductwork.
- d. Plan piping sizes and floor penetration arrays within wall assemblies.
- 7. Electrical Work: Show the following:
  - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
  - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
  - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
  - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 8. Fire-Protection System: Show the following:
  - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
- 10. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Division 01 Section "Submittal Procedures."
- 11. Information Technology Rooms: The selected GC is to coordinate with the owner's IT personnel in creating coordination documents and installation of all IT related equipment and infrastructure.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
  - 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
  - 2. File Preparation Format: DWG, Version, operating in AutoCAD Architecture 2016 operating system.
  - 3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
  - 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files upon receipt of completed Cad Request Release form.
    - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
    - b. Digital Data Software Program: Drawings are available in AutoCAD Architecture 2016.
    - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.

#### 1.07 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.

PROJECT MANAGEMENT AND COORDINATION SECTION 01301 - 4

- 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- 3. Construction Progress Meetings: If during the course of a scheduled construction progress meeting, a question is raised and resolved at the meeting, the resolution of the issue will be recorded in the meeting minutes and shall be considered formal direction to proceed under that course of action. The Architect will not issue a separate document echoing that direction, nor shall the Contractor issue a confirming RFI. If the Contractor believes that the direction results in a change in the contract sum or schedule, he shall submit a proposal for consideration by the Owner as stipulated elsewhere in this Section.
- 4. Reference Division 1 section "Progress Management and Coordination".
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect and Construction Manager.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number, date of drawings, revision number, and detail references, as appropriate. The drawing shall be the latest dated drawing issued.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.
  - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.
  - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. EST will be considered as received the following working day.
  - 1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.

- f. Requests for interpretation of Architect's actions on submittals.
- g. Incomplete RFIs or inaccurately prepared RFIs.
- 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
- 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
  - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 7 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. The project website shall generate and update of the RFI log and immediately notify via e-mail the Architect and Owner when an RFI has been posted and the Contractor and/or subcontractors when the RFI has been responded to. The Contractor will be required to distribute the RFI response to affected parties. Review the Owner's or Architect's response and post on the project's website for the Architect's notification within seven days if Contractor disagrees with Architect's response.

Include the following:

- 1. Project name.
- 2. Name and address of Contractor.
- 3. Name and address of Architect and Construction Manager.
- 4. RFI number including RFIs that were returned without action or withdrawn.
- 5. RFI description.
- 6. Date the RFI was submitted.
- 7. Date Architect's response was received.
- F. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
- G. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- H. Identification of related Field Order, Work Change Directive, Proposal Request, as appropriate.
- I. Forms to be used for all RFI are attached to the end of this section.

#### 1.08 **PROJECT WEB SITE**

A. The Contractor shall provide in its bid the cost to provide an interactive project website for the purpose of providing electronic access to project documents generated during the course of construction for all parties involved in the project. The purpose of establishing this website is to cut down on the amount of paper used on the project, to substantially reduce the costs associated with sending documents between parties via postal or delivery services, and to provide time efficiencies in the project for all parties involved. It is up to the Contractor to select the provider of this service. The provider of the interactive website shall be capable of providing training free of charge to the Owner, Architect, the Architect's subconsultants, Contractor, all subcontractors, sub-subcontractors, and suppliers on a scheduled

> PROJECT MANAGEMENT AND COORDINATION SECTION 01301 - 6

basis once the Owner has issued the Notice to Proceed.

- 1. All fees for this service are to be paid by the Contractor.
- B. The types of documents to be hosted on the website include, but may not be limited to, the following:

Architects Supplemental Instructions (ASIs)
Contractor's Schedule of Values
Contractor's List of Key Personnel and Contact Information Contractor's
Construction Schedule
Meeting Minutes
Requests for Information (RFIs) and Responses Product Submittals (except for product samples) Proposal Requests (PRs)
Change Order Proposals (COPs) Change Orders
Construction Change Directives (CCDs) Certificate(s) of Substantial Completion Progress Photographs
Any close-out documents not listed above

- C. All documents to be posted to the project website will be required to be in PDF file format. Photos to be in JPEG file format.
- D. The provider of the interactive website, as part of their services, shall provide a free downloadable document editing software program to be used for providing review comments directly on the posted documents as applicable.

#### 1.09 **PROJECT MEETINGS**

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees two days prior to meeting date.
  - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.
  - 4. Changes to prior minutes shall be noted at the beginning of each meeting and recorded as the first item of business.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
  - 1. Conduct the conference to review responsibilities and personnel assignments.
  - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect progress, including the following:

- a. Tentative construction schedule.
- b. Phasing.
- c. Critical work sequencing and long-lead items.
- d. Designation of key personnel and their duties.
- e. Lines of communications.
- f. Procedures for processing field decisions and Change Orders.
- g. Procedures for RFIs.
- h. Procedures for testing and inspecting.
- i. Procedures for processing Applications for Payment.
- j. Distribution of the Contract Documents.
- k. Submittal procedures.
- I. LEED requirements.
- m. Preparation of record documents.
- n. Use of the premises and existing building.
- o. Work restrictions.
- p. Working hours.
- q. Owner's occupancy requirements.
- r. Responsibility for temporary facilities and controls.
- s. Procedures for moisture and mold control.
- t. Procedures for disruptions and shutdowns.
- u. Construction waste management and recycling.
- v. Parking availability.
- w. Office, work, and storage areas.
- x. Equipment deliveries and priorities.
- y. First aid.
- z. Security.
- aa. Progress cleaning.
- 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, Construction Manager, and Owner's Commissioning Authority of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility requirements.
    - k. Time schedules.
    - I. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.

#### PROJECT MANAGEMENT AND COORDINATION

SECTION 01301 - 8

- p. Acceptability of substrates.
- q. Temporary facilities and controls.
- r. Space and access limitations.
- s. Regulations of authorities having jurisdiction.
- t. Testing and inspecting requirements.
- u. Installation procedures.
- v. Coordination with other work.
- w. Required performance results.
- x. Protection of adjacent work.
- y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Construction Manager will schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
  - 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Construction Manager, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for completing LEED documentation.
    - e. Requirements for preparing operations and maintenance data.
    - f. Requirements for delivery of material samples, attic stock, and spare parts.
    - g. Requirements for demonstration and training.
    - h. Preparation of Contractor's punch list.
    - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - j. Submittal procedures.
    - k. Coordination of separate contracts.
    - I. Owner's partial occupancy requirements.
    - m. Installation of Owner's furniture, fixtures, and equipment.
    - n. Responsibility for removing temporary facilities and controls.
  - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Construction Manager will conduct progress meetings at biweekly intervals.
  - 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner, Owner's Commissioning

PROJECT MANAGEMENT AND COORDINATION **SECTION 01301 - 9** 

Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

- 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    - 1) Review schedule for next period.
  - b. Review present and future needs of each entity present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Resolution of BIM component conflicts.
    - 4) Status of submittals.
    - 5) Deliveries.
    - 6) Off-site fabrication.
    - 7) Access.
    - 8) Site utilization.
    - 9) Temporary facilities and controls.
    - 10) Progress cleaning.
    - 11) Quality and work standards.
    - 12) Status of correction of deficient items.
    - 13) Field observations.
    - 14) Status of RFIs.
    - 15) Status of proposal requests.
    - 16) Pending changes.
    - 17) Status of Change Orders.
    - 18) Pending claims and disputes.
    - 19) Documentation of information for payment requests.
- 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes within three days to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Construction Manager will conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
  - 1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority, Construction Manager, and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and

PROJECT MANAGEMENT AND COORDINATION SECTION 01301 - 10 authorized to conclude matters relating to the Work.

- 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each contractor present, including the following:
    - 1) Interface requirements.
    - 2) Sequence of operations.
    - 3) Resolution of BIM component conflicts.
    - 4) Status of submittals.
    - 5) Deliveries.
    - 6) Off-site fabrication.
    - 7) Access.
    - 8) Site utilization.
    - 9) Temporary facilities and controls.
    - 10) Work hours.
    - 11) Hazards and risks.
    - 12) Progress cleaning.
    - 13) Quality and work standards.
    - 14) Change Orders.
- 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- G. Project Photography
  - 1. General Contractor to provide 5 monthly aerial photos to Owner in hard copy and electronic media.
  - 2. General Contractor to provide weekly photo update to Owner with at least 8 captioned progress photos on PowerPoint format.
- H. Forms: Used as part of the requirements of this section are attached at the end of this section and are as follows:
  - 1. AIA Document AIA G716 2004
  - 2. RFI Evaluation Form

#### PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

#### END OF SECTION

PROJECT MANAGEMENT AND COORDINATION SECTION 01301 - 11

# Math A Bocument G716<sup>™</sup> – 2004

# Request for Information (RFI)

PROJECT:       ISSUE DATE:       RFINO:         PROJECT NUMBERS:       COPIES TO:       REDUESTED REPLY DATE:         PROJECT NUMBERS:       COPIES TO:       References/Reply describe the question or type of information requested.)         REFERENCES/ATTACHMENTS:       (List specific documents researched when seeking the information requested.)         SPECIFICATIONS       DRAWINGS       OTHER         SENDER'S RECOMMENDATION:       If RFT concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)         RECEIVER'S REPLY:       (Provide gnswer to RFI, including cost and/or schedule considerations.)         By:       Det:       Copies to:	TO:	FROM:							
REQUESTED REPLY DATE:         PROJECT NUMBERS:         COPIES TO:         RFI DESCRIPTION: (Fully describe the question or type of information requested.)         SECIFICATIONS         DRAWINGS         OTHER         SENDER'S RECOMMENDATION: (IF RFI concerns à site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)         RECEIVER'S REPLY: (Proyide answer to RFI, including cost and/or schedule considerations.)         By:       Date:       Copies to:	PROJECT:	ISSUE DATE:							
PROJECT NUMBERS: RFI DESCRIPTION: (Fully describe the question or type of information requested.) REFERENCES/ATTACHMENTS: (List specific documents researched when seeking the information requested.) SPECIFICATIONS DRAWINGS OTHER SENDER'S RECOMMENDATION: (If RFI concerns à site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.) RECEIVER'S REPLY: (Provide auswer to RFI, including cost and/or schedule considerations.) By: Date: Copies to:		REQUESTED REPLY DATE:							
RFI DESCRIPTION: (Fully describe the question or type of information requested.)         REFERENCES/ATTACHMENTS: (List specific documents researched when seeking the information requested.)         SPECIFICATIONS       DRAWINGS         OTHER         SENDER'S RECOMMENDATION: (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)         RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.)         By:       Date:	PROJECT NUMBERS:	COPIES TO:							
REFERENCES/ATTACHMENTS: (List specific documents researched when seeking the information requested.) SPECIFICATIONS DRAWINGS OTHER SENDER'S RECOMMENDATION: (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.) RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.) By: Date: Copies to:	RELDESCRIPTION: (Fully describe the question or type	of information requested)							
REFERENCES/ATTACHMENTS: (List specific documents researched when seeking the information requested.)         SPECIFICATIONS       DRAWINGS         SENDER'S RECOMMENDATION: (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)         RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.)         By:       Date:       Copies to:									
SPECIFICATIONS       DRAWINGS       OTHER         SENDER'S RECOMMENDATION: (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.)       RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.)         By:       Date:       Copies to:	REFERENCES/ATTACHMENTS: (List specific documents)	s researched when seeking the information requested.)							
SENDER'S RECOMMENDATION: (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.) RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.) By: Date: Copies to:	SPECIFICATIONS DRAWINGS	OTHER							
RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.) By: Date: Copies to:	SENDER'S RECOMMENDATION: (If RFI concerns a site recommended solution, including cost and/or schedule	or construction condition, the sender may provide a considerations.)							
By: Date: Copies to:	RECEIVER'S REPLY: (Provide answer to RFI, including	cost and/or schedule considerations.)							
•	By: Date:	Copies to:							

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work must be executed in accordance with the Contract Documents.

REQUEST FOR INFORMATION EVALUATION								
	BESSOLO DESIGN GROUP, INC. Bessolo Design Group, 7901 4 <sup>th</sup> St. N., Suite 200, St. Petersburg, Florida 33702							
	Project N	Name:	BDG Project No	o RFI No.				
Date Received: Date of Review: Reviewed by:								
	In accordance with BDG's policy and procedures for evaluating potential Requests for Information (RFI's), a review of the document is conducted to determine if the document is a justifiable and complete request.							
	The attached document is considered a justifiable Request for information (RFI) within the definition of the Contract Documents and has been classified as one of the following categories:							
		Interpretation of Contract Documents		Clarification of Contract Do	cuments			
		Drawing/Plan Clarifications		Constructability Issue				
		Site Condition Issue		Additional Drawings/Specif	ications			

□ The attached RFI is determined to be a justifiable and complete Request for information (RFI), response is noted on the attached document:

This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work, it must be approved and executed by the Owner in accordance with the Contract Documents.

□ The attached RFI is REJECTED due to insufficient required information. The following information is missing and must be included in the RFI:

- □ Specification/Drawing/and detail reference no.
- Clearly state why a response is needed
   GC's own interpretation of the issue
- Clear and concise issue requiring clarification
- Priority of the Request
- Confirm no Change Order Required

GC's proposed response/solution

- Confirm no time extension required
- The attached document is NOT a Request for information (RFI) within the definition of the Contract Documents and therefore has not been reviewed and is being returned to you without a response. The attached document has NOT been entered into the project's RFI Log.

The attached document is considered one or more of the following:

- Project Communication
  Response to
  - □ Request for Substitution/Or Equal Submittal
  - □ Schedule Submittal/Change/Update
  - Construction Deficiency
  - □ Change in Design/Project Scope

- Response to Non-Conformance Notice
- □ Submittal and/or Shop Drawing
- □ Value Engineering Change Proposal
- Addresses Means and Methods
- Other: \_\_\_\_

For evaluation and response in a timely manner, please resubmit the attached document in the proper format as stipulated in the Contract Documents.

#### **SECTION 01302**

#### CONSTRUCTION PROGRESS DOCUMENTATION

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Startup construction schedule.
  - 2. Contractor's construction schedule.
  - 3. Construction schedule updating reports.
  - 4. Daily construction reports.
  - 5. Material location reports.
  - 6. Site condition reports.
  - 7. Special reports.
- B. Related Requirements:
  - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
  - 2. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

#### 1.03 **DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF electronic file.
- B. Startup construction schedule.
  - 1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
  - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
  - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
  - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- F. Construction Schedule Updating Reports: Submit with Applications for Payment.
- G. Daily Construction Reports: Submit with Applications for Payment.
- H. Material Location Reports: Submit with Applications for Payment.

- I. Site Condition Reports: Submit at time of discovery of differing conditions.
- J. Special Reports: Submit at time of unusual event.

# 1.05 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.
- B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones and partial Owner occupancy.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review schedule for work of Owner's separate contracts.
  - 6. Review submittal requirements and procedures.
  - 7. Review time required for review of submittals and resubmittals.
  - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 9. Review time required for Project closeout and Owner startup procedures.
  - 10. Review and finalize list of construction activities to be included in schedule.
  - 11. Review procedures for updating schedule.

#### 1.06 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

# PART 2 - PRODUCTS

#### 2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  - 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  - 4. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Phasing: Arrange list of activities on schedule by phase.
  - 2. Work under More Than One Contract: Include a separate activity for each contract.
  - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  - 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  - 6. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  - 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Subcontract awards.
    - b. Submittals.
    - c. Purchases.
    - d. Mockups.
    - e. Fabrication.
    - f. Sample testing.
    - g. Deliveries.
    - h. Installation.
    - i. Tests and inspections.
    - j. Adjusting.
    - k. Curing.

- I. Building flush-out.
- m. Startup and placement into final use and operation.
- 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
  - a. Structural completion.
  - b. Temporary enclosure and space conditioning.
  - c. Permanent space enclosure.
  - d. Completion of mechanical installation.
  - e. Completion of electrical installation.
  - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
  - 1. See Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

#### 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 7 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.

- 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 20 days after date established for the notice to Proceed.
  - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
- 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
- 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
- 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
  - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing.
    - j. Punch list and final completion.
    - k. Activities occurring following final completion.
  - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  - 3. Processing: Process data to produce output data on a computer-drawn, timescaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  - 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
  - 5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the

amount of 5 percent of the Contract Sum.

- a. Each activity cost shall reflect an appropriate value subject to approval by Architect.
- b. Total cost assigned to activities shall equal the total Contract Sum.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
  - 1. Contractor or subcontractor and the Work or activity.
  - 2. Description of activity.
  - 3. Main events of activity.
  - 4. Immediate preceding and succeeding activities.
  - 5. Early and late start dates.
  - 6. Early and late finish dates.
  - 7. Activity duration in workdays.
  - 8. Total float or slack time.
  - 9. Average size of workforce.
  - 10. Dollar value of activity (coordinated with the schedule of values).
- G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
  - 1. Identification of activities that have changed.
  - 2. Changes in early and late start dates.
  - 3. Changes in early and late finish dates.
  - 4. Changes in activity durations in workdays.
  - 5. Changes in the critical path.
  - 6. Changes in total float or slack time.
  - 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
  - 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
  - 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
  - 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
  - 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
    - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

# 2.3 **REPORTS**

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. List of separate contractors at Project site.
  - 3. Approximate count of personnel at Project site.
  - 4. Equipment at Project site.
  - 5. Material deliveries.
  - 6. High and low temperatures and general weather conditions, including presence of rain or snow.
  - 7. Accidents.
  - 8. Meetings and significant decisions.
  - 9. Unusual events (see special reports).
  - 10. Stoppages, delays, shortages, and losses.
  - 11. Meter readings and similar recordings.
  - 12. Emergency procedures.
  - 13. Orders and requests of authorities having jurisdiction.
  - 14. Change Orders received and implemented.
  - 15. Construction Change Directives received and implemented.
  - 16. Services connected and disconnected.
  - 17. Equipment or system tests and startups.
  - 18. Partial completions and occupancies.
  - 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
  - 1. Material stored prior to previous report and remaining in storage.
  - 2. Material stored prior to previous report and since removed from storage and installed.
  - 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

#### 2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Architect within 1 day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

#### **PART 3 - EXECUTION**

#### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

#### **END OF SECTION**

# SECTION 01303 PHOTOGRAPHIC DOCUMENTATION

# PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Preconstruction photographs.
  - 2. Periodic construction photographs.
  - 3. Final completion construction photographs.

#### B. Related Requirements:

- 1. Division 01 Section "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
- 2. Division 01 Section "Submittal Procedures" for submitting photographic documentation as project record documents at project closeout.
- 3. Division 01 section "Demonstration and Training" for submitting video recording of demonstration of equipment and training of Owners personnel.

#### 1.02 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit unaltered, original, full-size image files within 5 days of taking photographs.
  - 1. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Date photograph was taken.
    - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
- C. Construction Photographs: Submit file of each photographic view within 5 days of taking photographs.
  - 1. Identification: On back of each print, provide an applied label or rubberstamped impression with the following information:
    - a. Name of Project.
    - b. Date photograph was taken if not date stamped by camera.
    - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - d. Unique sequential identifier keyed to accompanying key plan.
- D. Weekly submission of photographs can be in a report form and be a PDF file. Include the Owner and Architect in the distribution.

#### 1.03 USAGE RIGHTS

A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

#### 1.04 ADDITIONAL PHOTOGRAPHS

A. If the Contractor for their own use, shoots additional photos or videos (i.e. aerial or satellite) those also are to be made available to the Owner and Architect.

#### PART 2 - PRODUCTS

#### 2.01 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG or PDF format produced by a digital camera.

#### PART 3 - EXECUTION

#### 3.01 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in file name for each image.
  - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.
- C. Preconstruction Photographs: Before commencement of excavation, or starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.
  - 1. Take a minimum of 20 photographs to show existing conditions adjacent to property before starting the Work.
- D. Periodic Construction Photographs: Take a minimum of 20 photographs, not including time lapse, weekly. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Time Lapse Sequence Construction Photographs: Take a minimum of 10 photographs as indicated, to show status of construction and progress since last photographs were taken.
  - 1. Frequency: Take photographs weekly.
- F. Final Completion Construction Photographs: Take a minimum of 100 color photographs after date of Substantial Completion for submission as Project Record Documents.

PHOTOGRAPHIC DOCUMENTATION SECTION 01303 -2

- G. Additional Photographs: Architect or Owner may request photographs in addition to periodic photographs specified.
  - 1. In emergency situations, take additional photographs within 24 hours of request.
  - 2. Circumstances that could require additional photographs include, but are not limited to, the following:
    - a. Special events planned at Project site.
    - b. Immediate follow-up when on-site events result in construction damage or losses.
    - c. Photographs to be taken at fabrication locations away from Project site.
    - d. Substantial Completion of a major phase or component of the Work.
    - e. Extra record photographs at time of final acceptance.

#### **END OF SECTION**

# SECTION 01304 PRODUCT REQUIREMENTS

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Division 01 Section "Allowances" for products selected under an allowance.
  - 2. Division 01 Section "Alternates" for products selected under an alternate.
  - 3. Division 01 Section "Substitution Procedures" for requests for substitutions.
  - 4. Division 01 Section "References" for applicable industry standards for products specified.

#### 1.03 **DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

# 1.04 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

PRODUCT REQUIREMENTS SECTION 01304 -1

- 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
- 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within a reasonable number of days of receipt of request, or of receipt of additional information or documentation, whichever is later.
  - a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
  - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

# 1.05 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
  - 1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

#### 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
  - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
  - 1. Store products to allow for inspection and measurement of quantity or counting of units.
  - 2. Store materials in a manner that will not endanger Project structure.

- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 6. Protect stored products from damage and liquids from freezing.
- 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

#### **1.07 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

#### **PART 2 - PRODUCTS**

#### 2.01 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

PRODUCT REQUIREMENTS SECTION 01304 -3

- 4. Where products are accompanied by the term "as selected," Architect will make selection.
- 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
  - 1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered. Subject to review and approval of Architect.
  - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered. Subject to review and approval of Architect.
  - 3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
    - b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  - 4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered.
    - b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  - 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers.

Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with

PRODUCT REQUIREMENTS SECTION 01304 -4 other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

# 2.02 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
  - 1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
  - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.
  - 6. Indicate any cost advantage to the Owner and / or no cost change for the using of the comparable product. Contractor is to absorb any associated cost (including but not limited to) Architects/ Engineers redesign, permit fees, work under separate contracts and current work under contract.
  - 7. Evidence that proposed product does not affect the current schedule.

PART 3 - EXECUTION - Not Used

# **END OF SECTION**
# SECTION 01400 QUALITY CONTROL

#### PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-ups.
- E. Inspection and testing laboratory services.
- F. Manufacturers' field services and reports.

## **1.03 RELATED SECTIONS**

- A. Section 01300 Submittals: Submission of Manufacturers' Instructions and Certificates.
- B. Section 01401 Structural Threshold Inspection, if applicable.

#### 1.04 QUALITY ASSURANCE/CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality
- F. Secure Products in place with positive anchorage devices, designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

#### 1.05 **REFERENCES**

- A. Conform to reference standard by date of issue current on date of Owner—Contractor Agreement.
- B. Obtain copies of standards when required by Contract Documents.

QUALITY CONTROL SECTION 01400-1

- C. Should specified reference standards conflict with Contract Documents, request clarification for Architect/Engineer before proceeding.
- D. The contractual relationship of the parties to the Contract shall not be altered from the Contract documents by mention or inference otherwise in any reference document.

## 1.06 FIELD SAMPLES

- A. Install field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect/Engineer.

## 1.07 MOCK-UPS

- A. Tests will be performed under provisions identified in this section.
- B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals and finishes, where specified in other sections of this project manual.
- C. Where mock-up is specified in individual Sections to be removed, clear area after mockup has been accepted by Architect/Engineer/ Owner.
- D. In addition to mock-ups specified in other sections of this project manual, the general contractor shall mock up one apartment unit of each unit type shown on the drawings. These unit mock-ups shall be completed in a two (2) step process as follows:
  - 1. Step 1;
    - a. All partitions, soffits and ceilings completely framed.
    - b. All electrical devises roughed-in for Owner/ Architect review and approval prior to proceeding to step 2.
  - 2. Step 2;
    - a. All wall and ceiling finishes installed.
    - b. Windows and doors complete with all hardware and screens.
    - c. Framed openings, soffits and access doors.
    - d. Millwork trim, casing, moldings, wall base.
    - e. Tile work with all joints completely grouted and sealed.
    - f. All floor transitions/ thresholds between materials
    - g. Kitchen and bathroom cabinets, countertops, and appliances.
    - h. Bathroom accessories including grab bars, towel bars, soap dishes, shower curtain rod, mirrors, medicine cabinets, handicap shower seats.
    - i. All finishes including carpet, vinyl flooring, tile and painting.
    - j. All electrical receptacles and switches, electrical panels, fire alarm devices, smoke and heat detectors, CO detectors, speakers, disconnect switches, light fixtures, low voltage outlets.
    - k. Mechanical and plumbing systems including ductwork, grilles, access doors, heating/air conditioning unit, condensate lines, plumbing fixtures and trim.

Each unit shall be reviewed by the owner, architect, engineer and interior decorator for compliance with the contract documents. The mock up unit shall serve as the standard by which all other apartment units are to be built. Mock ups may serve as a sales unit

#### QUALITY CONTROL SECTION 01400-2

for marketing purposes if desired and directed by the owner. The above list may not include all items that are required for each project, refer to the construction drawings for all work required in each resident unit.

## 1.08 INSPECTION AND TESTING LABORATORY SERVICES

- A. Owner will appoint, employ, and pay for service of an independent firm to perform inspection and testing.
- B. The independent firm will perform inspections, tests and other services specified in individual specification Sections and as required by the Architect/Engineer.
- C. Reports will be submitted by the independent firm to the Architect/Engineer, in triplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
  - 1. Notify Architect/Engineer and independent firm 24 hours prior to expected time for operations requiring services.
  - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Architect/Engineer. Payment for re-testing will be charged to the Contractor by deducting inspection or testing charges from the Contract Sum/Price.

#### 1.09 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, or required by material or Product suppliers or manufacturers, that qualified staff personnel observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, or to initiate instructions when necessary, this service shall be provided at no cost to the Owner.

#### PART 2 – PRODUCTS - Not Used

#### PART 3 - EXECUTION

#### 3.01 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

#### **END OF SECTION**

QUALITY CONTROL SECTION 01400-3

# SECTION 01421 REFERENCE STANDARDS AND DEFINITIONS

#### PART 1 – GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

#### 1.02 **DEFINITIONS**

- A. General: Basic contract definitions are included in the Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
  - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
  - 2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does

not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

- 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
  - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, to report on and, if required, to interpret results of those inspections or tests.

## 1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the 16-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
    - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

#### 1.04 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
Refer uncertainties and requirements that are different, but apparently equal, to the

Architect for a decision before proceeding.

- 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.
- F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following abbreviations and acronyms, as referenced in the Contract Documents, mean the associated names. Names and addresses are subject to change and are believed, but are not assured, to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association 900 19th St., NW, Suite 300 Washington, DC 20006 www.aluminum.org	(202) 862-5100
ААВС	Associated Air Balance Council 1518 K St., NW, Suite 503 Washington, DC 20005 www.aabchq.com	(202) 737-0202
ААМА	American Architectural Manufacturers Association 1827 Walden Office Sq., Suite 104 Schaumburg, IL 60173-4268 www.aamanet.org	(847) 303-5664
AAN	American Association of Nurserymen (See ANLA)	
AASHTO	American Association of State Highway& Transportation Officials 444 North Capitol St., NW, Suite 249 Washington, DC 20001 www.aashto.org	(202) 624-5800

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AATCC	American Association of Textile Chemists and Colorists P.O. Box 12215 Research Triangle Park, NC 27709-2215 www.aatcc.org	(919) 549-8141
ABMA	American Bearing Manufacturers Association 1200 19th St., NW, Suite 300 Washington, DC 20036-2401 www.abma-dc.org	(202) 429-5155
АВМА	American Boiler Manufacturers Association 950 North Glebe Rd., Suite 160 Arlington, VA 22203-1824 www.abma.com	(703) 522-7350
ACI	American Concrete Institute P.O. Box 9094 Farmington Hills, MI 48333-9094 www.aci-int.org	(248) 848-3700
ACIL	American Council of Independent Laboratories 1875 I St., NW, Suite 500 Washington, DC 20006 www.acil.org	(202) 887-5872
ACPA	American Concrete Pipe Association 222 West Las Colinas Blvd., Suite 641 Irving, TX 75039-5423 www.concrete-pipe.org	(972) 506-7216
ADC	Air Diffusion Council 11 South LaSalle St., Suite 1400 Chicago, IL 60603 www.airdiffusercouncil.org	(312) 201-0101
AEIC	Association of Edison Illuminating Companies 600 N. 18th St./P.O. Box 2641 Birmingham, AL 35291-0992 www.aeic.org	(205) 250-2530
AFBMA	Anti-Friction Bearing Manufacturers Association (See ABMA)	
AFPA	American Forest and Paper Association 1111 19th St., NW, Suite 800 Washington, DC 20036 www.afandpa.org	(800) 878-8878
AGA	American Gas Association 1515 Wilson Blvd. Arlington, VA 22209 www.aga.com	(703) 841-8400
АНА	American Hardboard Association 1210 W. Northwest Hwy Palatine, IL 60067-1897 www.ahec.org	(847) 934-8800
АНАМ	Association of Home Appliance Manufacturers 20 N. Wacker Dr., Suite 1500 Chicago, IL 60606 www.aham.org	(312) 984-5800

AI	Asphalt Institute Research Park Dr./P.O. Box 14052 Lexington, KY 40512-4052 www.asphaltinstitute.org	(606) 288-4960
AIA	The American Institute of Architects 1735 New York Ave., NW Washington, DC 20006-5292 www.aia.org	(202) 626-7300
AIA	American Insurance Association 1130 Connecticut Ave., NW, Suite 1000 Washington, DC 20036 www.aiadc.org	(202) 828-7100
AIHA	American Industrial Hygiene Association 2700 Prosperity Ave., Suite 250 Fairfax, VA 22031 www.aiha.org	(703) 849-888
AISC	American Institute of Steel Construction One East Wacker Dr., Suite 3100 Chicago, IL 60601-2001	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute 1101 17th St., NW Washington, DC 20036-4700 www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction 7012 S. Revere Pkwy, Suite 140 Englewood, CO 80112 www.aitc-glulam.org	(303) 792-9559
ALA	American Laminators Association (See LMA)	
ALCA	Associated Landscape Contractors of America 12200 Sunrise Valley Dr., Suite 150 Reston, VA 20191 www.alca.org	(703) 620-6363
ALI	Associated Laboratories, Inc. P.O. Box 152837/1323 Wall St. Dallas, TX 75315 www.associatedlab.com	(214) 565-0593
ALSC	American Lumber Standards Committee P.O. Box 210 Germantown, MD 20875 www.alsc.org	(301) 972-1700
АМСА	Air Movement and Control Association International, Inc. 30 W. University Dr. Arlington Heights, IL 60004-1893 www.amca.org	(847) 394-0150
ANLA	American Nursery and Landscape Association 1250 Eye St., NW, Suite 500 Washington, DC 20005 www.anla.org	(202) 789-2900

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ANSI	American National Standards Institute 11 West 42nd St., 13th Floor New York, NY 10036-8002 www.ansi.org	(212) 642-4900
AOAC	AOAC International 481 N. Frederick Ave., Suite 500 Gaithersburg, MD 20877 www.aiac.org	(301) 924-7077
AOSA	Association of Official Seed Analysts 201 N. 8th St., Suite 400 P.O. Box 81152 Lincoln, NE 68501-1152 www.aosaseed.org	(402) 476-3852
APA	APA-The Engineered Wood Association P.O. Box 11700 Tacoma, WA 98411-0700 www.apawood.org	(206) 565-6600
APA	Architectural Precast Association P.O. Box 08669 Fort Myers, FL 33908-0669 www.archprecast.org	(941) 454-6989
API	American Petroleum Institute 1220 L St., NW, Suite 900 Washington, DC 20005-8029 www.api.org	(202) 682-8000
ARI	Air-Conditioning and Refrigeration Institute 4301 Fairfax Dr., Suite 425 Arlington, VA 22203 www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association Center Park, 4041 Powder Mill Rd., Suite 404 Calverton, MD 20705 www.asphaltroofing.org	(301) 231-9050
ASA	Acoustical Society of America 500 Sunnyside Blvd. Woodbury, NY 11797 www.acousticsociety.org	(516) 576-2360
ASC	Adhesive and Sealant Council 1627 K St., NW, Suite 1000 Washington, DC 20006-1707 www.ascouncil.org	(202) 452-1500
ASCA	Architectural Spray Coaters Association 230 W. Wells St., Suite 311 Milwaukee, WI 53203 www.asca.org	(414) 273-3430
ASCE	American Society of Civil Engineers-World Headquarters 1801 Alexander Bell Dr. Reston, VA 20191-4400 www.asce.org	(800) 548-2723 (703) 295-6000

ASHES	American Society for Healthcare Environmental Services - Division of the American Hospital Assoc. One North Franklin, Suite 2700 Chicago, IL 60606 www.ahe.org	(800) 424-2626 (312) 422-3860
ASHRAE	American Society of Heating, Refrigerating and Air- Conditioning Engineers 1791 Tullie Circle, NE Atlanta, GA 30329-2305 www.ashrae.org	(800) 527-4723 (404) 636-8400
ASLA	American Society of Landscape Architects 4401 Connecticut Ave., NW, 5th Floor Washington, DC 20008-2369 www.asla.org	(202) 686-2752
ASME	American Society of Mechanical Engineers 345 East 47th St. New York, NY 10017-2392 www.asme.org	(800) 434-2763 (212) 705-7722
ASPA	American Sod Producers Association (See TPI)	
ASPE	American Society of Plumbing Engineers 3617 Thousand Oaks Blvd., Suite 210 Westlake Village, CA 91362-3649 www.aspe.org	(805) 495-7120
ASQC	American Society for Quality Control 611 East Wisconsin, Ave. Milwaukee, WI 53201-3005 www.asqc.org	(800) 248-1946 (414) 272-8575
ASSE	American Society of Sanitary Engineering 28901 Clemens Rd. Westlake, OH 44145 www.asse-plumbing.org	(216) 835-3040
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr. West Conshohocken, PA 19428-2959 www.astm.org	(610) 832-9500
ATIS	Alliance for Telecommunications Industry Solutions 1200 G St., NW, Suite 500 Washington, DC 20005	(202) 628-6380
AWCI	Association of the Wall and Ceiling Industries–International 307 E. Annandale Rd., Suite 200 Falls Church, VA 22042-2433 www.awci.org	(703) 534-8300
AWCMA	American Window Covering Manufacturers Association (See WCMA)	
AWI	Architectural Woodwork Institute 1952 Isaac Newton Sq. Reston, VA 20190 www.awinet.org	(703) 733-0600

12/23/2021

AWPA	American Wood Preservers' Association 3246 Fall Creek Hwy, Suite 1900 Granbury, TX 76049-7979 www.awpa.com	(817) 326-6300
AWS	American Welding Society 550 NW LeJeune Rd. Miami, FL 33126 www.amweld.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association 6666 W. Quincy Ave. Denver, CO 80235 www.awwa.org	(800) 926-7337 (303) 794-7711
ВНМА	Builders Hardware Manufacturers Association 355 Lexington Ave., 17th Floor New York, NY 10017-6603 www.buildershardware.com	(212) 661-4261
BIA	Brick Institute of America 11490 Commerce Park Dr. Reston, VA 22091-1525 www.bia.org	(703) 620-0010
BIFMA	The Business & Institutional Furniture Manufacturer's Association 2680 Horizon Dr., SE, Suite A1 Grand Rapids, MI 49546-7500 www.bifma.com	(616) 285-3963
CAGI	Compressed Air and Gas Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/cagi	(216) 241-7333
CAUS	Color Association of the United States 409 W. 44th St. New York, NY 10036-4402 <u>www.colorassociation.com</u>	(212) 582-6884
СВМ	Certified Ballast Manufacturers Association 1422 Euclid Ave., Suite 402 Cleveland, OH 44115-2094	(216) 241-0711
ССС	Carpet Cushion Council P.O. Box 546 Riverside, CT 06878-0546 www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association Inc. 260 Madison Ave., 16th Floor New York, NY 10016-2401 www.copper.org	(800) 232-3282 (212) 251-7200
CFFA	Chemical Fabrics & Film Association, Inc. c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/cffa	(216) 241-7333
CGA	Compressed Gas Association 1725 Jefferson Davis Hwy, Suite 1004 Arlington, VA 22202-4102 www.cganet.com	(703) 412-0900
	<b>REFERENCE STANDARDS AND DEFINITIONS</b>	

SECTION 01421 - 8

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CISCA	Ceilings and Interior Systems Construction Association 1500 Lincoln Hwy, Suite 202 St. Charles, IL 60174 www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Rd., Suite 419 Chattanooga, TN 37421 www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute 9891 Broken Land Pkwy, Suite 300 Columbia, MD 21046 www.chainlinkinfo.org	(301) 596-2584
СРРА	Corrugated Polyethylene Pipe Association 432 N. Superior St. Toledo, OH 43604 www.plasticpipe.org	(800) 510-2772 (419) 241-2221
CRI	Carpet and Rug Institute 310 S. Holiday, Ave. Dalton, GA 30722-2048 www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Rd. Schaumburg, IL 60173-4758 www.crsi.org	(847) 517-1200
CSSB	Cedar Shake and Shingle Bureau 515 116th Ave., NE, Suite 275 Bellevue, WA 98004-5294 www.cedarbureau.org	(206) 453-1323
СТІ	Ceramic Tile Institute of America 12061 West Jefferson Blvd. Culver City, CA 90230-6219 www.ctioa.org	(310) 574-7800
СТІ	Cooling Tower Institute P.O. Box 73383 Houston, TX 77273 www.cti.org	(281) 583-4087
DASMA	Door & Access Systems Manufacturers Association, Intl c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/dasma	(216) 241-7333
DHI	Door and Hardware Institute 14170 Newbrook Dr. Chantilly, VA 20151-2223 www.dhi.org	(703) 222-2010
DIPRA	Ductile Iron Pipe Research Association 245 Riverchase Pkwy East, Suite O Birmingham, AL 35244	(205) 988-9870
ECSA	Exchange Carriers Standards Association (See ATIS)	

EIA	Electronic Industries Association 2500 Wilson Blvd. Arlington, VA 22201 www.eciaonline.org	(703) 907-7500
EIMA	EIFS Industry Members Association 402 N. Fourth St., Suite 102 Yakima, WA 98901-2470 www.eifsfacts.com	(800) 294-3462 (509) 457-3500
EJMA	Expansion Joint Manufacturers Association 25 N. Broadway Tarrytown, NY 10591-3201 www.ejma.org	(914) 332-0040
FCI	Fluid Controls Institute c/o Thomas Associates, Inc 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/fci	(216) 241-7333
FCICA	Floor Covering Installation Contractors Association P.O. Box 948 Dalton, GA 30722-0948 www.fcica.com	(706) 226-5488
FGMA	Flat Glass Marketing Association (See GANA)	
FM	Factory Mutual System P.O. Box 9102 Norwood, MA 02062-9102 www.factorymutual.com	(781) 762-4300
FTI	Facing Tile Institute c/o Stark Ceramics P.O. Box 8880 Canton, OH 44711 www.ctioa.org	(330) 488-1211
GA	Gypsum Association 810 First St., NE, Suite 510 Washington, DC 20002 www.usg.com	(202) 289-5440
GANA	Glass Association of North America 3310 SW Harrison St. Topeka, KS 66611-2279 www.glasswebsite.com/gana	(913) 266-7013
GRI	Geosynthetic Research Institute 33rd and Lancaster Walk, Rush Building, West Wing Philadelphia, PA 19104 www.gri-server.coe.drexel.edu	(215) 895-2343
HEI	Heat Exchange Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/hei	(216) 241-7333
HI	Hydraulic Institute 9 Sylvan Way Parsippany, NJ 07054-3802 www.pumps.org	(201) 267-9700

HI	Hydronics Institute P.O. Box 218/35 Russo Pl. Berkeley Heights, NJ 07922 www.gamanet.org	(908) 464-8200
НМА	Hardwood Manufacturers Association 400 Penn Center Blvd., Suite 530 Pittsburgh, PA 15235-5605 www.hardwood.org	(412) 829-0770
HPVA	Hardwood Plywood and Veneer Association 1825 Michael Farraday Dr./P.O. Box 2789 Reston, VA 22195-0789 www.hpva.org	(703) 435-2900
IAS	International Approval Services 8504 East Pleasant Valley Rd. Cleveland, OH 44131 www.iasapprovals.org	(216) 524-4990
ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, MA 02664	(508) 394-4424
IEC	International Electrotechnical Commission (Available from ANSI) 11 West 42nd St., 13th Floor New York, NY 10036-8002	(212) 642-4900
IEEE	Institute of Electrical and Electronics Engineers 345 E. 47th St. New York, NY 10017-2394 www.ieee.org	(800) 678-4333 (212) 705-7900
IESNA	Illuminating Engineering Society of North America 120 Wall St., 17th Floor New York, NY 10005-4001 www.iesna.org	(212) 248-5000
IGCC	Insulating Glass Certification Council (Now part of ITS)	
IIDA	International Interior Design Association	(312) 467-1950
ILI	Indiana Limestone Institute of America Stone City Bank Building, Suite 400 Bedford, IN 47421 www.iliai.org	(812) 275-4426
IMSA	International Municipal Signal Association P.O. Box 539/165 E. Union St. Newark, NY 14513 www.imsasafety.org	(800) 723-4672 315) 331-2182
INCE	Institute of Noise Control Engineering P.O. Box 3206, Arlington Branch Poughkeepsie, NY 12603 www.inceusa.org	(914) 462-4006
IRI	Industrial Risk Insurers P.O. Box 5010/85 Woodland St. Hartford, CT 06102-5010 www.insuranceproviders.org	(860) 520-7300

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ISA	ISA - International Society for Measurement and Control P.O. Box 12277/67 Alexander Dr. Research Triangle Park, NC 27709 www.isa.org	(919) 549-8411
ISS	Iron and Steel Society 410 Commonwealth Dr. Warrendale, PA 15086-7512 www.issource.org	(412) 776-1535
ISWA	Insect Screening Weavers Association P.O. Box 1018 Occining NV 10562	(914) 962-9052
ITS	Intertek Testing Services P.O. Box 2040 Cortland, NY 13045-7902 www.itsglobal.com	(800) 345-3851 (607) 753-6711
КСМА	Kitchen Cabinet Manufacturers Association 1899 Preston White Dr. Reston, VA 22091-4326 www.kema.org	(703) 264-1690
LGSI	Light Gage Structural Institute c/o Loseke Technologies, Inc. P.O. Box 560746 The Colony, TX 75056 www.cfsei.org	(972) 625-4560
LIA	Lead Industries Association, Inc. 295 Madison Ave. New York, NY 10017 www.leadinfo.com	(800) 422-5323 (212) 578-4750
LMA	Laminating Materials Association 116 Lawrence St. Hillsdale, NJ 07642-2730 www.lma.org	(201) 664-2700
LPI	Lightning Protection Institute 3335 N. Arlington Heights Rd., Suite E Arlington Heights, IL 60004-7700 www.lightning.org	(800) 488-6864 (847) 577-7200
мвма	Metal Building Manufacturer's Association c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/mbma	(216) 241-7333
MCAA	Mechanical Contractors Association of America 1385 Piccard Dr. Rockville, MD 20850-4329 www.mcaa.org	(301) 869-5800
MFMA	Maple Flooring Manufacturers Association 60 Revere Dr., Suite 500 Northbrook, IL 60062 www.maplefloor.com	(847) 480-9138
MFMA	Metal Framing Manufacturers Association 401 N. Michigan Ave. Chicago, IL 60611	(312) 644-6610

	www.metalframingmfg.org	
МНІ	Material Handling Institute 8720 Red Oak Blvd., Suite 201 Charlotte, NC 28217-3992 www.mhi.org	(800) 345-1815 (704) 522-8644
MIA	Marble Institute of America 30 Eden Alley, Suite 301 Columbus, OH 43215 www.marble-institute.com	(614) 228-6194
MIA	Masonry Institute of America 2550 Beverly Blvd. Los Angeles, CA 90057 www.masonryinstitute.org	(213) 388-0472
ML/SFA	Metal Lath/Steel Framing Association 8 South Michigan Ave., Suite 1000 Chicago, IL 60603	(312) 456-5590
MRCA	Midwest Roofing Contractors Association 4840 W. 15th St., Suite 1000 Lawrence, KS 66049 www.mrca.org	(800) 879-4448 (913) 843-4888
MSS	Manufacturers Standardization Society of the Valve &Fittings Industry 127 Park St., NE Vienna, VA 22180-4602	(703) 281-6613
NAA	National Arborist Association P.O. Box 1094 Amherst, NH 03031-1094 www.natlarb.com	(800) 733-2622 (603) 673-3311
NAAMM	National Association of Architectural Metal Manufacturers 8 South Michigan Ave., Suite 1000 Chicago, IL 60603 www.gss.net/naamm	(312) 456-5590
NAGDM	National Association of Garage Door Manufacturers (See DASMA)	
NAIMA	North American Insulation Manufacturers Association 44 Canal Center Plaza, Suite 310 Alexandria, VA 22314 www.naima.org	(703) 684-0084
NAMI	National Accreditation & Management Institute, Inc. P.O. Box 366/207 S. Washington St. Berkeley Springs, WV 25411	(304) 258-5100
NAPA	National Asphalt Pavement Association NAPA Building 5100 Forbes Blvd. Lanham, MD 20706-4413 www.asphaltpavement .org	(301) 731-4748
NAPM	National Association of Photographic Manufacturers 550 Mamaroneck Ave. Harrison, NY 10528	(914) 698-7603
NBHA	National Builders Hardware Association (See DHI)	

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	REFERENCE STANDARDS AND DEFINITIONS	10/00/000
NFPA	National Fire Protection Association One Batterymarch Park/ P.O. Box 9101 Quincy, MA 02269-9101 www.nfpa.org	(800) 344-3555 (617) 770-3000
NETA	InterNational Electrical Testing Association P.O. Box 687/106 Stone St. Morrison, CO 80465-1526 www.electricnet.com/neta	(303) 697-8441
NEMA	National Electrical Manufacturers Association 1300 N 17th St., Suite 1847 Rosslyn, VA 22209 www.nema.org	(703) 841-3200
NELMA	Northeastern Lumber Manufacturers Association 272 Tuttle Rd./P.O. Box 87A Cumberland Center, ME 04021 www.nelma.org	(207) 829-6901
NEI	National Elevator Industry 185 Bridge Plaza North, Suite 310 Fort Lee, NJ 07024 www.neii.org	(201) 944-3211
NECA	National Electrical Contractors Association 3 Bethesda Metro Center, Suite 1100 Bethesda, MD 20814-5372 www.necanet.org	(301) 657-3110
NEBB	Natural Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877-4121 www.nebb.org	(301) 977-3698
NCSPA	National Corrugated Steel Pipe Association 1255 23rd St., NW, Suite 850 Washington, DC 20037 www.ncspa.org	(202) 452-1700
NCRPM	National Council on Radiation Protection & Measurements 7910 Woodmont Ave., Suite 800 Bethesda, MD 20814-3095 www.ncrp.com	(800) 229-2652 (301) 657-2652
NCPI	National Clay Pipe Institute P.O. Box 759/253-80 Center St. Lake Geneva, WI 53147 www.ncpi.org	(414) 248-9094
NCMA	National Concrete Masonry Association 2302 Horse Pen Rd. Herndon, VA 20171-3499 <u>www.ncma.org</u>	(703) 713-1900
NCCA	National Coil Coaters Association 401 N. Michigan Ave. Chicago, IL 60611 <u>www.coilcoating.org</u>	(312) 321-6894
NCAC	National Council of Acoustical Consultants P.O. Box 359/66 Morris Ave., Suite 1A Springfield, NJ 07081 www.ncac.com	(201) 564-5859

SECTION 01421 - 14

12/23/2021

	Silver Spring, MD 20910 www.nssea.org	
NTMA	National Terrazzo and Mosaic Association 3166 Des Plaines Ave., Suite 121 Des Plaines, IL 60018 www.ntma.com	(800) 323-9736 (847) 635-7744
NUSIG	National Uniform Seismic Installation Guidelines 12 Lahoma Ct. Alamo, CA 94526 www.nbug.org	(510) 946-0135
NWMA	National Woodwork Manufacturers Association (See NWWDA)	
NWWDA	National Wood Window and Door Association 1400 E. Touhy Ave., G-54 Des Plaines, IL 60018 www.nwwda.org	(800) 223-2301 (847) 299-5200
ΡΑΤΜΙ	Power Actuated Tool Manufacturers' Institute, Inc. 1603 Boonslick Rd. St. Charles, MO 63301-2244	(314) 947-6610
РСА	Portland Cement Association 5420 Old Orchard Rd. Skokie, IL 60077-1083 www.portcement.org	(847) 966-6200
PCI	Precast/Prestressed Concrete Institute 175 W. Jackson Blvd. Chicago, IL 60604 www.pci.org	(312) 786-0300
PDCA	Painting and Decorating Contractors of America 3913 Old Lee Hwy, Suite 33-B Fairfax, VA 22030 www.pdca.com	(800) 332-7322 (703) 359-0826
PDI	Plumbing and Drainage Institute 45 Bristol Dr., Suite 101 South Easton, MA 02375	(800) 589-8956 (508) 230-3516
PEI	Porcelain Enamel Institute 4004 Hillsboro Pike, Suite 224-B Nashville, TN 37215 www.porcelainenamel.com	(615) 385-5357
PGI	PVC Geomembrane Institute P.O. Box 4226 Traverse City, MI 49685 users.aol.com/forPVC1	(616) 933-6373
PPFA	Plastic Pipe and Fittings Association 800 Roosevelt Rd., Building C, Suite 20 Glen Ellyn, IL 60137-5833	(630) 858-6540
PPI	Plastic Pipe Institute 1801 K St., NW, Suite 600L Washington, DC 20006 www.plasticpipe.org	(202) 974-5306
RCMA	Roof Coatings Manufacturers Association Center Park 4041 Powder Mill Rd., Suite 404	(301) 230-2501

	Calverton, MD 20705	
RCSC	Research Council on Structural Connections Sargent & Lundy 55 E. Monroe St. Chicago, IL 60603	(312) 269-2424
RFCI	Resilient Floor Covering Institute 966 Hungerford Dr., Suite 12-B Rockville, MD 20850-1714 www.rfci.com	(301) 340-8580
RMA	Rubber Manufacturers Association 1400 K St., NW, Suite 900 Washington, DC 20005 <u>www.rma.org</u>	(800) 220-7620 (202) 682-4800
SAE	SAE International 400 Commonwealth Dr. Warrendale, PA 15096-0001 For publications: Call (412) 776-4970 www.sae.org	(412) 776-4841
SDI	Steel Deck Institute P.O. Box 25 Fox River Grove, IL 60021 www.sdi.org	(847) 462-1930
SDI	Steel Door Institute 30200 Detroit Rd. Cleveland, OH 44145-1967 www.steeldoor.org	(216) 889-0010
SEFA	Scientific Equipment and Furniture Association 1028 Duchess Dr. McLean, VA 22102-2010 www.sefalabfurn.com	(703) 790-8661
SEGD	Society for Environmental Graphic Design 401 F St., NW, Suite 333 Washington, DC 20001-2728	(202) 638-5555
SHLMA	Southern Hardwood Lumber Manufacturers Association (See HMA)	
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Ave. Chicago, IL 60611-4267 www.igmaonline.org	(312) 644-6610
SJI	Steel Joist Institute 3127 10th Ave., North Ext. Myrtle Beach, SC 29577-6760 www.steeljoist.org	(803) 626-1995
SMA	Screen Manufacturers Association 2850 S. Ocean Blvd., Suite 114 Palm Beach, FL 33480-5535	(561) 533-0991
SMACNA	Sheet Metal & Air Conditioning Contractors' National Assoc. 4201 Lafayette Center Dr./P.O. Box 221230 Chantilly, VA 20151-1209 www.smacna.org	(703) 803-2980

SPI	Society of the Plastics Industry, Inc, .Spray Polyurethane Division 1801 K St., NW, Suite 600K Washington, DC 20006 www.socplas.org	(800) 951-2001 (202) 974-5200
SPIB	Southern Pine Inspection Bureau 4709 Scenic Hwy Pensacola, FL 32504-9094 www.spib.org	(904) 434-2611
SPRI	SPRI (Formerly: Single Ply Roofing Institute) 175 Highland Ave. Needham Heights, MA 02194-3034 www.spri.org	(617) 444-0242
SSINA	Specialty Steel Industry of North America c/o Collier, Shannon Rill & Scott 3050 K St., NW, Suite 400 Washington, DC 20007 www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	Steel Structures Painting Council 40 24th St., 6th Floor Pittsburgh, PA 15222-4643 www.sspc.org	(412) 281-2331
SSPMA	Sump and Sewage Pump Manufacturers Association P.O. Box 647 Northbrook, IL 60065-0647	(847) 559-9233
STI	Steel Tank Institute 570 Oakwood Rd. Lake Zurich, IL 60047-1559 www.steel.org	(847) 438-8265
SWI	Steel Window Institute c/o Thomas Associates, Inc. 1300 Sumner Ave. Cleveland, OH 44115-2851 www.taol.com/swi	(216) 241-7333
SWPA	Submersible Wastewater Pump Association 1806 Johns Dr. Glenview, IL 60025-1657	(847) 729-7972
SWRI	Sealant, Waterproofing and Restoration Institute 2841 Main Kansas City, MO 64108 www.swrionline.org	(816) 472-7974
TCA	Tile Council of America 100 Clemson Research Blvd. Anderson, SC 29625 www.tcnatile.com	(864) 646-8453
TIMA	Thermal Insulation Manufacturers Association (See NAIMA)	
TMS	The Masonry Society 105 South Sunset St., Suite Q Longmont, CO 80501-6172 www.masonrysociety.org	(303) 939-9700

ТРІ	Truss Plate Institute 583 D'Onofrio Dr., Suite 200 Madison, WI 53719 www.tpinsf.org	(608) 833-5900
TPI	Turfgrass Producers International 1855-A Hicks Rd. Rolling Meadows, IL 60008	(800) 405-8873 (847) 705-9898
UL	Underwriters Laboratories Inc. 333 Pfingsten Rd. Northbrook, IL 60062 www.ul.com	(800) 704-4050 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association 2655 Villa Creek Dr., Suite 155 Dallas, TX 75234 www.members.aol.com/unibell1	(972) 243-3902
USITT	USITT: The American Association of Design and Production Professionals in the Performing Arts 6443 Ridings Rd. Syracuse, NY 13206-1111	(800) 938-7488 (315) 463-6463
USP	U.S. Pharmacopeia 12601 Twinbrook Pkwy Rockville, MD 20852-1790	(800) 227-8772 (301) 881-0666
WA	Wallcoverings Association 401 N. Michigan Ave. Chicago, IL 60611-4267 www.wallcoverings.org	(312) 644-6610
WCLIB	West Coast Lumber Inspection Bureau P.O. Box 23145 Portland, OR 97281-3145 wwwwclib.org	(503) 639-0651
WCMA	Window Covering Manufacturers Association 355 Lexington Ave., 17th Floor New York, NY 10017-6603 <u>www.wcmanet.org</u>	(212) 661-4261
WEF	Water Environment Federation 601 Wythe St. Alexandria, VA 22314-1994	(703) 684-2400
WMMPA	Wood Moulding & Millwork Producers Association 507 First St. Woodland, CA 95695 <u>www.wmmpa.com</u>	(800) 550-7889 (916) 661-9591
WRI	Wire Reinforcement Institute 203 Loudoun St., SW Leesburg, VA 20175-2718 www.wirereinforcementinstitute.org	(703) 779-2339
WSC	Water Systems Council Building C, Suite 20, 800 Roosevelt Rd. Glen Ellyn, IL 60137 www.watersystemscouncil.org	(630) 545-1762

WWPA	Western Wood Products Association Yeon Building/522 SW 5th Ave. Portland, OR 97204-2122 www.wwpa.org	(503) 224-3930
G.	Federal Government Agencies: Names and titles of Federal Government sta specification-producing agencies are often abbreviated. The following abbreviated in the Contract Documents indicate names of standard producing agencies of the Federal Government. Names and addresses are a are believed, but are not assured, to be accurate and up-to-date as of the da Documents.	andards- or reviations and ds- or specification- subject to change and te of the Contract
CE	Corps of Engineers (U.S. Department of the Army) 20 Massachusetts Ave., NW Washington, DC 20314	(202) 761-0660
	CRD standards are available from: U.S. Army Corps of Engineers Waterways Experiment Station Technical Report Distribution Section Services Branch, TIC 3909 Halls Ferry Rd. Vicksburg, MS 39180-6199	(601) 634-2696
CFR	Code of Federal Regulations (Available from the Government Printing Office) Washington, DC 20401 <u>www.access.gpo.gov</u>	(202) 512-0000
CPSC	Consumer Product Safety Commission East West Towers/4330 East-West Hwy Bethesda, MD 20814 <u>www.cpsc.gov</u>	(800) 638-2772
CS	Commercial Standard (U.S. Department of Commerce)Government Printing Office Washington, DC 20402	(202) 512-1800
DOC	Department of Commerce 14th St. and Constitution Ave., NW Washington, DC 20230 www.commerce.gov	(202) 482-2000
DOT	Department of Transportation 400 Seventh St., SW Washington, DC 20590 www.dot.gov	(202) 366-4000
EPA	Environmental Protection Agency 401 M St., SW Washington, DC 20460 <u>www.epa.gov</u>	(202) 260-2090
FAA	Federal Aviation Administration (U.S. Department of Transportation) 800 Independence Ave., SW Washington, DC 20591 <u>www.faa.gov</u>	(202) 366-4000
FCC	Federal Communications Commission 1919 M St., NW Washington, DC 20554 <u>www.fcc.gov</u>	(202) 418-0126

FDA	Food and Drug Administration 5600 Fishers Lane Rockville, MD 20857 www.fda.gov	(301) 443-1544
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 Seventh St., SW Washington, DC 20410 www.hud.gov	(202) 401-0388
FS	Federal Specification Unit (Available from GSA) 470 East L'Enfant Plaza, SW, Suite 8100 Washington, DC 20407 <u>www.gsa.gov</u>	(202) 619-8925
GSA	General Services Administration F St. and 18th St., NW Washington, DC 20405 www.gsa.gov	(202) 708-5082
MIL	Military Standardization Documents (U.S. Department of Defense) Defense Printing Service 700 Robbins Ave., Building 4D Philadelphia, PA 19111	(215) 697-2179
NIST	National Institute of Standards and Technology Building 101, #A1134, Rte. I-270 and Quince Orchard Rd. Gaithersburg, MD 20899 www.nist.gov	(301) 975-2000
OSHA	Occupational Safety and Health Administration 200 Constitution Ave., NW Washington, DC 20210 <u>www.osha.gov</u>	(202) 219-8148
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, DC 20402	(202) 512-1800
RUS	Rural Utilities Service (U.S. Department of Agriculture) 14th St. and Independence Ave., SW Washington, DC 20250	(202) 720-9560
TRB	Transportation Research Board, National Research Council 2101 Constitution Ave., NW Washington, DC 20418 <u>www.tra.org</u>	(202) 334-2934
USDA	U.S. Department of Agriculture 14th St. and Independence Ave., SW Washington, DC 20250 www.usda.gov	(202) 720-8732
USPS	U.S. Postal Service 475 L'Enfant Plaza, SW Washington, DC 20260-0010 www.uspa.gov	(202) 268-2000

## 1.05 GOVERNING REGULATIONS AND AUTHORITIES

- A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need.
- B. Comply with all rules, regulations, directives, etc. pertaining to the latest edition of the Florida Building Code which includes but is not necessarily limited to the following:
  - 1. All supplements to the Building Code issued and effective.
  - 2. Guidelines for Design and Construction of Health Care Facilities.
  - 3. Florida Building Commission Building Codes and Standards
  - 4. Florida Fire Prevention Code
  - 5. International Code Council

#### 1.06 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

#### END OF SECTION

# SECTION 01503 EXECUTION

## PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting and patching.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
  - 9. Correction of the Work.
- B. Related Requirements:
  - 1. Division 01 Section "Summary" for limits on use of Project site.
  - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
  - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
  - 4. Division 07 Section "Penetration Firestopping" for patching penetrations in firerated construction.

#### 1.03 **DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

#### 1.04 INFORMATIONAL SUBMITTALS

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

- 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
- 3. Products: List products to be used for patching and firms or entities that will perform patching work.
- 4. Dates: Indicate when cutting and patching will be performed.
- 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
  - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit 4 copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

#### 1.05 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Fire separation assemblies.
    - c. Air or smoke barriers.
    - d. Fire-suppression systems.
    - e. Mechanical systems piping and ducts.
    - f. Control systems.
    - g. Communication systems.
    - h. Fire-detection and -alarm systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in

increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers.
- b. Membranes and flashings.
- c. Exterior curtain-wall construction.
- d. Sprayed fire-resistive material.
- e. Equipment supports.
- f. Piping, ductwork, vessels, and equipment.
- g. Noise- and vibration-control elements and systems.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
  - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable design requirements Section.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

#### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

- 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - 1. Description of the Work.
  - 2. List of detrimental conditions, including substrates.
  - 3. List of unacceptable installation tolerances.
  - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### 3.02 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

#### 3.03 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

#### 3.04 FIELD ENGINEERING

- A. Identification: Contractor will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of 2 permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

Record benchmark locations, with horizontal and vertical data on Project Record Documents.

Where the actual location or elevation of layout points cannot be marked, provide temporary reference points to locate the Work.

Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a land surveyor to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

## 3.05 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

- 2. Allow for building movement, including thermal expansion and contraction.
- 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

#### 3.06 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.

- 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
- 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
- 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

## 3.07 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

Preinstallation Conferences: Include Owner's construction personnel at preinstallation

conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

## 3.08 **PROGRESS CLEANING**

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
  - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls" and as dictated by local authorities having jurisdiction whichever is most stringent.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

## 3.09 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

## 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

## **END OF SECTION**

# SECTION 01600 MATERIALS AND EQUIPMENT

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.
- F. Alternatives.

#### 1.03 RELATED SECTIONS

A. Section 01400 – Quality Control: Product quality monitoring.

#### 1.04 **PRODUCTS**

- A. Products: Means new material, machinery components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for re-use.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.

#### 1.05 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

#### 1.06 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.

## MATERIALS AND EQUIPMENT SECTION 01600 - 1
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Avoid mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

## 1.06 **PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming one or more Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products specified by naming one or more manufacturers with a provision for Substitutions: Submit a request for substitution for any manufacturer not named.

## PART 2 - PRODUCTS

## 2.01 **PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
  - 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  - 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
  - 1. Proprietary Specification Requirements: Where Specifications name only a single product or manufacturer, provide the product indicated. No substitutions will be permitted.
  - 2. Semiproprietary Specification Requirements: Where Specifications name 2 or more products or manufacturers, provide 1 of the products indicated. No substitutions will be permitted.
    - a. Where Specifications specify products or manufacturers by name, accompanied by the term "or equal" or "or approved equal," comply

MATERIALS AND EQUIPMENT SECTION 01600 - 2 with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.

- 3. Nonproprietary Specifications: When Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.
- 4. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- 5. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with these requirements and are recommended by the manufacturer for the application indicated.
  - a. Manufacturer's recommendations may be contained in published product literature or by the manufacturer's certification of performance.
- 6. Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
- 7. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product
  - a. Where no product available within the specified category matches satisfactorily and complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category.
- 8. Visual Selection: Where specified product requirements include the phrase "... as selected from manufacturer's standard colors, patterns, textures ..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.
- 9. Allowances: Refer to individual Specification Sections and "Allowance" provisions in Division 1 for allowances that control product selection and for procedures required for processing such selections.

## PART 3 - EXECUTION

## 3.01 INSTALLATION OF PRODUCTS

- A. Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
  - 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

## **END OF SECTION**

MATERIALS AND EQUIPMENT SECTION 01600 - 3

# SECTION 01631 SUBSTITUTIONS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
  - 1. Multiple Prime Contracts: Provisions of this Section apply to the construction activities of each prime contractor.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 1 Section "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
  - 2. Division 1 Section "Submittals" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
  - 3. Division 1 Section "Materials and Equipment" specifies requirements governing the Contractor's selection of products and product options.

## 1.03 **DEFINITIONS**

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract are considered to be requests for substitutions. The following are not considered to be requests for substitutions:
  - 1. Substitutions requested during the bidding period, and accepted by Addendum prior to award of the Contract, are included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
  - 2. Revisions to the Contract Documents requested by the Owner or Architect.
  - 3. Specified options of products and construction methods included in the Contract Documents.
  - 4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

## 1.04 SUBMITTALS

A. Substitution Request Submittal: The Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received more than 60 days after commencement of the Work may be considered or rejected at the discretion of the Architect.

SUBSTITUTIONS SECTION 01631 - 1

- 1. Submit 3 copies of each request for substitution for consideration. Submit requests in the form and according to procedures required for change-order proposals.
- 2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
- 3. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
  - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed substitution.
  - b. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
  - c. Product Data, including Drawings and descriptions of products and fabrication and installation procedures.
  - d. Samples, where applicable or requested.
  - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
  - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
  - g. The Contractor's certification that the proposed substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
  - h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
- 4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of a request for substitution. The Architect will notify the Contractor of acceptance or rejection of the substitution within 2 weeks of receipt of the request, or one week of receipt of additional information or documentation, whichever is later. Acceptance will be in the form of a change order.
  - a. Use the product specified if the Architect cannot make a decision on the use of a proposed substitute within the time allocated.

## PART 2 - PRODUCTS

## 2.01 SUBSTITUTIONS

- A. Conditions: The Architect will receive and consider the Contractor's request for substitution when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests without action except to record noncompliance with these requirements.
  - 1. Extensive revisions to the Contract Documents are not required.
  - 2. Proposed changes are in keeping with the general intent of the Contract Documents.

SUBSTITUTIONS SECTION 01631 - 2

- 3. The request is timely, fully documented, and properly submitted.
- 4. The specified product or method of construction cannot be provided within the Contract Time. The Architect will not consider the request if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
- 5. The request is directly related to an "or-equal" clause or similar language in the Contract Documents.
- 6. The requested substitution offers the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. The Owner's additional responsibilities may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner, and similar considerations.
- 7. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
- 8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials and where the Contractor certifies that the substitution will overcome the incompatibility.
- 9. The specified product or method of construction cannot be coordinated with other materials and where the Contractor certifies that the proposed substitution can be coordinated.
- 10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- 11. Where a proposed substitution involves more than one prime contractor, each contractor shall cooperate with the other contractors involved to coordinate the Work, provide uniformity and consistency, and assure compatibility of products.
- B. The Contractor's submittal and the Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.
- C. Forms: Used as part of the requirements of this section are attached at the end of this section and are as follows:
  - 1. Proposed Equal Substitution Form, (2) Pages

## PART 3 – EXECUTION - Not Used

## **END OF SECTION**

# Proposed Equal Substitution Form

Project:			
Title:			
То:			
Re:			
From:			
Date:			
Project Number:			
Contract For:			
Specification Title: Description:			
Section: Page: Article/Paragrapl	h:		
Proposed Substitution:			
Manufacturer:	Address:	Phone:	
Trade Name: Model No.:			
adequate for evaluation of the description of changes to the ( proper installation. The Undersigned certifies: • Proposed substitution has beer • Same warranty will be furnish • Same maintenance service and • Proposed substitution will hav • Proposed substitution does not • Payment will be made for char substitution.	request; applicable portions of the Contract Documents that the propose in fully investigated and determined to ed for proposed substitution as for spec- l source of replacement parts, as appli e no adverse effect on other trades and t affect dimensions and functional clear nges to building design, including A/F	data are clearly identified. Attached da sed substitution will require for its be equal or superior in all respects to spe ecified product. icable, is available. d will not affect or delay progress schedu arances. E design, detailing, and construction costs	ecified product. le.
Submitted by:		Signed by:	
Firm:	Address:	Telep	phone:
A/E's REVIEW AND ACTION <ul> <li>Substitution approved - Ma</li> <li>Substitution approved as not</li> <li>Substitution rejected - Use</li> <li>Substitution Request receiv</li> </ul> Signed by: Date: <ul> <li>Supporting Data Attached: Data</li> </ul>	ke submittals in accordance with Spec oted - Make submittals in accordance specified materials. ed too late - Use specified materials. rawings Product Data Samples Tests I	cification Section 01331. with Specification Section 01331. Reports	
Note: Tenderers are advised the accompanied by technical pro technical data includes inform	hat consideration will only be given duct data sufficient to facilitate an c nation described	to "or equal" substitution proposals w objective review by the evaluation team	hich are 1. Required

# Proposed Equal Substitution Form

Note: Tenderers are advised that no voluntary option for any product will be reviewed by the evaluation team unless the Tenderer submitting the voluntary option also provides a bid price on a product which is either the "basis of design", or a specified equal product, or a substitute product which in fact meets with the requirements of an "Equal Substitution".

Specification Title: Description:

Section: Page: Item ID: \_\_\_\_\_

Proposed Voluntary Option:

Manufacturer: Address: Phone: \_\_\_\_\_

Trade Name: Model No.:

Installer: Address: Phone:

History: New product 2-5 years old 5-10 years old More than 10 years old Differences between voluntary option and specified product: Point-by-point comparative data attached Reason for not providing specified item:

Similar Installation:	
Project: Architect:	
Address: Owner:	
Date Installed:	

Proposed Voluntary Option affects other parts of Work: No Yes; explain

Savings to Owner for accepting Voluntary Option: (\$).

Supporting Data Attached: Drawings Product Data Samples Tests Reports

Note: Tenderers are advised that consideration will only be given to "or equal" substitution proposals which are accompanied by technical product data sufficient to facilitate an objective review by the evaluation team. Required technical data includes information described on each item page and that which is required by section 01631. Burden to demonstrate technical compliance with the furnished specifications lies with the Tenderer.

The Undersigned certifies:

- Proposed voluntary option has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed voluntary option will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted voluntary option which may
- subsequently become apparent are to be waived.
- Proposed voluntary option does not affect dimensions and functional clearances.

• Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the voluntary option.

• Coordination, installation, and changes in the Work as necessary for accepted voluntary option will be complete in all respects.

 Submitted by:
 Signed by:

 Firm:
 Address:
 Telephone:

# SECTION 01650 STARTING OF SYSTEMS

## PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

#### 1.02 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting, and balancing.

#### 1.03 RELATED SECTIONS

- A. Section 01400 Quality Control: Manufacturers field reports.
- B. Section 01700 Contract Closeout: System operation and maintenance data and extra materials.

## 1.04 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are completed and tested.
- F. Execute start-up under supervision of responsible Contractor's personnel in accordance with manufacturers' instruction.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

STARTING OF SYSTEMS SECTION 01650- 1

## 1.05 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment and instruct by a qualified manufacturers' representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instruction.

#### 1.06 TESTING, ADJUSTING, AND BALANCING

- A. Contractor will appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.
- B. The independent firm will perform services specified in Section 15990.
- C. Reports will be submitted by the independent firm to the Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.
- D. The mechanical and electrical sub-contractors shall conduct 3-month, 6-month and 9month inspections, following the Substantial Completion of Construction, for preventative maintenance purposes. These first year warranty inspection reports shall be submitted in written form to the Owner/Architect within ten (10) days of inspection.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION- Not Used

## END OF SECTION

# SECTION 01700 CONTRACT CLOSEOUT

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.

## 1.03 RELATED SECTIONS

A. Section 01740 - Warranties and Bonds.

## 1.04 CLOSOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's inspection.
- B. Provide submittals to Architect/Engineer that shall include the following:
  - 1. Record Drawings
  - 2. Operation and Maintenance Data
  - 3. Guarantees, Warranties and Bonds
  - 4. Keys and Keying Schedule
  - 5. Spare Parts and Maintenance Materials
  - 6. Certificate of Insurance for Products and Completed Operations
  - 7. Certificate of Occupancy, if required
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

## 1.05 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition.

CONTRACT CLOSEOUT SECTION 01700-1

- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

## 1.06 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

## **1.07 PROJECT RECORD DOCUMENTS**

- A. Maintain on-site, one set of the following record documents; record actual revisions to the Work:
  - 1. Contract Drawings
  - 2. Specifications
  - 3. Addenda
  - 4. Change Orders and other Modifications to the Contract
  - 5. Reviewed shop drawings, product data, and samples
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
  - 1. Manufacturers' name and product model and number
  - 2. Product substitutions or alternates utilized
- E. Record Documents and Shop Drawings: legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish ground floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 4. Field changes of dimension and detail.
  - 5. Details not on original Contract Drawings.
- F. The Contractor shall submit to the Architect/Engineer, four (4) weeks before final inspection, an electronic copy of operating and maintenance data in a single PDF file for review. All data shall be assembled and completely indexed into one volume and shall identify the size, model, and features indicated for each item.

## 1.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

## CONTRACT CLOSEOUT SECTION 01700-2

## PART 2 – PRODUCTS - Not Used

## PART 3 - EXECUTION

## 3.01 CLOSEOUT PROCEDURES

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
  - 1. Maintenance manuals.
  - 2. Record documents.
  - 3. Spare parts and materials.
  - 4. Tools.
  - 5. Lubricants.
  - 6. Fuels.
  - 7. Identification systems.
  - 8. Control sequences.
  - 9. Hazards.
  - 10. Cleaning.
  - 11. Warranties and bonds.
  - 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
  - 1. Startup.
  - 2. Shutdown.
  - 3. Emergency operations.
  - 4. Noise and vibration adjustments.
  - 5. Safety procedures.
  - 6. Economy and efficiency adjustments.
  - 7. Effective energy utilization.

## 3.02 FINAL CLEANING

- A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
    - a. Remove labels that are not permanent labels.
    - b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

CONTRACT CLOSEOUT SECTION 01700-3

- c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
  - 1. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

## END OF SECTION

# SECTION 01730 OPERATION AND MAINTENANCE DATA

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Format and content of manuals.
- B. Schedule of submittals.

#### 1.03 RELATED SECTIONS

- A. Section 01300 Submittals: Shop drawings, product data and samples.
- B. Section 01400 Quality Control: Manufacturer's instructions.
- C. Section 01400 Quality Control: Test and balance reports.
- D. Section 01600 Material and Equipment: Systems demonstration.
- E. Section 01700 Contract Closeout: Project Record Documents.
- F. Individual Specifications Sections: Specific requirements for operation and maintenance data.

#### 1.04 QUALITY ASSURANCE

A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

#### 1.05 FORMAT

- A. Prepare data in the form of an instructional manual.
- B. Binders: Commercial quality, 8-1/2 x 11 inch three-ring binders with hardback, cleanable, plastic covers. When multiple binders are used, correlate data into related consistent groupings.
- C. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project and identify subject matter of contents.
- D. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- E. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

## OPERATION AND MAINTENANCE DATA SECTION 01730 - 1

- F. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- G. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

## 1.06 CONTENTS, EACH VOLUME

- A. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, sub-consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of volume.
- B. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- C. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- D. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. (Do not use Project Record Documents as maintenance drawings.)
- E. Type Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01400.
- F. Warranties and Bonds: As specified in Section 01740.

## 1.07 MANUAL FOR MATERIALS AND FINISHES

- A. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
- B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance and repair.
- D. Additional Requirements: As specified in individual Product specification sections.
- E. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

## 1.08 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications.

#### OPERATION AND MAINTENANCE DATA SECTION 01730 - 2

- C. Include color coded wiring diagram as installed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulations, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- L. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagram.
- M. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- N. Include test and balancing reports as specified in Section 01400.
- O. Additional Requirements: As specified in individual Product specification sections.
- P. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

## 1.09 INSTRUCTION OF OWNER PERSONNEL

- A. Before final inspection, instruct Owner's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times.
- B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.
- C. Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

#### 1.10 SUBMITTALS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes in final form 15 days prior to final inspection. Copy will be returned after final inspection, with Architect/Engineer comments. Revise content of documents as required prior to final submittal.
- D. Submit two copies of revised volumes of data in final form within ten days after final inspection.

PART 2 – PRODUCTS - Not Used

PART 3 – EXECUTION - Not Used

END OF SECTION

## **SECTION 01731**

## PROJECT RECORD DOCUMENTS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
  - 4. Miscellaneous record submittals.
- B. Related Requirements:
  - 1. Division 01 Section "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
  - 2. Division 01 Section "Execution" for final property survey.
  - 3. Division 01 Section "Closeout Procedures" for general closeout procedures.
  - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 5. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

## 1.03 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit 1 set(s) of marked-up record drawings and specifications.
  - Number of Electronic Copies: Submit copies of record Drawings as follows:
     a. Final Submittal:
    - 1) Submit 1 paper-copy set(s) of marked-up record drawings.
    - 2) Submit PDF electronic files of scanned record drawings.
- B. Record Product Data: Submit 1 paper copy and annotated PDF electronic files and directories of each submittal.
  - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit 1 paper copy and annotated PDF electronic files and directories of each submittal.

D. Reports: Submit written report [weekly] indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

## PART 2 - PRODUCTS

## 2.01 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding markedup record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  - 2. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - I. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.
  - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

- 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
- 2. Format: Annotated PDF electronic file with comment function enabled.
- 3. Identification: As follows:
  - a. Project name.
  - b. Date.
  - c. Designation "PROJECT RECORD DRAWINGS."
  - d. Name of Architect.
  - e. Name of Contractor.

## 2.02 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders and record Drawings where applicable.
- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
  - 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

## 2.03 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
  - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

## PART 3 - EXECUTION

## 3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

## **END OF SECTION**

## PROJECT RECORD DOCUMENTS SECTION 01731 -3

## **SECTION 01732**

## DEMONSTRATION AND TRAINING

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.
- B. Related Requirements:
  - 1. Divisions 02 through 16 Sections for specific requirements for demonstration and training for products in those Sections.

## 1.03 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

## 1.04 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit 2 copies within 7 days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Date of video recording.
  - 2. Transcript: Prepared and bound in format matching operation and maintenance

DEMONSTRATION & TRAINING SECTION 01732 -1 manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.

- 3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
- 4. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

## 1.05 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01, Section 01301 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  - 1. Inspect and discuss locations and other facilities required for instruction.
  - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  - 3. Review required content of instruction.
  - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.06 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## PART 2 - PRODUCTS

#### 2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.
  - 4. Operations: Include the following, as applicable:
    - a. Startup procedures.
    - b. Equipment or system break-in procedures.
    - c. Routine and normal operating instructions.
    - d. Regulation and control procedures.
    - e. Control sequences.
    - f. Safety procedures.
    - g. Instructions on stopping.
    - h. Normal shutdown instructions.
    - i. Operating procedures for emergencies.
    - j. Operating procedures for system, subsystem, or equipment failure.
    - k. Seasonal and weekend operating instructions.
    - I. Required sequences for electric or electronic systems.

DEMONSTRATION & TRAINING SECTION 01732 -3

- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

## 3.01 **PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

## 3.02 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires

DEMONSTRATION & TRAINING SECTION 01732 -4 seasonal operation, provide similar instruction at start of each season.

- 1. Schedule training with Owner with at least 7 days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral, a written or a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

#### 3.03 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
  - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
  - D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment

DEMONSTRATION & TRAINING	G
SECTION 01732 -5	

markings are clearly visible prior to recording.

- 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

## **END OF SECTION**

# SECTION 01740 WARRANTIES AND BONDS

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 SECTION INCLUDES

- A. Preparation and submittal
- B. Time and schedule of submittals

## 1.03 RELATED SECTIONS

- A. Document 00701 General Conditions: Performance Bond and Labor and Material Payment Bonds, Warranty, and Correction of Work.
- B. Section 01700 Contract Closeout
- C. Section 01730 Operation and Maintenance Data.
- D. Individual Specifications Sections: Warranties required for specific products or Work.

## 1.04 FORM OF SUBMITTALS

- A. Bind in commercial quality, 8-1/2 x 11 inch three ring side binders with hardback, cleanable plastic covers.
- B. Label cover of each binder with typed or printed title, "WARRANTIES AND BONDS", with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible principal.
- C. Table of contents: Neatly typed, in the sequence of the Table of Contents of the Project manual, with each item identified with the number and title of the specification Section in which specified, and the name of the product or Work item.
- D. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address and telephone number of responsible principal.

## **1.05 PREPARATION OF SUBMITTALS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item or work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.

WARRANTIES AND BONDS SECTION 01740-1

- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

## 1.06 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten (10) days after acceptance.
- B. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.
- C. For items of Work when acceptance is delayed beyond Date of Substantial Completion, submit within ten (10) days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## **PART 2 - PRODUCTS**

Not Used

## PART 3 - EXECUTION

Not Used

## **END OF SECTION**

## SECTION 01805 CLEANING UP

## PART I – GENERAL

## 1.01 RELATED DOCUMENTS

A. The general provisions of the Contract, including the General, Supplementary General Conditions and special conditions shall apply to the Work specified in this section.

## 1.02 REQUIREMENTS OF REGULATORY AGENCIES

- A. Volatile waste shall be stored in covered metal containers, and removed from the premises daily.
- B. Clean-up and disposal operations shall be conducted to comply with local ordinances and Anti-Pollution Laws.
  - 1. Burning or burying of rubbish and waste on the site is not permitted.
  - 2. Disposal of volatile fluid waste in storm or sanitary sewer systems, or into streams or waterways is not permitted.
- C. Hazardous materials shall be stored and disposed of only as permitted by law and shall be properly and legally removed from the premises prior to the completion of the Contract.

## 1.03 MATERIALS

A. Cleaning materials shall be used on materials only when recommended specifically by the materials manufacturer.

## 1.04 CLEANING DURING CONSTRUCTION

- A. The Contractor shall oversee cleaning by the various trades and ensure that the building and grounds are maintained free from accumulations of waste materials. The premises shall be kept free from the accumulation of waste materials or rubbish at all times, daily cleaning required.
- B. The Contractor shall provide suitable containers on the Site for collection of waste disposed of in a legal manner.
- C. The Contractor shall not, in any case, use the Owner's trash facilities.

## 1.05 FINAL CLEANING

A. At completion of the Project, and just prior to Final Acceptance, the Contractor and Owner shall conduct an inspection of the entire Project. Prior to conducting this inspection, the Contractor shall clean, or re-clean, entire areas exposed to view to normal level for "first class" maintenance/cleaning of building projects of a similar nature, as needed to produce a "clean" condition as judged by the Architect and Owner. The Contractor shall at minimum:

- 1. Remove grease, dust, dirt, stains, temporary labels, and fingerprints, nonpermanent protection and other foreign materials from interior and exterior surface.
- 2. Repair, patch, and touch-up marred surfaces to match adjacent finishes.
- 3. Broom clean paved surfaces, clean and rake site, and clean other exposed site finishes.
- B. The Contractor shall maintain cleaning while the Project is occupied by the Owner.
- C. The Contractor shall remove all his/her waste materials and rubbish from and about the project as well as all tools, construction equipment, and machinery and surplus materials.

## **END OF SECTION**

# SECTION 02070 SELECTIVE DEMOLITION

## PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
  - 1. Demolition and removal of selected portions of a building.
  - 2. Demolition and removal of selected site elements.
  - 3. Patching and repairs.

## 1.03 RELATED SECTIONS

- A. Division 1 Section "Summary of Work" for use of the building and phasing requirements.
- B. Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.
- C. Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures for selective demolition operations.
- D. Division 1 Section "Contract Closeout" for record document requirements.
- E. Division 6 Section "Rough Carpentry" for material and construction requirements for temporary enclosures.
- F. Division 9 Section "Gypsum Board Assemblies" for material and construction requirements for temporary enclosures.
- G. Division 15 Sections for cutting, patching, or relocating mechanical items.
- H. Division 16 Sections for cutting, patching, or relocating electrical items.

## 1.04 **DEFINITIONS**

- A. Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.
- B. Remove and Salvage: Items indicated to be removed and salvaged remain the Owner's property. Remove, clean, and pack or crate items to protect against damage. Identify contents of containers and deliver to Owner's designated storage area.
- C. Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations or in locations indicated.

D. Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

## 1.05 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.
- B. Historical items indicated remain the Owner's property. Carefully remove and salvage each item in a manner to prevent damage and deliver promptly to the Owner.
- C. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered during selective demolition, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.
  - 1. Cooperate with Owner's archaeologist or historical adviser.

## 1.06 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.
- B. Proposed dust-control measures.
- C. Proposed noise-control measures.
- D. Schedule of selective demolition activities indicating the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
  - 2. Interruption of utility services.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator and stairs.
  - 5. Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
  - 6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
  - 7. Locations of temporary partitions and means of egress.
- E. Inventory of items to be removed and salvaged.
- F. Inventory of items to be removed by Owner.
- G. Photographs or videotape, sufficiently detailed, of existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by selective demolition operations.

- H. Record drawings at Project closeout according to Division 1 Section "Contract Closeout."
  - 1. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions.
- 1. Landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

## 1.07 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Predemolition Conference: Conduct conference at Project site to comply with preinstallation conference requirements of Division 1 Section "Project Meetings."

## 1.08 **PROJECT CONDITIONS**

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct selective demolition so that Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner assumes no responsibility for actual condition of buildings to be selectively demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Asbestos: It is not expected that asbestos will be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Architect and the Owner.
  - 1. Asbestos will be removed by Owner before start of Work.
- D. Asbestos: Asbestos is present in the building to be selectively demolished. A report on the presence of asbestos is on file for review and use. Examine the report to become aware of locations where asbestos is present.
  - 1. Asbestos abatement is specified elsewhere in the Contract Documents.
  - 2. Do not disturb asbestos or any material suspected of containing asbestos except under the procedures specified elsewhere in the Contract Documents.
- E. Storage or sale of removed items or materials on-site will not be permitted.

## 1.09 SCHEDULING

A. Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.

## 1.10 WARRANTY

A. Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

## PART 2 - PRODUCTS

## 2.01 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
  - 1. Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
  - 2. Use materials whose installed performance equals or surpasses that of existing materials.

## PART 3 - EXECUTION

## 3.01 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Architect.
- E. Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.
- F. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

## 3.02 UTILITY SERVICES

- A. Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - Do not interrupt existing utilities serving occupied or operating facilities, except when authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to governing authorities.
    - a. Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
- B. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services serving building to be selectively demolished.
  - 1. Owner will arrange to shut off indicated utilities when requested by Contractor.

## SELECTIVE DEMOLITION SECTION 02070 - 4

- 2. Arrange to shut off indicated utilities with utility companies.
- 3. Where utility services are required to be removed, relocated, or abandoned, provide bypass connections to maintain continuity of service to other parts of the building before proceeding with selective demolition.
- 4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit after bypassing.
- C. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utility services. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

## 3.03 PREPARATION

- A. Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
- B. Employ a certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.
- C. Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
  - Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- D. Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.
  - 1. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
  - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
  - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
  - 4. Provide temporary weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
  - 5. Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
  - 6. Cover and protect furniture, furnishings, and equipment that have not been removed.
- E. Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
  - 1. Construct dustproof partitions of not less than nominal 3 5/8-inch studs, 5/8inch gypsum wallboard with joints taped on occupied side, and 1/2-inch fireretardant plywood on the demolition side.
  - 2. Insulate partition to provide noise protection to occupied areas.

- 3. Seal joints and perimeter. Equip partitions with dustproof doors and security locks.
- 4. Protect air-handling equipment.
- 5. Weatherstrip openings.
- F. Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of building to be selectively demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

## 3.04 POLLUTION CONTROLS

- A. Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.
  - 1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- B. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.

## 3.05 SELECTIVE DEMOLITION

- A. Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition work above each floor or tier before disturbing supporting members on lower levels.
  - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  - 5. Maintain adequate ventilation when using cutting torches.
  - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

#### SELECTIVE DEMOLITION SECTION 02070 - 6
- 8. Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- 9. Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
- 10. Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
- B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain, using power-driven masonry saw or hand tools; do not use power-driven impact tools.
- C. Break up and remove concrete slabs on grade, unless otherwise shown to remain.
- D. Remove resilient floor coverings and adhesive according to recommendations of the Resilient Floor Covering Institute's (RFCI) "Recommended Work Practices for the Removal of Resilient Floor Coverings" and Addendum.
  - 1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- E. Remove no more existing roofing than can be covered in one day by new roofing. See applicable Division 7 Section for new roofing requirements.
- F. Remove air-conditioning equipment without releasing refrigerants.

## 3.06 PATCHING AND REPAIRS

- A. Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
- B. Patching is specified in Division 1 Section "Cutting and Patching."
- C. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
  - 1. Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.
- D. Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.
- E. Patch and repair floor and wall surfaces in the new space where demolished walls or partitions extend one finished area into another. Provide a flush and even surface of uniform color and appearance.
  - 1. Closely match texture and finish of existing adjacent surface.
  - 2. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
  - 3. Where patching smooth painted surfaces, extend final paint coat over entire unbroken surface containing the patch after the surface has received primer and second coat.
  - 4. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- 5. Inspect and test patched areas to demonstrate integrity of the installation, where feasible.
- F. Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

## 3.07 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Burning: Burning of demolished materials will be permitted only at designated areas on Owner's property, providing required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.
- D. Disposal: Transport demolished materials and dispose of at designated spoil areas on Owner's property.
- E. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

#### 3.08 CLEANING

- A. Sweep the building broom clean on completion of selective demolition operation.
- B. Change filters on air-handling equipment on completion of selective demolition operations.

### 3.09 SELECTIVE DEMOLITION SCHEDULE

A. As indicated on the drawings

## END OF SECTION

# SECTION 06100 ROUGH CARPENTRY

#### PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## **1.02 DESCRIPTION OF WORK**

- A. This Section includes the following:
  - 1. Framing with dimension lumber.
  - 2. Framing with timbers.
  - 3. Framing with engineered wood products.
  - 4. Wood furring, grounds, nailers, and blocking.
  - 5. Sheathing.
  - 6. Subflooring.
  - 7. Underlayment.
  - 8. Utility shelving.

## 1.03 RELATED SECTIONS

- A. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 6 Section "Metal-Plate-Connected Wood Trusses."
  - 2. Division 6 Section "Finish Carpentry" for nonstructural carpentry items exposed to view and not specified in another Section.
  - 3. Division 9 Section "Gypsum Board Assemblies"

### 1.04 **DEFINITIONS**

- A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise specified.
- B. Exposed Framing: Dimension lumber not concealed by other construction and indicated to receive a stained or natural finish.

#### 1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for the following products:
  - 1. Engineered wood products.
  - 2. Underlayment.
  - 3. Insulating sheathing.
  - 4. Air-infiltration barriers.
  - 5. Metal framing anchors.
  - 6. Construction adhesives.
- C. Material certificates for dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee's (ALSC) Board of Review.

- D. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installing, and finishing treated materials:
  - 1. For each type of preservative-treated wood product, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
  - 2. For waterborne-treated products, include statement that moisture content of treated materials was reduced to levels indicated before shipment to Project site.
  - 3. For fire-retardant-treated wood products, include certification by treating plant that treated materials comply with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated materials.
- E. Material test reports from a qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
- F. Warranty of chemical treatment manufacturer for each type of treatment.
- G. Research or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence the following products' compliance with building code in effect for Project.
  - 1. Engineered wood products.
  - 2. Foam-plastic sheathing.
  - 3. Air-infiltration barriers.
  - 4. Metal framing anchors.
  - 5. Power-driven fasteners.
  - 6. Fire-retardant-treated wood.

## 1.06 QUALITY ASSURANCE

- A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted criteria conforming to ASTM E699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- B. Single-Source Responsibility for Engineered Wood Products: Obtain each type of engineered wood product from one source and by a single manufacturer.
- C. Single-Source Responsibility for Fire-Retardant-Treated Wood: Obtain each type of fireretardant-treated wood product from one source and by a single producer.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Keep materials under cover and dry. Protect from weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels. Provide for air circulation within and around stacks and under temporary coverings.
  - 1. For lumber and plywood pressure treated with waterborne chemicals, place spacers between each bundle to provide air circulation.

## PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Wood-Preservative-Treated Materials:
    - a. Baxter: J. H. Baxter Co.
    - b. Chemical Specialties, Inc.
    - c. Continental Wood Preservers, Inc.
    - d. Hickson Corp.
    - e. Hoover Treated Wood Products, Inc.
    - f. Osmose Wood Preserving, Inc.
  - 2. Fire-Retardant-Treated Materials, Interior Type A:
    - a. Baxter: J. H. Baxter Co.
    - b. Chemical Specialties, Inc.
    - c. Continental Wood Preservers, Inc.
    - d. Hickson Corp.
    - e. Hoover Treated Wood Products, Inc.
  - 3. Fire-Retardant-Treated Materials, Exterior Type:
    - a. American Wood Treaters, Inc.
    - b. Hoover Treated Wood Products, Inc.
  - 4. Laminated-Veneer Lumber:
    - a. Alpine Structures.
    - b. Boise Cascade Corp.
    - c. Georgia-Pacific Corp.
    - d. Louisiana-Pacific Corp.
    - e. Trus Joist MacMillan.
    - f. Willamette Industries, Inc.
  - 5. Parallel-Strand Lumber:
    - a. Alpine Structures.
      - b. Trus Joist MacMillan.
  - 6. Prefabricated Wood I-Joists:
    - a. Alpine Structures.
    - b. Boise Cascade Corp.
    - c. Georgia-Pacific Corp.
    - d. Louisiana-Pacific Corp.
    - e. Superior Wood Systems, Inc.
    - f. Trus Joist MacMillan.
    - g. Willamette Industries, Inc.
  - 7. Gypsum Sheathing Board:
    - a. Domtar Gypsum.
    - b. Georgia-Pacific Corp.
    - c. National Gypsum Co.; Gold Bond Building Products Division.
    - d. United States Gypsum Co.
  - 8. Glass-Fiber-Surfaced Gypsum Sheathing Board:
    - a. Georgia-Pacific Corp.
    - b. United States Gypsum Co.
  - 9. Extruded Cellular Polystyrene Sheathing:

- a. Amoco Foam Products Co.
- b. Dow Chemical Company (The).
- c. UC Industries, Inc.
- 10. Polyisocyanurate Foam Sheathing:
  - a. Celotex Corporation (The); Building Products Division.
  - b. NRG Barriers, Inc.
- 11. Air-Infiltration Barriers:
  - a. Amoco Foam Products Co.
  - b. Anthony Industries, Inc.; Simplex Products Division.
  - c. Celotex Corporation (The); Building Products Division.
  - d. DuPont Company; Fibers Department.
  - e. Parsec, Inc.
  - f. Raven Industries, Inc.
  - g. Reemay, Inc.
  - h. Sto-Cote Products, Inc.
- 12. Metal Framing Anchors:
  - a. Cleveland Steel Specialty Co.
  - b. Hilti Inc. USA
  - c. DeWalt, USA
  - d. Simpson Strong-Tie Company, Inc.
  - e. Southeastern Metals Manufacturing Co., Inc.

#### 2.02 LUMBER, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.
- B. Inspection Agencies: Inspection agencies, and the abbreviations used to reference them, include the following:
  - 1. NELMA Northeastern Lumber Manufacturers Association.
  - 2. SPIB Southern Pine Inspection Bureau.
  - 3. WWPA Western Wood Products Association.
- C. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
  - 1. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps and provide grade-compliance certificates issued by inspection agency.
- D. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
  - 1. Provide dressed lumber, S4S, unless otherwise indicated.
  - 2. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal (38-mm actual) thickness or less, unless otherwise indicated.

#### 2.03 WOOD-PRESERVATIVE-TREATED MATERIALS

A. General: Where lumber or plywood is indicated as preservative treated or is specified to be treated, comply with applicable requirements of AWPA C2 (lumber) and AWPA C9 (plywood). Mark each treated item with the Quality Mark Requirements of an inspection

agency approved by ALSC's Board of Review.

- 1. Do not use chemicals containing chromium or arsenic.
- 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- B. Pressure treat aboveground items with waterborne preservatives to a minimum retention of 0.25 lb/cu. ft. (4.0 kg/cu. m). After treatment, kiln-dry lumber and plywood to a maximum moisture content of 19 and 15 percent, respectively. Treat indicated items and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
  - 3. Wood framing members less than 18 inches (460 mm) above grade.
  - 4. Wood floor plates installed over concrete slabs directly in contact with earth.
- C. Pressure treat wood members in contact with ground or freshwater with waterborne preservatives to a minimum retention of 0.40 lb/cu. ft. (6.4 kg/cu. m).
- D. Complete fabrication of treated items before treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces. Inspect each piece of lumber or plywood after drying and discard damaged or defective pieces.

## 2.04 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated wood is indicated, comply with applicable requirements of AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL; U.S. Testing; Timber Products Inspection, Inc.; or another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Research or Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which a current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated.
  - 2. For exposed items indicated to receive stained finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.
- B. Interior Type A: For interior locations, use chemical formulation that produces treated lumber and plywood with the following properties under conditions present after installation:
  - 1. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by a qualified independent testing agency.
  - 2. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
  - 3. Contact with treated wood does not promote corrosion of metal fasteners.
- C. Exterior Type: Use for exterior locations and where indicated.
- D. Inspect each piece of treated lumber or plywood after drying and discard damaged or

defective pieces.

#### 2.05 DIMENSION LUMBER

- A. General: Provide dimension lumber of grades indicated according to the ALSC National Grading Rule (NGR) provisions of the inspection agency indicated.
- B. Non-Load-Bearing Interior Partitions: Provide framing of the following grade and species:
  - 1. Grade: Construction, Stud, or No. 3.
  - 2. Grade: Standard, Stud, or No. 3.
  - 3. Species: Eastern softwoods; NELMA.
  - 4. Species: Spruce-pine-fir south; NELMA.
  - 5. Species: Hem-fir north; NLGA.
  - 6. Species: Spruce-pine-fir north; NLGA.
  - 7. Species: Northern species; NLGA.
  - 8. Species: Southern pine; SPIB.
  - 9. Species: Mixed southern pine; SPIB.
  - 10. Species: Hem-fir; WCLIB or WWPA.
  - 11. Species: Spruce-pine-fir south; WCLIB or WWPA.
  - 12. Species: Any species above.
- C. Exterior and Load-Bearing Walls: Provide framing of the following grade and species:
  - 1. Grade: No. 2, or better.
  - 2. Species: Southern pine; SPIB.
  - 3. Species: Hem-fir; WCLIB or WWPA.
  - 4. Species: Douglas fir south; WWPA.
- D. Framing Other than Non-Load-Bearing Partitions: Provide framing of the following grade and species:
  - 1. Grade: No. 2.
  - 2. Grade: Construction or No. 2.
  - 3. Grade: Construction, Stud, or No. 3.
  - 4. Species: Spruce-pine-fir south; NELMA.
  - 5. Species: Douglas fir-larch north; NLGA.
  - 6. Species: Hem-fir north; NLGA.
  - 7. Species: Spruce-pine-fir north; NLGA.
  - 8. Species: Southern pine; SPIB.
  - 9. Species: Mixed southern pine; SPIB.
  - 10. Species: Douglas fir-larch; WCLIB or WWPA.
  - 11. Species: Hem-fir; WCLIB or WWPA.
  - 12. Species: Douglas fir south; WWPA.
  - 13. Species: Any species above.
  - 14. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1450f-1.3E.
  - 15. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1800f-1.6E.
- E. Ceilings (Non-Load-Bearing): For ceiling framing that does not support a floor, roof, or attic, provide the following grade and species:
  - 1. Grade: No. 2.
  - 2. Grade: Construction or No. 2.
  - 3. Grade: Construction, Stud, or No. 3.
  - 4. Species: Spruce-pine-fir south; NELMA.
  - 5. Species: Douglas fir-larch north; NLGA.
  - 6. Species: Hem-fir north; NLGA.

- 7. Species: Spruce-pine-fir north; NLGA.
- 8. Species: Southern pine; SPIB.
- 9. Species: Mixed southern pine; SPIB.
- 10. Species: Douglas fir-larch; WCLIB or WWPA.
- 11. Species: Hem-fir; WCLIB or WWPA.
- 12. Species: Douglas fir south; WWPA.
- 13. Species: Any species above.
- F. Other Framing Not Listed Above: Provide the following grades and species:
  - 1. Grade: Select Structural.
  - 2. Grade: No. 1.
  - 3. Grade: No. 2.
  - 4. Grade: Construction or No. 2.
  - 5. Grade: Construction, Stud, or No. 3.
  - 6. Species: Douglas fir-larch north; NLGA.
  - 7. Species: Hem-fir north; NLGA.
  - 8. Species: Southern pine; SPIB.
  - 9. Species: Douglas fir-larch; WCLIB or WWPA.
  - 10. Species: Hem-fir; WCLIB or WWPA.
  - 11. Species: Douglas fir south; WWPA.
  - 12. Species: Any species above.
  - 13. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1450f-1.3E.
  - 14. Species and Grade: Any species of machine stress-rated (MSR) dimension lumber with a grade of 1800f-1.6E.
  - 15. Species and Grade: Any species and grade with a modulus of elasticity of at least 1,300,000 psi (8950 MPa) and an extreme fiber stress in bending of at least 850 psi (5.9 MPa) for 2-inch nominal (38 mm-actual) thickness and 12-inch nominal (286-mm actual) width for single member use.
- G. Exposed Framing: Provide material hand-selected from lumber of species and grade indicated below for uniformity of appearance and freedom from characteristics that would impair finish appearance.
  - 1. Species and Grade: As indicated above for load-bearing construction of same type.
  - 2. Species and Grade: Spruce-pine-fir south, Select Structural; NELMA, WCLIB, or WWPA.
  - 3. Species and Grade: Hem-fir north, Select Structural; NLGA.
  - 4. Species and Grade: Spruce-pine-fir north, Select Structural; NLGA.
  - 5. Species and Grade: Southern pine, Select Structural; SPIB.
  - 6. Species and Grade: Hem-fir, Select Structural; WCLIB or WWPA.

#### 2.06 TIMBERS

- A. For timbers of 5-inch nominal (117-mm actual) size and thicker, provide material complying with the following requirements:
  - 1. Species and Grade: Douglas fir-larch north, Select Structural per NLGA rules.
  - 2. Species and Grade: Southern pine, No. 1 Dense per SPIB rules.

#### 2.07 BOARDS

- A. Exposed Boards: Where boards will be exposed in the finished work, provide the following:
  - 1. Moisture Content: 19 percent maximum.
  - 2. Moisture Content: 15 percent maximum.
  - 3. Species and Grade: Eastern white pine, D Select per NELMA or NLGA rules.

- 4. Species and Grade: Redwood, Clear per RIS rules.
- 5. Species and Grade: Southern pine, C Finish per SPIB rules.
- 6. Species and Grade: Hem-fir, C & Btr per WCLIB rules or C Select per NLGA or WWPA rules.
- 7. Species and Grade: Spruce-pine-fir, C & Btr per WCLIB rules or C Select per NLGA or WWPA rules.
- B. Concealed Boards: Where boards will be concealed by other work, provide lumber with 19 percent maximum moisture content and of following species and grade:
  - 1. Species and Grade: Eastern softwoods, No. 3 Common per NELMA rules.
  - 2. Species and Grade: Northern species, No. 3 Common or Standard per NLGA rules.
  - 3. Species and Grade: Mixed southern pine, No. 2 per SPIB rules.
  - 4. Species and Grade: Hem-fir, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 5. Species and Grade: Spruce-pine-fir, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 6. Species and Grade: Western woods, Standard per WCLIB rules or No. 3 Common per WWPA rules.
  - 7. Species and Grade: Any species above.

#### 2.08 MISCELLANEOUS LUMBER

- A. General: Provide lumber for support or attachment of other construction, including rooftop equipment curbs and support bases, cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members.
- B. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.
- C. Moisture Content: 19 percent maximum for lumber items not specified to receive wood preservative treatment.
- D. Grade: For dimension lumber sizes, provide No. 3 or Standard grade lumber per ALSC's NGRs of any species. For board-size lumber, provide No. 3 Common grade per NELMA, NLGA, or WWPA; No. 2 grade per SPIB; or Standard grade per NLGA, WCLIB or WWPA of any species.

#### 2.09 ENGINEERED WOOD PRODUCTS

- A. General: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that evidence compliance with building code in effect for Project.
  - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified independent testing agency.
- B. Parallel-Strand Lumber: Lumber manufactured by laying up wood strands using an exteriortype adhesive complying with ASTM D2559, and cured under pressure to produce members with grain of strands parallel to their lengths and complying with the following requirements:
  - 1. Extreme Fiber Stress in Bending: 2900 psi (20 MPa) for 12-inch nominal- (286-mm

actual-) depth members.

- 2. Modulus of Elasticity: 2,000,000 psi (13 800 MPa).
- 3. Tension Parallel to Grain: 2400 psi (16.5 MPa).
- 4. Compression Parallel to Grain: 2900 psi (20 MPa).
- 5. Compression Perpendicular to Grain: 400 psi (3 MPa) perpendicular to and 600 psi (4.1 MPa) and parallel to wide face of strands.
- 6. Horizontal Shear: 210 psi (1.4 MPa) perpendicular to and 290 psi (2 MPa) and parallel to wide face of strands.

C. Prefabricated Wood I-Joists: Units manufactured by bonding stress-graded lumber flanges to wood-based structural-use panel webs with exterior-type adhesives complying with ASTM D2559, to produce I-shaped joists complying with the following requirements:

- 1. Flange Material: Laminated-veneer lumber.
- 2. Flange Material: Southern pine dimension lumber.
- 3. Flange Material: Spruce-pine-fir dimension lumber.
- 4. Flange Material: Any material indicated above, as standard with joist manufacturer.
- 5. Web Material: Oriented-strand board (OSB) complying with DOC PS 2.
- 6. Web Material: Plywood complying with DOC PS 2.
- 7. Web Material: Either material indicated above, as standard with joist manufacturer.
- 8. Structural Capacities: Establish and monitor structural capacities according to ASTM D5055.
- 9. Sizes: Depths and widths as indicated, with flanges not less than 1-1/2 inches (38 mm) in actual width.

#### 2.10 WOOD-BASED STRUCTURAL-USE PANELS, GENERAL

- A. Structural-Use Panel Standards: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.
- B. Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.

#### 2.11 CONCEALED, PERFORMANCE-RATED STRUCTURAL-USE PANELS

- A. General: Where structural-use panels are indicated for the following concealed types of applications, provide APA-performance-rated panels complying with requirements designated under each application for grade, span rating, exposure durability classification, and edge detail (where applicable).
  - 1. Thickness: Provide panels meeting requirements specified but not less than thickness indicated.
  - 2. Span Ratings: Provide panels with span ratings required to meet "Code Plus" provisions of APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial."
- B. Combination Subfloor-Underlayment: APA-rated Sturd-I-Floor.
  - 1. Exposure Durability Classification: Exposure 1.
  - 2. Span Rating: As required to suit joist spacing indicated.
  - 3. Span Rating: Single Floor 24.
  - 4. Edge Detail: Tongue and Groove.
  - 5. Surface Finish: Fully sanded face.

- C. Wall Sheathing: APA-rated Structural I sheathing.
  - 1. Exposure Durability Classification: Exposure 1.
  - 2. Span Rating: As required to suit stud spacing indicated.
  - 3. Span Rating: 12/0, 16/0, 20/0, or Wall 16 for stud spacing of 16 inches (406 mm) or less.
  - 4. Span Rating: 24/0, 24/16, 32/16, or Wall 24 for stud spacing of 24 inches (610 mm) or less.
- D. Roof Sheathing: APA-rated Structural I sheathing.
  - 1. Exposure Durability Classification: Exposure 1.
  - 2. Span Rating: As required to suit rafter spacing indicated.
  - 3. Span Rating: 12/0.
  - 4. Span Rating: 16/0 or Roof 16.
  - 5. Span Rating: 20/0 or Roof 20.
  - 6. Span Rating: 24/0 or Roof 24.
  - 7. Span Rating: 24/16.
  - 8. Span Rating: 32/16 or Roof 32.
  - 9. Span Rating: 40/20 or Roof 40.
  - 10. Span Rating: 48/24 or Roof 48.

## 2.12 STRUCTURAL-USE PANELS FOR BACKING

A. Plywood Backing Panels: For mounting electrical or telephone equipment, provide fireretardant-treated plywood panels with grade, C-D Plugged Exposure 1, in thickness indicated or, if not otherwise indicated, not less than 15/32 inch (11.9 mm) thick.

#### 2.13 STRUCTURAL-USE PANELS FOR UNDERLAYMENT

- A. General: Over smooth subfloors, provide underlayment not less than 1/4 inch (6.4 mm) thick. Over board or uneven subfloors, provide underlayment not less than 11/32 inch (8.7 mm) thick.
- B. Structural-Use Panel Underlayment for Resilient Flooring: For underlayment 19/32 inch (15.1 mm) thick or more, provide fully sanded, veneer-faced, APA-rated, Sturd-I-Floor panels as follows:
  - 1. Exposure Classification: Exposure 1.
- C. Plywood Underlayment for Ceramic Tile: Provide APA-rated, Underlayment grade, exterior plywood, 5/8 inch (15.9 mm) thick, for ceramic tile set in epoxy mortar.
- D. Structural-Use Panel Underlayment for Carpet: For underlayment 19/32 inch (15.1 mm) thick or more, provide APA-rated Sturd-I-Floor panels with touch sanded face and as follows:
  1. Exposure Classification: Exposure 1.

#### 2.14 GYPSUM SHEATHING

- A. Gypsum Sheathing Board: Water-resistant-core gypsum sheathing board complying with ASTM C79 with long edges surfaced with water-repellent paper and as follows:
  - 1. Type: Regular.
  - 2. Type: X.
  - 3. Edge Configuration: V-shaped tongue-and-groove long edges, for horizontal application.
  - 4. Edge Configuration: Square, for vertical application.
  - 5. Thickness: 1/2 inch (12.7 mm).

- 6. Thickness: 5/8 inch (15.9 mm).
- B. Glass-Fiber-Surfaced Gypsum Sheathing Board: Gypsum sheathing board consisting of noncombustible gypsum core incorporating a water-resistant material, surfaced on face and back with glass-fiber mats with alkali-resistant coating, and with unsurfaced square edges; complying with ASTM C79, and requirements indicated below:
  - 1. Type: Regular.
  - 2. Type: X.
  - 3. Thickness: As indicated.

### 2.15 **AIR-INFILTRATION BARRIER**

- A. Asphalt-saturated organic felt complying with ASTM D226, Type I (No. 15 asphalt felt), unperforated.
- B. Air retarder complying with ASTM E1677; made from polyolefins; either cross-laminated films, woven strands, or spunbonded fibers; coated or uncoated; with or without perforations to transmit water vapor but not liquid water; and as follows:
  - 1. Minimum Thickness: 3 mils (0.08 mm).
  - 2. Minimum Water-Vapor Transmission: 10 perms (575 ng/Pa x s x sq. m) when tested according to ASTM E96, Procedure A.
  - 3. Maximum Flame Spread: 25 per ASTM E84.
  - 4. Minimum Allowable Exposure Time: 3 months.

## 2.16 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A153 or of Type 304 stainless steel.
- B. Nails, Wire, Brads, and Staples: FS FF-N-105.
- C. Power-Driven Fasteners: CABO NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M)
- F. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.

## 2.17 METAL FRAMING ANCHORS

- A. General: Provide galvanized steel framing anchors of structural capacity, type, and size indicated and as follows:
  - 1. Research or Evaluation Reports: Provide products for which model code research or evaluation reports exist that are acceptable to authorities having jurisdiction and that evidence compliance of metal framing anchors for application indicated with building code in effect for Project.
  - 2. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis, and demonstrated by comprehensive testing performed by a qualified

independent testing agency.

- B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653, G60 (ASTM A653M, Z180) coating designation; structural, commercial, or lock-forming quality, as standard with manufacturer for type of anchor indicated.
- C. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.
  - 1. Thickness: 0.052 inch (1.3 mm).
  - 2. Thickness: 0.064 inch (1.6 mm).
- D. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.
  - 1. Strap Width: 1-1/2 inches (38 mm).
  - 2. Strap Width: 2 inches (50 mm).
  - 3. Thickness: 0.052 inch (1.3 mm).
  - 4. Thickness: 0.064 inch (1.6 mm).
- E. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch (50-mm) minimum side cover, socket 0.064 inch (1.6 mm) thick, standoff and adjustment plates 0.108 inch (2.8 mm) thick.
- F. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.
  - 1. Width: 3/4 inch (19 mm).
  - 2. Width: 1-1/4 inches (32 mm).
  - 3. Thickness: 0.052 inch (1.3 mm).
  - 4. Thickness: 0.064 inch (1.6 mm).
  - 5. Length: 16 inches (400 mm).
  - 6. Length: 24 inches (600 mm).
  - 7. Length: As indicated.
- G. Rafter Tie-Downs (Hurricane Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 1-5/8 inches (41 mm) wide by 0.052 inch (1.3 mm) thick.

#### PART 3 - EXECUTION

#### 3.01 INSTALLATION, GENERAL

- A. Discard units of material with defects that impair quality of rough carpentry and that are too small to use with minimum number of joints or optimum joint arrangement.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds, and similar supports to allow attachment of other construction.
- D. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- E. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
  - 2. Published requirements of metal framing anchor manufacturer.

- 3. "Recommended Nailing Schedule" of referenced framing standard and with AFPA's "National Design Specifications for Wood Construction."
- 4. "Table 23-I-Q--Nailing Schedule" of the Uniform Building Code.
- 5. Florida Building Code
- F. Use common wire nails, unless otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; predrill as required.
- G. Use hot-dip galvanized or stainless-steel nails where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity.
- H. Countersink nail heads on exposed carpentry work and fill holes with wood filler.

## 3.02 WOOD GROUNDS, NAILERS, BLOCKING, AND SLEEPERS

- A. Install wood grounds, nailers, blocking, and sleepers where shown and where required for screeding or attaching other work. Form to shapes shown and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
- C. Install permanent grounds of dressed, preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

#### 3.03 WOOD FURRING

- A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
  - 1. Firestop furred spaces of walls at each floor level and at ceiling with wood blocking or noncombustible materials, accurately fitted to close furred spaces.
- B. Furring to Receive Plywood Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring at 24 inches (610 mm) o.c., horizontally and vertically. Select furring with no knots capable of producing bent-over nails and damage to paneling.
- C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.
- D. Furring to Receive Plaster Lath: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring at 16 inches (406 mm) o.c., vertically.

#### 3.04 WOOD FRAMING, GENERAL

- A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Install framing members of size and at spacing indicated.

- D. Do not splice structural members between supports.
- E. Firestop concealed spaces of wood-framed walls and partitions at each floor level and at ceiling line of top story. Where firestopping is not inherent in framing system used, provide closely fitted wood blocks of 2-inch nominal- (38-mm actual-) thickness lumber of same width as framing members.

#### 3.05 WALL AND PARTITION FRAMING

- A. General: Arrange studs so that wide face of stud is perpendicular to direction of wall or partition and narrow face is parallel. Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs; except single top plate may be used for non-load-bearing partitions. Nail or anchor plates to supporting construction, unless otherwise indicated.
  - 1. For exterior walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
  - 2. For interior partitions and walls, provide 2-by-4-inch nominal- (38-by-89-mm actual-) size wood studs spaced 16 inches (406 mm) o.c., except where otherwise indicated or required.
- B. Construct corners and intersections with 3 or more studs. Provide miscellaneous blocking and framing as shown and as required to support facing materials, fixtures, specialty items, and trim.
  - Provide continuous horizontal blocking at midheight of single-story partitions over 96 inches (2438 mm) high and multistory partitions, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.
- C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Set headers on edge and support on jamb studs.
  - 1. For non-load-bearing partitions, provide double-jamb studs with headers not less than 4-inch nominal (89-mm actual) depth for openings 36 inches (900 mm) and less in width, and not less than 6-inch nominal (140-mm actual) depth for wider openings.
  - 2. For load-bearing walls, provide double-jamb studs for openings 72 inches (1800 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth shown or, if not shown, as recommended by AFPA's "Manual for Wood Frame Construction."
- D. Provide bracing in exterior walls, at both walls of each external corner, full-story height, unless otherwise indicated. Provide one of the following:
- E. Provide bracing in walls, at locations indicated, full-story height, unless otherwise indicated. Provide one of the following:
  - 1. Diagonal bracing at 45-degree angle using let-in 1-by-4-inch nominal- (19-by-89-mm actual-) size boards.
  - 2. Diagonal bracing at 45-degree angle using metal bracing.
  - 3. Plywood panels, not less than 48 by 96 inches (1219 by 2438 mm) applied vertically.

#### 3.06 FLOOR JOIST FRAMING

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on

masonry. Attach floor joists as follows:

- 1. Where supported on wood members, by toe nailing or by using metal framing anchors.
- 2. Where framed into wood supporting members, by using wood ledgers as shown or, if not shown, by using metal joist hangers.
- B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches (76 mm) and do not embed more than 4 inches (102 mm).
- C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).
- D. Do not notch in middle third of joists; limit notches to 1/6 depth of joist, 1/3 at ends. Do not bore holes larger than 1/3 depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.
- E. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.
- F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.
- G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c. extending over and fastening to 3 joists. Embed anchors at least 4 inches (100 mm) into masonry with ends bent at right angles 4 inches (100 mm) into grouted masonry.
- H. Under jamb studs at openings, provide solid blocking between joist.
- I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.
  - 1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.
- J. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.
  - 1. Diagonal wood bridging formed from bevel cut 1-by-3-inch nominal- (19-by-64-mm actual-) size lumber, double-crossed and nailed both ends to joists.
  - 2. Steel bridging installed to comply with bridging manufacturer's written instructions.
  - 3. Bridging may be omitted where joist depth is 12-inch nominal (286-mm actual) size or less, and where indicated live load is 40 psf (1915 Pa) or less.

### 3.07 RAFTER AND CEILING JOIST FRAMING

- A. Ceiling Joists: Install ceiling joists with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
  - Where ceiling joists are at right angles to rafters, provide additional short joists perpendicular to rafters from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

- B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.
  - 1. At valleys, provide double-valley rafters of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
  - 2. At hips, provide hip rafter of size shown or, if not shown, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.
- C. Provide collar beams (ties) as shown or, if not shown, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.
- D. Provide special framing as shown for eaves, overhangs, dormers, and similar conditions, if any.

#### 3.08 TIMBER FRAMING

- A. Install timber framing with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members, unless otherwise indicated; tie together over supports if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) air space at sides and ends of wood members.
- C. Where built-up beams or girders of 2-inch nominal- (38-mm actual-) dimension lumber on edge are shown, fasten together with 2 rows of 20d (100-mm) nails spaced not less than 32 inches (800 mm) o.c. Locate one row near top edge and other near bottom edge. Locate end joints in members over supports; for continuous members, stagger ends at quarter points between supports.
- D. Install wood posts using metal anchors indicated.
- E. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

#### 3.09 INSTALLATION OF STRUCTURAL-USE PANELS

- A. General: Comply with applicable recommendations contained in APA Form No. E30, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
  - 1. Comply with "Code Plus" provisions of above-referenced guide.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Combination Subflooring-Underlayment: Glue and nail to framing throughout.
  - 2. Subflooring: Glue and nail to framing throughout.
  - 3. Sheathing: Nail to framing.
  - 4. Underlayment: Nail to subflooring.
  - 5. Plywood Backing Panels: Nail or screw to supports.

## 3.10 GYPSUM SHEATHING

- A. General: Fasten gypsum sheathing to supports with galvanized roofing nails or divergent point galvanized staples. Nail or staple to comply with manufacturer's recommended spacing and referenced fastening schedule. Keep perimeter fasteners 3/8 inch (10 mm) from edges and ends of units. Fit units tightly against each other and around openings.
- B. Install 24-by-96-inch (609-by-2438-mm) sheathing horizontally with long edges at right angles to studs with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent board without forcing. Abut ends of boards over centers of studs and stagger end joints of adjacent boards not less than 1 stud spacing, 2 where possible.

## 3.11 AIR-INFILTRATION BARRIER

- A. Cover sheathing with air-infiltration barrier as follows:
  - 1. Apply asphalt-saturated organic felt horizontally with 2-inch (50-mm) overlap and 6 inch (150 mm) end lap; fasten to sheathing with galvanized staples or roofing nails.
  - 2. Apply air retarder to comply with manufacturer's written instructions.
  - 3. Apply air-infiltration barrier to cover upstanding flashing with 4-inch (100-mm) overlap.

**END OF SECTION** 

# SECTION 06101 SHEATHING

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Wall sheathing.
- B. Related Requirements:
  - 1. Division 06 Section "Rough Carpentry" for plywood backing panels.
  - 2. Division 07 Section "Weather Barriers" for water-resistive barrier applied over wall sheathing.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
  - 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
  - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For following products, from ICC-ES:
  - 1. Preservative-treated plywood.
  - 2. Fire-retardant-treated plywood.

### 1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fireretardant-treated material, an inspection agency acceptable to authorities having

## SHEATHING SECTION 06101 - 1

B. jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation.
 Protect sheathing from weather by covering with waterproof sheeting, securely anchored.
 Provide for air circulation around stacks and under coverings.

#### PART 2 – PRODUCTS

#### 2.1 **PERFORMANCE REQUIREMENTS**

- A. Fire-Test-Response Characteristics: For assemblies with fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory.".
  - 2. Provide appropriate sheathing as indicated by UL assembly or current code.

#### 2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small- Scale Environmental Chambers."
- B. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
- C. Oriented Strand Board: DOC PS 2.
- D. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- E. Factory mark panels to indicate compliance with applicable standard.

#### 2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat all plywood unless otherwise indicated.

## 2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with firetest-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
  - 1. Use treatment that does not promote corrosion of metal fasteners.
  - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
  - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
  - 4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified. For roof sheathing and where high-temperature fire- retardant treatment is indicated, span ratings for temperatures up to 170 deg F shall be not less than span ratings specified.
- C. Kiln-dry material after treatment to maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
  - 1. Roof and wall sheathing within 48 inches of fire walls.
- F. Glass-mat Wall Sheathing: ASTM C1177./ 1177M
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corporation; GlasRoc
    - b. G-P Gypsum Corporation; Dens-Glass Gold
    - c. Temple-Inland Inc,; GreenGlass
    - d. United States Gypsum Co.; Securock
  - 2. Type and Thickness: Type X, 5/8 inch thick
  - 3. Size 48 by 96 inches or 48 by 108 inches or 48 by 120 inches for vertical installation.

## 2.5 WALL SHEATHING

- A. Plywood Wall Sheathing: Exposure 1 sheathing.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: As indicated on structural drawings.

- B. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: As indicated on structural drawings.

### 2.6 ROOF SHEATHING

- A. Plywood Roof Sheathing: Sheathing or as indicated on structural drawings.
  - 1. Span Rating: Not less than 16/0.
  - 2. Nominal Thickness: As indicated on structural drawings.

#### 2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.

## 2.8 SHEATHING JOINT –AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass Mat Gypsum Sheathing: Elastomeric; medium, medium-modulus, neutralcuring silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Division 078 Section "Joint Sealants".
  - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide by 10 by 10 or 10 by 20 threads/ inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mast gypsum sheathing and with a history of successful in-service use.

## 2.9 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.
  - 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

#### **PART 3 - EXECUTION**

## 3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

#### SHEATHING SECTION 06101 - 4

- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. NES NER-272 for power-driven fasteners.
  - 2. Provide "Fastening Schedule" as indicated in current local code, local ordinances having jurisdiction and structural drawings whichever is most stringent.
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

## 3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall and Roof Sheathing:
    - a. Nail or staple to wood framing.
    - b. Screw to cold-formed metal framing.
    - c. Space panels 1/8 inch apart at edges and ends.

#### 3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to wood framing with nails or screws.
  - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 3. Install boards with a 3/8 inch gap where on-load bearing construction abuts structural elements.
  - 4. Install boards with a ¼ inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

- 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlaying self- furring metal lath is screw attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
  - 1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
  - 2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlaying self- furring metal lath is screw attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
  - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

## END OF SECTION

#### **SECTION 07210**

#### **BUILDING INSULATION**

### PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

#### 1.02 DESCRIPTION OF WORK

- A. All labor, material, and services necessary to provide insulation with vapor barrier for locations shown on drawings and specified herein.
  - 1. Rigid board insulation
  - 2. Masonry cell insulation
  - 3. Batt insulation
  - 4. Safing insulation
  - 5. Radiant barriers
  - 6. Vapor barriers

## 1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver in original unopened packages with legible intact labels indicating brand names, type and thermal resistance (R) value. Store out of weather in locations to preserve original condition.

## PART 2 - PRODUCTS

## 2.01 BATT OR BLANKET INSULATION WITH VAPOR BARRIER

- A. Type: Conform to requirements of current issue of ASTM C665, Type III. Kraft faced Batts.
- B. Thickness: As shown on the Construction Drawings.
- C. Width: Full width to fit tightly between studs at walls.
- D. Sound attenuation batts: provide at areas as noted on finish schedule and partition details.
- E. Polyethylene self-adhering type, translucent, mesh reinforced, 2 inches wide.

#### 2.02 ACCEPTABLE MANUFACTURERS

- A. Johns Manville
- B. Owens Corning
- C. GAF
- D. Certainteed

## 2.03 SAFING INSULATION AND ACCESSORIES

A. Slag-Wool-Fiber Board Safing Insulation: Semirigid boards designed for use as fire stop at openings between edge of slab and exterior wall panels, produced by combining slag-wool fibers with thermosetting resin binders to comply with ASTM C 612, Type IA and IB; nominal density of 4 lb/cu. ft. (64 kg/cu. m); passing ASTM E 136 for combustion characteristics; thermal resistivity of 4 deg F x h x sq. ft./Btu x in. at 75 deg F (27.7 K x m/W at 24 deg C).

- B. Caulking Compound: Material approved by manufacturer of safing insulation for sealing joint between foil backing of safing insulation and edge of concrete floor slab against penetration of smoke.
- C. Safing Clips: Galvanized steel safing clips approved by manufacturer of safing insulation for holding safing insulation in place.

## 2.06 RADIANT BARRIERS

- A. Radiant Barrier Coating: Silver-colored, not thickness-dependent, low-emissivity coating, formulated for adherence to substrates indicated.
- B. Foil-Polymer Laminate: 2 layers of aluminum foil laminated to polyester inner layer, with maximum flame spread of 25, in sheets 48 inches (1219 mm) wide and up to 250 feet (76 m) long.
- C. Foil-Scrim-Polyethylene Laminate: 2 layers of aluminum foil laminated with scrim reinforcing to polyethylene inner layer with an overall weight of 14.3 lb/1000 sq. ft. (7 kg/100 sq. m), with maximum flame-spread and smoke-developed indices of 5 and 10, respectively, in sheets 48 inches (1219 mm) wide and up to 375 feet (114 m) long.
- D. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Radiant Barrier Coating:
    - a. LO/MIT-1; Solar Energy Corp.
  - 2. Foil-Polymer Laminate:
    - a. R+Heatshield Radiant Barrier; Innovative Energy, Inc.
  - 3. Foil-Scrim-Polyethylene Laminate:
    - a. Super R Diamond; Innovative Insulation, Inc.

#### 2.07 VAPOR RETARDERS

- A. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils (0.15 mm) thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
- B. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).
- C. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either a nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb/1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.53 ng/Pa x s x sq. m) and flame-spread and smoke-developed indices of not more than 5 and 75, respectively.
- D. Foil-Polyester Film Vapor Retarder: 2 layers of 0.5-mil- (0.013-mm-) thick polyester film laminated to an inner layer of 1-mil- (0.025-mm-) thick aluminum foil, with maximum water-vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame-spread and smoke-developed indices of 15 and 5, respectively.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

#### ALACHUA COUNTY HOUSING AUTHORITY - OFFICE CONVERSION

- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Reinforced-Polyethylene Vapor Retarders:
    - a. DURA-SKRIM 6WW; Raven Industries, Inc.
    - b. Griffolyn T-65; Reef Industries, Inc., Griffolyn Div.
  - 2. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders:
    - a. DURA-SKRIM 2FR; Raven Industries, Inc.
    - b. Griffolyn T-55 FR; Reef Industries, Inc., Griffolyn Div.
  - 3. Foil-Polyester Film Vapor Retarder:
    - a. Alumiseal Zero Perm; Alumiseal Corporation.

#### 2.08 AUXILIARY INSULATING MATERIALS

- A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.
- B. Asphalt Coating for Cellular Glass Block Insulation: Cutback asphalt or asphalt emulsion of type recommended by cellular glass block insulation manufacturer.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Karnak 100; Karnak Corp.
    - b. PITTCOTE 300 Coating; Pittsburgh Corning Corporation.
- C. Protection Board: Premolded, semirigid asphalt/fiber composition board, 1/4 inch (6 mm) thick, formed under heat and pressure, standard sizes.
- D. Eave Ventilation Troughs: Preformed rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

## 2.09 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation, of thickness indicated, securely in position indicated with self-locking washer in place; and complying with the following requirements:
  - 1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
  - 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches (2.67 mm) in diameter, length to suit depth of insulation indicated.
- B. Adhesively Attached, Angle-Shaped, Spindle-Type Anchors: Angle welded to projecting spindle, capable of holding insulation securely in position indicated with self-locking washer in place, and complying with the following requirements:
  - 1. Angle: Formed from 0.030-inch- (0.762-mm-) thick, perforated, galvanized carbon-steel sheet with each leg 2 inches (50 mm) square.
  - 2. Spindle: Copper-coated low carbon steel, fully annealed, 0.105 inches (2.67 mm) in diameter, length to suit depth of insulation indicated.
- C. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
  - 1. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

- D. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of dimension indicated between face of insulation and substrate to which anchor is attached.
  - 1. Air Space: 1 inch (25 mm).
  - 2. Air Space: 2 inches (50 mm).
  - 3. Air Space: 3 inches (76 mm).
- E. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - Adhesively Attached, Spindle-Type Anchors:
    - a. TACTOO Insul-Hangers; AGM Industries, Inc.
    - b. Spindle Type Gemco Hangers; Gemco.
  - 2. Adhesively Attached, Angle-Shaped, Spindle-Type Anchor:
    - a. 90 Degree Insulation Hangers; Gemco.
  - 3. Insulation-Retaining Washers:
    - a. RC150; AGM Industries, Inc.
    - b. SC150; AGM Industries, Inc.
    - c. Dome-Cap; Gemco.
    - d. R-150; Gemco.
    - e. S-150; Gemco.
  - 4. Insulation Standoff:
    - a. Clutch Clip; Gemco.
  - 5. Anchor Adhesives:
    - a. TACTOO Adhesive; AGM Industries, Inc.
    - b. Tuff Bond Hanger Adhesive; Gemco.

#### PART 3 - EXECUTION

1.

## 3.01 INSPECTION

- A. Examine areas shown to receive insulation to ensure protection against inclement weather and other hazards, and to ensure that work of preceding trades is complete.
- B. Examine space allocated for insulation for proper depth to receive material.

## 3.02 **PREPARATION**

A. Preparation: Remove projections in construction framing that may damage or prevent proper installation.

#### 3.03 INSTALLATION

- A. Installation, GENERAL
  - 1. Comply with insulation manufacturer's written instructions applicable to products and application indicated.
  - 2. Install insulation that is undamaged, dry, unsoiled, and has not been exposed at any time to water.
  - 3. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
  - 4. Apply single layer of insulation to produce thickness indicated.

5. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

## 3.04 INSTALLATION OF CAVITY WALL AND MASONRY CELL INSULATION

- A. On units of plastic insulation, install small pads of adhesive spaced approximately 24 inches (610 mm) o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
  - 1. Supplement adhesive attachment of insulation by securing boards with 2-piece wall ties designed for this purpose and specified in Division 4 Section "Unit Masonry."
- B. On units of cellular glass insulation, apply insulation with closely fitting joints using method indicated below:
  - 1. Gob Method: Install 4 gobs of adhesive per unit and apply firmly against inside wythe of masonry or other construction as shown. Apply gobs at each corner; spread gobs to form pads 4 inches (101 mm) in diameter by 1/4 inch (6 mm) thick.
  - 2. Serrated-Trowel Method: Apply adhesive to entire surface of each cellular-glass insulation unit with serrated trowel complying with insulation manufacturer's specifications.
  - 3. Coat edges of insulation units with full bed of adhesive to seal joints between insulation and between insulation and adjoining construction.
  - 4. Coat exterior face (cold face) of installed cellular glass block insulation course with asphalt coating recommended by insulation manufacturer for this purpose.
- C. Pour granular insulation into cavities indicated to receive insulation, taking care to fill voids completely. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close ports after confirming complete coverage. Limit fall of insulation to 1 story in height, but not exceeding 20 feet (6 m).
- D. Batt Insulation:
  - 1. Locations:
    - a. Stud cavities behind exterior wall on building interior, in locations shown on drawings.
    - b. Miscellaneous crevices in exterior construction as required insulating between interior conditioned spaces and building exterior.
    - c. At pipes or conduit in insulated cavities, place insulation between exterior wall and the pipe, compressing insulation as necessary.
  - 2. Install insulation moisture barrier toward warm-air side.
  - 3. Fit insulation snugly between framing. Insulate total width and length of framing cavity. Install with tight butt joints or overlapping between pieces of insulation and framing.
  - 4. Carefully cut and fit insulation around pipes, conduits, and other obstructions to maintain integrity of the insulation and to neatly and tightly fit non-standard framing spacing.
  - 5. Insulate small crevices to ensure insulation continuity.
  - 6. Exercise care to ensure vapor barrier is continuous over entire surface. Patch, tape and seal punctures, tears, voids and other damaged areas in vapor barrier.
  - 7. Tape and seal all joints between pieces of insulation and joints around perimeters of pipes, conduits and other obstructions to prevent infiltration of air between joints.
  - 8. Methods of securing insulation in position shall be the responsibility of the applicator.
  - 9. Install insulation so that it will not be displaced.
  - 10. For walls, secure insulation flange to framing members to retain it in position, using staples or nails or other approved methods.

E. Friction fit rigid board insulation between metal stud framing at exterior wall locations.

#### 3.05 INSTALLATION OF GENERAL BUILDING INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.
- C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
  - 1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
- D. Set reflective, foil-faced units with not less than 0.75-inch (19-mm) air space in front of foil as indicated.
- E. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
  - 1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
  - 2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. For wood-framed construction with faced blankets having stapling flanges, position insulation to produce 1/2-inch (13-mm) continuous air space between insulation facing and inner surface of concealing finish material, unless otherwise indicated. Secure insulation by inset, stapling flanges to sides of framing members.
  - 4. For wood-framed construction with faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to produce airtight installation after concealing finish material is in place.
- F. Install board insulation on concrete substrates by adhesively attached, spindle-type insulation anchors as follows:
  - 1. Fasten insulation anchors to concrete substrates with insulation anchor adhesive according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.
  - 2. Apply insulation standoffs to each spindle to create cavity width indicated between concrete substrate and insulation.
    - a. After adhesive has dried, install board insulation by pressing insulation into position over spindles and securing it tightly in place with insulation-retaining washers, taking care not to compress insulation below indicated thickness.
    - b. Where insulation will not be covered by other building materials, apply capped washers to tips of spindles.
- G. Install board insulation in curtain wall construction as indicated on Drawings and according to curtain wall manufacturer's written instructions.
  - 1. Retain insulation in place by metal clips and straps or integral pockets within window frames, spaced at intervals recommended by insulation manufacturer to hold insulation

securely in place without touching spandrel glass. Maintain cavity width between insulation and glass of dimension indicated.

- 2. Brace insulation where it contacts safing insulation to prevent insulation from bowing under pressure from safing insulation.
- H. Place loose-fill insulation into spaces and onto surfaces as shown, either by pouring or by machine blowing to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
  - For cellulosic loose-fill insulation, comply with the Cellulose Insulation Manufacturers Association's "Special Report -- Standard Practice for Installing Cellulose Insulation."
- I. Apply self-supported, spray-applied, cellulosic insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make it even with studs by using method recommended by insulation manufacturer.
- J. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

#### 3.06 INSTALLATION OF SAFING INSULATION

1.

A. Install safing insulation to fill gap between edge of concrete floor slab and back of exterior spandrel panels on safing clips spaced as needed to support insulation, but not further apart than 24 inches (610 mm) o.c. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of slab with calking approved by safing insulation manufacturer for this purpose. Leave no voids in completed installation.

#### 3.07 INSTALLATION OF RADIANT BARRIERS

A. Install radiant barriers in locations indicated according to ASTM C 1158 and radiant barrier insulation manufacturer's written instructions.

## 3.08 INSTALLATION OF VAPOR RETARDERS

- A. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) o.c.
- C. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
- D. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.

- E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- F. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

## 3.09 **PROTECTION**

A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

## END OF SECTION

# SECTION 07212 WEATHER BARRIERS

#### PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.02 SUMMARY

- A. Section Includes:
  - 1. Building paper.
  - 2. Building wrap.
  - 3. Flexible flashing.
- B. Related Requirements:
  - 1. Division 06 Section "Sheathing" for sheathing joint and penetration treatment.
  - 2. Division 07 Section "Modified Bituminous Sheet Air Barriers" for sheet air barrier applied over wall sheathing.

## 1.03 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

## 1.04 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

### PART 2 - PRODUCTS

#### 2.01 WATER-RESISTIVE BARRIER

- A. Building Paper: ASTM D 226, Type 1 (No. 15 asphalt-saturated organic felt), unperforated.
- B. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction. Including all components as required by manufacturers for a complete system meeting warranty requirements.
  - 1. Products: Subject to compliance with requirements and basis of design, provide a product from the following manufacturers:
    - a. DuPont (E. I. du Pont de Nemours and Company) Basis of Design; Tyvek Stucco wrap.
    - b. Reemay, Inc.; Typar.
    - c. James Hardie Building Products.
    - d. Green Guard; Pactiv
  - 2. Water-Vapor Permeance: Not less than 150 g through 1 sq. m of surface in 24 hours per ASTM E 96/E 96M, Desiccant Method (Procedure A).

WEATHER BARRIERS SECTION 07212 -1

- 3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg when tested according to ASTM E 2178.
- 4. Allowable UV Exposure Time: Not less than three months.
- C. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

## 2.02 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.040 inch.
  - 1. Products: Subject to compliance with requirements available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); DuPont Flashing Tape.
    - b. Grace Construction Products, a unit of W. R. Grace & Co. Conn.; Vycor Butyl Self Adhered Flashing.
    - c. Carlisle Coatings & Waterproofing; CCW-705-TWF Thru-Wall Flashing.
- B. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- C. Nails and Staples: ASTM F 1667.

## PART 3 - EXECUTION

#### 3.01 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
  - 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion-or control-joint locations.
  - 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- C. Apply 1 layer of building wrap over sheathing then apply one layer of building paper, prior to installation of exterior finish system. (masonry, stucco, siding, etc.)
- D. Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.
- E. Building Wrap: Comply with manufacturer's written instructions.
  - 1. Seal seams, edges, fasteners, and penetrations with tape.
  - 2. Extend into jambs of openings and seal corners with tape.

WEATHER BARRIERS SECTION 07212 -2

# 3.02 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
  - 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
  - 4. Lap water-resistive barrier over flashing at heads of openings.
  - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

# **END OF SECTION**
## **SECTION 07250**

#### WEATHER RESISTANT BARRIERS

#### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Weather barrier membrane: Commercial Wrap
- B. Seam Tape
- C. Flashing and Thru-Wall Flashing
- D. Fasteners

## 1.2 **REFERENCES**

- A. ASTM International
  - 1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
  - 2. ASTM C1193; Standard Guide for Use of Joint Sealants
  - 3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
  - 4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
  - 5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
  - 6. ASTM E96; Test Method for Water Vapor Transmission of Materials
  - 7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
  - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
  - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- B. AATCC American Association of Textile Chemists and Colorists
  - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
  - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
  - 2. Test Method T-460; Air Resistance (Gurley Hill Method)

# 1.3 SUBMITTALS

- A. Refer to Section 01300 Submittal Procedures
- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals
  - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
  - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
  - 3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.

## WEATHER RESISTANT BARRIERS

- E. Closeout Submittals
  - 1. Refer to Section [01 78 00 Closeout Submittals] [insert section number and title].
  - 2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

## 1.4 QUALITY ASSURANCE

- A. Qualifications
  - 1. Installer shall have experience with installation of commercial weather barrier assemblies under similar conditions.
  - 2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
  - 3. Source Limitations: Provide commercial weather barrier and accessory materials produced by single manufacturer.
- B. Mock-up
  - 1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
    - a. Mock-up size: [10 feet by 10 feet] [insert size].
    - b. Mock-up Substrate: Match wall assembly construction, including window opening.
    - c. Mock-up may [not] remain as part of the work.
  - 2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.
- C. Pre-installation Meeting
  - 1. Refer to Section [01 31 19 Project Meetings] [insert section number and title].
  - Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Engineer, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
  - 3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

# 1.5 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section [01 60 00 Product Requirements] [insert section number and title].
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by weather barrier manufacturer.

## 1.6 SCHEDULING

A. Review requirements for sequencing of installation of weather barrier assembly with

# WEATHER RESISTANT BARRIERS

installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.

B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

## 1.7 WARRANTY

- A. Refer to Section 01740 Warranties
- B. Special Warranty
  - 1. Special weather-barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
  - 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty are required.
  - 3. Warranty Areas: [Describe specific areas of work protected and areas of work excluded as required by project conditions].

#### PART 2 – PRODUCTS

#### 2.1 MANUFACTURER

A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com

#### 2.2 MATERIALS

- A. Basis of Design: spun-bonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont Tyvek Commercial Wrap and related assembly components.
- B. Performance Characteristics:
  - Air Penetration: 0.001 cfm/ft<sup>2</sup> at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft<sup>2</sup> at 75 Pa, when tested in accordance with ASTM E2357
  - 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
  - 3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
  - 4. Basis Weight: 2.7 oz/yd<sup>2</sup>, when tested in accordance with TAPPI Test Method T-410.
  - 5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
  - 6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
  - 7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
  - 8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

#### 2.3 ACCESSORIES

A. Seam Tape: 3-inch-wide, DuPont<sup>™</sup> Tyvek<sup>®</sup> Tape for commercial applications.

#### WEATHER RESISTANT BARRIERS

- B. Fasteners:
  - 1. Tyvek<sup>®</sup> Wrap Caps, as distributed by DuPont: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
- C. Sealants
  - 1. Refer to Section 07900 Joint Sealants

## PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

## 3.2 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
  - 1. Exterior corners: minimum 12 inches.
  - 2. Seams: minimum 6 inches.
- H. Weather Barrier Attachment:
  - 1. Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- I. Apply 4 inch by 7 inch piece of DuPont<sup>™</sup> StraightFlash<sup>™</sup> or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

## 3.3 SEAMING

A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping

# WEATHER RESISTANT BARRIERS

seams.

B. Seal any tears or cuts as recommended by weather barrier manufacturer.

## 3.4 **OPENING PREPARATION** (for use with non-flanged windows – all cladding types)

- A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

## 3.5 **OPENING PREPARATION** (for use with flanged windows)

- A. Cut weather barrier in an " $\_$ -cut" pattern. A modified  $\_$ -cut is also acceptable.
  - 1. Cut weather barrier horizontally along the bottom and top of the window opening.
  - 2. From the top center of the window opening, cut weather barrier vertically down to the sill.
  - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
- B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

## 3.6 FLASHING (for use with flanged windows)

- A. Cut 7-inchwide DuPont<sup>™</sup> FlexWrap<sup>™</sup> or DuPont<sup>™</sup> FlexWrap<sup>™</sup> NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont<sup>™</sup> FlexWrap<sup>™</sup> edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont<sup>™</sup> FlexWrap<sup>™</sup> at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont<sup>™</sup> FlexWrap<sup>™</sup> NF.
- D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
- E. Install window according to manufacturer's instructions.
- F. Apply 4-inch wide strips of DuPont<sup>™</sup> StraightFlash<sup>™</sup> at jambs overlapping entire mounting flange. Extend jamb flashing 1-inch above top of rough opening and below bottom edge of sill flashing.
- G. Apply 4-inch wide strip of DuPont<sup>™</sup> StraightFlash<sup>™</sup> as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
- H. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont<sup>™</sup> StraightFlash<sup>™</sup> over the 45-degree seams.

# WEATHER RESISTANT BARRIERS

- I. Tape head flap in accordance with manufacturer recommendations.
- J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

#### 3.8 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
- H. Terminate membrane on vertical wall. [Terminate into reglet, counterflashing or with termination bar.]
- J. Apply sealant bead at each termination.

#### 3.9 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL

- A. Overlap thru-wall flashing with weather barrier by 6-inches.
- B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
- C. Seal vertical and horizontal seams with tape or sealing membrane.

#### 3.10 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE

- A. Seal weather barrier to bottom of shelf angle with sealing membrane.
- B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
- C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

#### 3.11 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD

- A. Cut flap in weather barrier at window head.
- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D. Install end dams bedded in sealant.

## WEATHER RESISTANT BARRIERS

- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.
- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

## 3.12 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain [required] periodic observations of weather barrier assembly installation.

# 3.13 **PROTECTION**

A. Protect installed weather barrier from damage.

# END OF SECTION

# SECTION 07620 SHEET METAL FLASHING AND TRIM

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

#### 1.02 DESCRIPTION OF WORK

- A. Roof curb, roof penetrations, exterior doors and exterior window flashings.
- B. Work of this Section is to physically protect membrane roofing, base flashings, and their connections from damage that would permit water leakage to building interior.

## 1.03 RELATED WORK

- A. Section 04200 Unit Masonry.
- B. Section 06001 Wood blocking, nailers, and grounds.
- C. Section 07900 Joint Sealers
- D. Section 09900 Painting: Prime and finish painting.

#### 1.04 REFERENCES

- A. AA (Aluminum Association) Aluminum Construction Manual: Aluminum Sheet Metal Work and Building Construction.
- B. ANSI/ASTM B 32 Solder Metal
- C. ASTM B 209 Aluminum and Aluminum Alloy Sheet and Plate.
- D. ASTM D 226 Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
- E. NRCA (National Roofing Contractors Association) Roofing Manual.
- F. SMACNA Architectural Sheet Metal Manual

# 1.05 QUALITY ASSURANCE

A. Applicator: Company specializing in sheet metal flashing work with three years minimum experience.

#### 1.06 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01300.
- B. Describe material profile, jointing pattern, details, fastening methods, and installation details.

## 1.07 STORAGE AND HANDLING

- A. Store products under provisions of Section 01600.
- B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation.
- C. Prevent contact with materials during storage which may cause discoloration, staining or damage.

## PART 2 - GENERAL

## 2.01 **PRODUCTS**

A. Aluminum Sheet: ASTM B 209, 24 gauge shop pre-coated with coating of selected color as selected by Architect.

## 2.02 ACCESSORIES

- A. Fastener: Galvanized steel or cadmium plating soft neoprene washers at exposed fasteners. Finish exposed fasteners same as flashing metal.
- B. Underlayment: ASTM D 266; No. 90 asphalt saturated roofing felt.
- C. Sealant: Type specified in Section 07900.
- D. Plastic cement: FS SS-C-153, Type 1- Asphaltic base cement.
- E. Reglets: Surface mounted .032 inch mill finish aluminum models RC-1 and RC-2; manufactured by M-M Systems; face and ends covered with plastic tape.
- F. Solder: ANSI/ASTM B 32; 60/40 or 80/20 type.
- G. Flux: FS O-F-506

## 2.03 REGLETS

- A. General: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces and compatible with flashing indicated.
- B. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- C. Stucco Type: Provide with upturned fastening flange and extension leg of length to match thickness of applied finish materials.

- D. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
- E. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
- F. Flexible Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
- G. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of the counterflashing lower edge.
  - 1. Material: Stainless steel, 0.0187 inch (0.5 mm) thick.
  - 2. Material: Aluminum, 0.024 inch (0.6 mm) thick.
  - 3. Material: Galvanized steel, 0.0217 inch (0.55 mm) thick.
- H. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Fry Reglet Corporation.
  - 2. Hickman: W.P. Hickman Co.
  - 3. Keystone Flashing Company.

## 2.04 FABRICATION

- A. Form sections true to shape, accurate in size, square and free from distortion or defects.
- B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
- C. Form pieces in longest practical lengths.
- D. Hem exposed edges on underside  $\frac{1}{2}$ " (13mm); miter and seam corners.
- E. Form material with standing flat lock cover plate seam.
- F. Solder and seal metal joints. After soldering, remove flux. Wipe and wash solder joints clean.
- G. Fabricate corners from one piece with minimum 18 inch long legs; seam solder for rigidity, seal with sealant.
- H. Fabricate vertical faces with bottom edge formed outward ¼" (6mm) and hemmed to form drip.
- I. Fabricate flashings to allow toe to extend two inches over roofing. Return and brake edges.

## 2.05 FINISH

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations on applying and designation finishes.
- B. Fluoropolymer two-coat coating system: Manufacturer's standard two-coat thermocured system complying with AAMA 605.2, composed of specially formulated inhibitive primer

and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene resin by weight, complying with AAMA 605.2.

## **PART 3 - EXECUTION**

#### 3.01 INSPECTION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.
- B. Verify membrane termination and base flashings are in place, sealed and secure.
- C. Beginning of installation means acceptance of existing conditions.

## 3.02 **PREPARATION**

- A. Field measure site conditions prior to fabricating work.
- B. Install starter and edge strips, and cleats before starting installation.
- C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- D. Insert flashings into reglets to form tight fit. Secure in place with lead plastic wedges at maximum 12 inches on center. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
- E. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect/Engineer.
- F. Lap and seal all joints.
- G. Apply plastic cement compound between metal flashings and felt flashing.
- H. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- I. Solder metal joints watertight for full metal surface contact. After soldering, wash metal clean with neutralizing solution and rinse with water.
- J. Seal metal joints watertight.

#### 3.03 INSTALLATION

A. Conform to drawing details and details included in SMACNA and NRCA manual.

#### 3.04 SCHEDULE

- A. Flashing at exterior doors and windows.
- B. Flashing at roof curb openings and other roof and wall penetrations.

**END OF SECTION** 

# SECTION 07900 JOINT SEALERS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 DESCRIPTION OF WORK

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing

## 1.03 RELATED SECTIONS

A. Section 08800 – Glazing: Sealants used in conjunction with glazing methods.

## 1.04 **REFERENCES**

Α.	ANSI/ASTM D 1056	Flexible Cellular Materials- Sponge or Expanded Rubber.	
В.	ANSI/ASTM D 1565	Flexible Cellular Materials- Vinyl Chloride Polymers and Co-polymers (Open-Cell Foam).	
C.	ASTM C 790	Use of Latex Sealing Compounds	
D.	ASTM C 804	Use of Solvent-Release Type Sealants.	
E.	ASTM C 834	Latex Sealing Compounds	
F.	FS TT-C-00598	Caulking Compound, Oil and Resin Base Type	
G.	FS TT-S-001657	Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.	
H.	FS TT-S-00227	Sealing Compound: Elastomeric Type, Multi-Component.	
I.	FS TT-S-00230	Sealing Compound: Elastomeric Type, Single Component	
J.	FS TT-S-001543	Sealing Compound: Silicone Rubber Base.	
К.	SWI	Sealant and Caulking Guide Specification. (Sealing & Waterproofer's Institute)	

#### 1.05 SUBMITTALS

- A. Submit samples under provisions of Section 01300.
- B. Submit two (2) samples 6 inches in size illustrating colors selected.

- C. Submit manufacturer's installation instructions under provisions of Section 01300.
- D. Submit Manufacturer's certificate under provisions of Section 01400 that products meet or exceed specified requirements.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum three (3) years' experience and approved by the manufacturer.
- B. Applicator: Company specializing in applying the work of this section with minimum three (3) years' experience.
- C. Conform to Sealant and Waterproofer's Institute (SWI) requirements for installation

## 1.07 FIELD SAMPLES

A. Provide samples under provisions of Section 01300.

## 1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

## 1.09 SEQUENCING AND SCHEDULING

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the work of this Section with all Sections referencing this Section.

## 1.10 WARRANTY

- A. Provide five (5) year warranty under provisions of Section 01740.
- B. Warranty: Include coverage of installed sealants and accessories which fails to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

# PART 2 PRODUCTS

## 2.01 SEALANTS

- A. Acrylic Sealant: FS TT-S-00230, Type II, Class A; color as selected as manufactured by Tremco Acrylic Latex Caulk, Sonneborn Nonelastic or Pecora AC 20.
- B. Polysulphide Sealant: FS TT-S-00227, Type II non-sag, Class A; color as selected; Shore A, Average 23 manufactured by Sonnenborn Sonolastic or Pecora Synthacalk.
- C. Polyurethane Sealant: Single component, FS TT-S-00230, Type 1, self-leveling, Class A; color as selected; manufactured by Sonneborn Sonolastic Paving Joint Sealant or Pecora NR-200 Urespan.

- D. Polyurethane Sealant: Multi-component, FS TT-S-00230, Type II, non-sag, Class A; color as selected; Shore A, Average 35, manufactured by Tremco Dymeric, Sonolastic NPPII or Pecora Dynatrol II.
- E. Silicone Sealant: FL TT-S-01543, Class A, low modulus type; color as selected; Shore A, Average 22, manufactured by General Electric Silpruf, Dow Corning 795 Building Sealant or Pecora 864 Architectural Silicone.
- F. Silicone Sealant: : FS TT-S-01543, Class A, high modulus type; color as selected; Shore A, Average 35, manufactured by General Electric 1200, Dow Corning 795 Building Sealant or Pecora 863.
- G. Firewall/Smokewall Penetration Sealant: UL and Factory Mutual approved, non-sag formulation as manufactured by 3M Fire Protection Products, #CP25 N/S or 7900 series.
- H. Preformed Foam Sealants: Manufacturer's standard preformed, precompressed, impregnated open-cell foam sealant manufactured from high-density urethane foam impregnated with a nondrying, water repellent agent; factory-produced in precompressed sizes and in roll or stick form to fit joint widths indicated and to develop a watertight and airtight seal when compressed to the degree specified by manufacturer; and complying with the following requirements:
  - 1. "Emseal," Emseal Corp.
  - 2.. "Emseal Greyflex," Emseal Corp.

## 2.02 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming material.
- C. Joint Backing: Open cell with silicone sealant and closed cell with all others.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

## PART 3 EXECUTION

## 3.01 EXAMINATION

- A. Verify that joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing surfaces.

## 3.02 **PREPARATION**

- A. Clean and prime joints in accordance with manufacturer's instructions.
- B. Remove loose materials and foreign matter which might impair adhesion of sealant.
- C. Verify that joint backing and release tapes are compatible with sealant.

- D. Protect elements surrounding the work of this Section from damage or disfiguration.
- E. Ensure that joints are dry prior to installing joint sealants.

## 3.03 INSTALLATION

- A. Install sealant in accordance with manufacturer's instructions.
- B. Measure joint dimensions and size materials to achieve required width/depth ratios.
- C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.
- D. Install bond breaker where joint backing is not used.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- H. Tool joints as detailed.

## 3.04 CLEANING AND REPAIRING

- A. Clean work under provisions of Section 01700.
- B. Clean adjacent soiled surfaces.
- C. Repair or replace defaced or disfigured finishes caused by work of this section.

## 3.05 **PROTECTION OF FIINISHED WORK**

- A. Protect finished installation under provisions of Section 01500.
- B. Protect sealants until cured.

## 3.06 SCHEDULE

	Location	Type	<u>Color</u>
Α.	Metal/wood to Masonry or concrete	Polysulphide, (B) single component	White
В.	Vinyl siding or Wood to wood	(A) Acrylic, latex	to match siding or wood trim
C.	Door frame/Walls	(A) Acrylic, Solvent Cure	White
D.	Under Thresholds	Butyl	Black
Ε.	Bathtub/Ceramic tile	(E) Silicone, Fungus Resistant	White
F.	Masonry to masonry Concrete to concrete	(E) Silicone low modules	

## **END OF SECTION**

# SECTION 08141 FLUSH WOOD DOORS

## PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

## 1.02 DESCRIPTION OF WORK

A. Flush Wood doors, hollow core and solid core, frames and panels fire rated and non-rated.

## 1.03 RELATED WORK

- A. Section 06402 Finish carpentry for wood door frames and jambs
- B. Section 08710 Hardware
- C. Section 09900 Painting: Site finishing doors

## 1.04 **REFERENCES**

- A. ANSI/NWMA I.S.1 Industry standard for Wood Flush Doors (includes Standards I.S.1.1 through I.I.S.1.7).
- B. ANSI A135.4 Basic Hardboard.
- C. ASTM E90 Measurement of Airborne Sound Transmission Loss of Building Partitions.
- D. ASTM E152 Methods of Fire Tests of Door Assemblies
- E. AWI Quality Standards of Architectural Woodwork Institute
- F. NFPA 80 Fire Doors and Windows
- G. NFPA 252 Standard Method of Fire Tests for Door Assemblies
- H. UL 10B Fire Tests of Door Assemblies

## 1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with the following standard:
  - 1. NWWDA Quality Standard: NWWDA I.S.1-A, "Architectural Wood Flush Doors."
  - 2. AWI Quality Standard: AWI's "Architectural Woodwork Quality Standards" for grade of door, core, construction, finish, and other requirements.

FLUSH WOOD DOORS SECTION 08141-1

- C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
  - 1. Test Pressure: Test at atmospheric pressure.
- D. Oversized, Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate stating that doors comply with all standard construction requirements of tested and labeled fire-door assemblies except for size.
  - 1. Temperature-Rise Rating: At stairwell enclosures, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
  - 2. Temperature-Rise Rating: At stairwell enclosures, provide doors that have a temperature-rise rating of 250 deg F (139 deg C) maximum in 30 minutes of fire exposure.

## 1.06 REGULATORY REQUIREMENTS

A. Conform to all applicable codes for fire rated doors and panels.

## 1.07 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

## 1.08 DELIVERY, STORAGE AND PROTECTION

- A. Protect products under provisions of Section 01600.
- B. Protect doors with resilient packaging, sealed with heat shrunk plastic. Break seal on site to permit ventilation.
- C. Package, deliver and store doors in accordance with AWI ANSI/AWMA requirements.

## 1.09 WARRANTY

A. Provide five (5) year manufacturer's warranty under provisions of Section 01740.

# PART 2 - PRODUCTS

## 2.01 ACCEPTABLE MANUFACTURERS

- A. VT Industries
- B. Algoma
- C. Marshfield Door systems
- D. Florida made Doors
- E. Substitutions: Under provisions of Section 10600

FLUSH WOOD DOORS SECTION 08141-2

## 2.02 DOOR AND PANEL TYPES

- A. Flush Interior Doors: 1-3/4" thick; solid core construction; fire rated as required, panel design per drawings.
- B. Flush interior doors in resident units: 1 3/8" thick, hollow core construction, panel design per drawings, with wood frames

## 2.03 DOOR AND PANEL CONSTRUCTION (ANSI/AWMA – I.S.1 STANDARD)

- A. Solid, Non-Rated Core: ANSI/NWMA I.S.1; solid wood block glued.
- B. Solid, Special Function Core: ANSI/NWMA I.S.1; labeled fire performance.

## 2.04 FLUSH DOOR AND PANEL FACING

- A. Facing Quality: AWI premium grade
- B. Basis of Design: Match existing
- C. Wood Species for Opaque Finish: Match existing.

## 2.05 ADHESIVES

A. Interior doors: AWI, ANSI/NWMA, Type II.

## 2.06 FABRICATION

- A. Fabricate flush wood doors in sizes indicated for Project site fitting.
- B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
  - 1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.
- C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
  - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  - 2. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- D. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
  - 1. Fixed Transom Panels: Fabricate fixed panels with solid lumber transom bottom rail and door top rail, both rabbeted as indicated. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- E. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Louvers: Factory install louvers in prepared openings.

## FLUSH WOOD DOORS SECTION 08141-3

- F. Exterior Doors: Factory treat exterior doors with water repellent after manufacturing has been completed.
  - 1. Flash top of out-swinging doors (with manufacturer's standard metal flashing).

## PART 3 - EXECUTION

## 3.01 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions.
- B. Machine cut relief for hinges and closers and coring for handsets and cylinders.
- C. Trim door width by cutting equally on both jamb edges. Trim fire door width from lock edge only, to a maximum of 3/16 inch (5mm).
- D. Trim door height by cutting equally on top and bottom edges to a maximum of 3/4 inch (19mm). Trim fire door height at bottom edge only, to a maximum of one inch (25mm).
- E. Pilot drill screw and bolt holes. Use threaded through bolts for half surface hinges.
- F. Prepare doors to receive finish hardware in accordance with AWI ANSI/AWMA requirements.
- G. Conform to ANSI/AWMA requirements for fit tolerances.
- H. Coordinate installation of glass and glazing.
- I. Install door louvers.

## 3.02 INSTALLATION TOLERANCES

A. Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

# 3.03 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

## **END OF SECTION**

# SECTION 08143 STILE AND RAIL WOOD DOORS

## PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.02 DESCRIPTION OF WORK

- A. This Section includes the following:
  - 1. Factory finishing of stile and rail wood doors.

## 1.03 RELATED SECTIONS

- A. Division 6 Section "Interior Architectural Woodwork" for requirements relating to custom veneers from the same flitches for both wood doors and architectural woodwork items.
- B. Division 6 Section "Interior Architectural Woodwork" for wood door frames.

## 1.04 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of door, including details of construction, glazing, and factoryfinishing specifications.
- C. Shop drawings indicating location and size of each door; elevation of each kind of door; construction details not covered in product data, including those for stiles, rails, panels, and moldings (sticking); location and extent of hardware cutouts; fire ratings; requirements for veneer matching and factory finishing; and other pertinent data.
- D. Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:
  - 1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.
- E. Samples for verification in the form of a corner section, 12 inches (300 mm) square, showing edges, faces, joinery, and material qualities of typical stile, rail, molding, and panel for each exposed material, door type, and finish required; and as follows:
  - 1. Doors for Transparent Finish: Door faces with typical range of color and grain for each veneer and lumber species required.
  - 2. Factory-Finished Doors: Door faces with typical factory finish.
- F. Product certificates signed by door manufacturers certifying that their products comply with specified requirements.

# 1.05 QUALITY ASSURANCE

A. Quality Standard: Comply with the following standard:

- 1. NWWDA Quality Standard: I.S.6, "Industry Standard for Wood Stile and Rail Doors," of the National Wood Window and Door Association.
- 2. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, construction, finish, and other requirements.
- B. Fire-Rated Wood Doors: Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.
- C. Safety Glass: Provide products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials except where those of Category I are expressly indicated and permitted.
- D. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.
- E. Product Certification: Require door manufacturer to certify that doors comply with specified requirements including those of referenced door standard.
  - 1. Mark, label, or otherwise identify panel wood doors as complying with NWWDA I.S.6.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.
- B. Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

## 1.07 **PROJECT CONDITIONS**

- A. Conditioning: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Conditioning: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with the following requirements applicable to Project's geographical location:
  - 1. AWI quality standard Section 100-S-11 "Relative Humidity and Moisture Content."

## PART 2 - PRODUCTS

## 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Stile and Rail Doors of Stock Design and Construction:
    - a. Eggers Industries.
    - b. The Maiman Company

c. Algoma Doors

## 2.02 STILE AND RAIL DOORS OF STOCK DESIGN AND CONSTRUCTION

- A. Interior Doors: Comply with the following requirements:
  - 1. NWWDA Grade for Transparent Finish: Premium or select.
  - 2. NWWDA Grade for Opaque Finish: Standard.
  - 3. Wood Species for Transparent Finish:
    - a. Raised Panel Thickness 3/8"
    - b. Basis of Design: Match existing.
  - 4. Wood Species for Opaque Finish: Match existing.
  - 5. Panel Configuration: Raised.
    - a. Raised Panel Thickness: Manufacturer's standard but not less than that required by referenced NWWDA standard for design group indicated.
    - b. Raised Panel Thickness: Match existing.
  - 6. Design and Layout: Panel design as described below under NWWDA design group, with minimum dimensions for stiles, rails, panels, and other elements complying with referenced NWWDA standard.
    - a. Panel Design: Match existing.
- B. Interior Fire Doors: Fire-rated doors with 1-3/4-inch- (45-mm-) thick stiles and rails and 1-3/8-inch- (35-mm-) thick raised panels, complying with requirements indicated for interior doors of NWWDA Design Group 1-3/8 Interior Panel Doors.
- C. Interior Frames and Jambs
  - 1. Quality Standard: Comply with AWI Section 900
    - a. Grade: Premium
    - b. Wood Species: Match existing.

# 2.03 FABRICATION

- A. Fabricate stile and rail wood doors to comply with the following requirements:
  - 1. In sizes indicated for job-site fitting.
  - 2. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:
    - a. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch (3.2 mm) at jambs and heads, 1/16 inch (1.6 mm) per leaf at meeting stiles for pairs of doors, and 1/2 inch (12.7 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 3/8-inch (9.5-mm) clearance from bottom of door to top of threshold.
    - b. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
    - c. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
    - d. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.

- 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
- C. Glazed Openings: Glaze doors at factory for applications indicated. Comply with requirements in Division 8 Section "Glazing."
- D. Transom and Side Panels: Fabricate panels to match adjoining doors in materials, finish, and quality of construction.

## 2.04 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime exposed portions of doors for paint finish with one coat of wood primer specified in Division 9 Section "Painting."
- B. Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain (if required) and other required pretreatments and first coat of finish as specified in the following:
  - 1. Division 9 Section "Painting."

#### 2.05 FACTORY FINISHING

- A. General: Comply with referenced quality standard's requirements for factory finishing.
- B. Finish wood doors at factory.
- C. Finish wood doors at factory where indicated on schedules or Drawings as factory finished.
- D. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
  - 1. Grade: Premium.
  - 2. Finish: Manufacturer's standard finish with performance requirements comparable to either AWI System TR-2 catalyzed lacquer or AWI System TR-4 conversion varnish.
  - 3. Staining: Match existing.
  - 4. Effect: Filled finish.
  - 5. Sheen: Match existing.
- E. Opaque Finish: Comply with requirements indicated for grade, finish system, color, and sheen.
  - 1. Grade: Premium.
  - 2. Finish: Manufacturer's standard finish with performance requirements comparable to AWI System OP-2 catalyzed lacquer.
  - 3. Color: Match existing.
  - 4. Sheen: Match existing.

## **PART 3 - EXECUTION**

#### 3.01 EXAMINATION

A. Examine installed door frames prior to hanging door:

- 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
- 2. Reject doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

## 3.02 INSTALLATION

- A. Hardware: For installation see Division 8 Section "Door Hardware."
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
  - 1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.
- C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
  - 1. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch (3.2 mm) at jambs and heads, 1/16 inch (1.6 mm) per leaf at meeting stiles for pairs of doors, and 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch (6.4-mm) clearance from bottom of door to top of threshold.
  - 2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
  - 3. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
  - 4. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at the job site.
- F. Field-Finished Doors: Refer to the following for finishing requirements:
  - 1. Division 9 Section "Painting."

## 3.03 ADJUSTING AND PROTECTION

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

# END OF SECTION

## SECTION 08710 DOOR HARDWARE

## PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.02 DESCRIPTION OF WORK

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
  - 1. Hinges.
  - 2. Pivots.
  - 3. Spring hinges.
  - 4. Key control system.
  - 5. Lock cylinders and keys.
  - 6. Lock and latch sets.
  - 7. Bolts.
  - 8. Exit devices.
  - 9. Push/pull units.
  - 10. Closers.
  - 11. Overhead holders.
  - 12. Miscellaneous door control devices.
  - 13. Door trim units.
  - 14. Protection plates.
  - 15. Sliding door equipment.
  - 16. Bifold door hardware.
  - 17. Weatherstripping for exterior doors.
  - 18. Sound stripping for interior doors.
  - 19. Automatic drop seals (door bottoms).
  - 20. Astragals or meeting seals on pairs of doors.
  - 21. Thresholds.

# 1.03 RELATED SECTIONS

- A. Division 6 Section "Interior Architectural Woodwork" for cabinet hardware.
- B. Division 8 Section "Hollow Metal Doors and Frames" for silencers integral with hollow metal frames.
- C. Division 8 Section "Wood Doors" for factory prefitting and factory premachining of doors for door hardware.
- D. Division 8 Section "Stile and Rail Wood Doors" for factory prefitting and factory premachining of doors for hardware.

- E. Division 8 Section "Aluminum Entrances and Storefronts" for aluminum entrance door hardware, except cylinders.
- F. Division 17 Building Security Systems.
- G. Products furnished but not installed under this Section include:
  - 1. Cylinders for locks on entrance doors.
  - 2. Final replacement cores and keys to be installed by Owner.

## 1.04 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
    - a. Type, style, function, size, and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each hardware set cross referenced to indications on Drawings both on floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
    - h. Keying information.
  - 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
  - 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Samples of each type of exposed hardware unit in finish indicated and tagged with full description for coordination with schedule. Submit samples prior to submission of final hardware schedule.
  - 1. Samples will be returned to the supplier. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated in the Work, within limitations of keying coordination requirements.
- E. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

## 1.05 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

## 1.06 **PRODUCT HANDLING**

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

## 1.07 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

## PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Butts and Hinges:
    - a. Bommer Industries, Inc.
    - b. Hager Hinge Co.
    - c. McKinney Products Co.
    - d. H. Soss & Company.
    - e. Stanley Hardware, Div. Stanley Works.
  - 2. Pivots:
    - a. Glynn-Johnson Corp.
    - b. Hager Hinge Co.
    - c. Stanley Hardware, Div. Stanley Works.
  - 3. Key Control System:
    - a. Key Control Systems, Inc.
    - b. Telkee Inc.
  - 4. Cylinders and Locks:
    - a. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
    - b. Falcon Lock Co.
    - c. Sargent Manufacturing Company.
    - d. Schlage Lock, Div. Ingersoll-Rand Door Hardware Group.
    - e. Yale Security Inc.
  - 5. Bolts:
    - a. Hager Hinge Co.
    - b. H. B. Ives
    - c. Stanley Hardware, Div. Stanley Works.
  - 6. Exit/Panic Devices:
    - a. Adams Rite Manufacturing Co.
    - b. Arrow Lock Manufacturing Co.
    - c. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
    - d. Dor-O-Matic.
    - e. Sargent Manufacturing Company.
    - f. Von Duprin, Div. Ingersoll-Rand Door Hardware Group.
    - g. Yale Security Inc.
  - 7. Push/Pull Units:
    - a. Baldwin Hardware Corp.
    - b. Brookline Industries, Div. Yale Security Inc.
    - c. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
    - d. Hager Hinge Co.
    - e. Hiawatha, Inc.
    - f. H. B. Ives
  - 8. Overhead Closers:
    - a. Arrow Lock Manufacturing Co.
    - b. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
    - c. Dorma Door Controls International.
    - d. LCN, Div. Ingersoll-Rand Door Hardware Group.
    - e. Norton Door Controls, Div. Yale Security Inc.

- f. Rixson-Firemark, Div. Yale Security Inc.
- g. Sargent Manufacturing Company.
- h. Yale Security Inc.
- 9. Smoke-Activated Closers:
  - a. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
  - b. Dor-O-Matic.
  - c. Dorma Door Controls International.
  - d. Norton Door Controls, Div. Yale Security Inc.
  - e. Rixson-Firemark, Div. Yale Security Inc.
  - f. Yale Security Inc.
- 10. Floor Closers:
  - a. Dor-O-Matic.
  - b. Dorma Door Controls International.
  - c. Rixson-Firemark, Div. Yale Security Inc.
- 11. Door Control Devices:
  - a. Baldwin Hardware Corp.
  - b. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
  - c. Glynn-Johnson Corp.
  - d. Hager Hinge Co.
  - e. H. B. Ives
- 12. Door Trim Units:
  - a. Baldwin Hardware Corp.
  - b. Brookline Industries, Div. Yale Security Inc.
  - c. Hager Hinge Co.
  - d. H. B. Ives
- 13. Kick, Mop, and Armor Plates:
  - a. Baldwin Hardware Corp.
  - b. Brookline Industries, Div. Yale Security Inc.
  - c. Corbin & Russwin Architectural Hardware, Div. Black & Decker Corp.
  - d. Hager Hinge Co.
  - e. Hiawatha, Inc.
  - f. H. B. Ives
- 14. Sliding Door Hardware Sets:
  - a. Grant Hardware Co.
  - b. L. E. Johnson Products, Inc.
  - c. Stanley Hardware, Div. Stanley Works.
- 15. Sliding Pocket Door Sets:
  - a. Grant Hardware Co.
  - b. L. E. Johnson Products, Inc.
  - c. Stanley Hardware, Div. Stanley Works.
- 16. Bifold Door Hardware:
  - a. Grant Hardware Co.
  - b. L. E. Johnson Products, Inc.
  - c. Stanley Hardware, Div. Stanley Works.
- 17. Door Stripping and Seals:
  - a. Hager Hinge Co.
  - b. National Guard Products, Inc.
  - c. Pemko Manufacturing Co., Inc.

- d. Reese Enterprises, Inc.
- e. Sealeze Corp.
- f. Zero International, Inc.
- 18. Thresholds:
  - a. Hager Hinge Co.
  - b. National Guard Products, Inc.
  - c. Pemko Manufacturing Co., Inc.
  - d. Reese Enterprises, Inc.
  - e. Sealeze Corp.
  - f. Zero International, Inc.
- 19. Automatic Drop Seals:
  - a. Hager Hinge Co.
  - b. National Guard Products, Inc.
  - c. Pemko Manufacturing Co., Inc.
  - d. Reese Enterprises, Inc.
  - e. Zero International, Inc.
- 20. Sound Stripping:
  - a. National Guard Products, Inc.
  - b. Pemko Manufacturing Co., Inc.
  - c. Reese Enterprises, Inc.
  - d. Zero International, Inc.
- 21. Astragals:
  - a. Hager Hinge Co.
  - b. National Guard Products, Inc.
  - c. Pemko Manufacturing Co., Inc.
  - d. Reese Enterprises, Inc.
  - e. Zero International, Inc.

## 2.02 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:
  - 1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.
  - 2. ANSI/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.
    - a. Butts and Hinges: ANSI/BHMA A156.1.
    - b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2.
    - c. Exit Devices: ANSI/BHMA A156.3.
    - d. Door Controls Closers: ANSI/BHMA A156.4.
    - e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
    - f. Architectural Door Trim: ANSI/BHMA A156.6.
    - g. Template Hinge Dimensions: ANSI/BHMA A156.7.
    - h. Door Controls Overhead Holders: ANSI/BHMA A156.8.

- i. Interconnected Locks and Latches: ANSI/BHMA A156.12.
- j. Mortise Locks and Latches: ANSI/BHMA A156.13.
- k. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.
- I. Closer Holder Release Devices: ANSI/BHMA A156.15.
- m. Auxiliary Hardware: ANSI/BHMA A156.16.
- n. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.
- o. Materials and Finishes: ANSI/BHMA A156.18.

## 2.03 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
  - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Base Metals: Produce hardware units of basic metal and forming method indicated using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units for finish designations indicated.
- D. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- E. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- F. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

## 2.04 HINGES, BUTTS, AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Provide Phillips flat-head screws complying with the following requirements:
  - 1. For metal doors and frames install machine screws into drilled and tapped holes.
  - 2. For wood doors and frames install wood screws.

- 3. For fire-rated wood doors install #12 x 1-1/4-inch (32-mm), threaded-to-the-head steel wood screws.
- 4. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - 1. Out-Swing Exterior Doors: Nonremovable pins.
  - 2. Out-Swing Corridor Doors with Locks: Nonremovable pins.
  - 3. Interior Doors: Nonrising pins.
  - 4. Tips: Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.
- D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches (2250 mm) or less in height and one additional hinge for each 30 inches (750 mm) of additional height.
  - 1. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches (2150 mm) or less in height with same rule for additional hinges.

## 2.05 LOCK CYLINDERS AND KEYING

- A. Standard System: Except as otherwise indicated, provide new masterkey system for Project.
- B. Equip locks with cylinders for interchangeable-core pin tumbler inserts. Furnish only temporary inserts for the construction period, and remove these when directed.
  - 1. Furnish final cores and keys for installation by Owner.
- C. Equip locks with high-security cylinders that comply with performance requirements for Grade 1 cylinders as listed in ANSI/BHMA A156.5 and that have been tested for pick and drill resistance requirements of UL 437 and are UL listed.
- D. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
- E. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
  - 1. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol, and notation, "DO NOT DUPLICATE."
- F. Key Material: Provide keys of nickel silver only.
- G. Key Quantity: Furnish 3 change keys for each lock, 5 master keys for each master system, and 5 grandmaster keys for each grandmaster system.
  - 1. Furnish one extra blank for each lock.
  - 2. Deliver keys to key control system manufacturer.
  - 3. Deliver keys to Owner.

## 2.06 KEY CONTROL SYSTEM

A. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150 percent of the number of locks required for the Project.

- 1. Provide complete cross index system set up by key control manufacturer, and place keys on markers and hooks in the cabinet as determined by the final key schedule.
- 2. Provide hinged-panel type cabinet for wall mounting.
- 3. Provide multiple-drawer type cabinet.

## 2.07 LOCKS, LATCHES, AND BOLTS

- A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
  - 1. Provide flat lip strikes for locks with 3-piece, antifriction latchbolts as recommended by manufacturer.
  - 2. Provide extra long strike lips for locks used on frames with applied wood casing trim.
  - 3. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
  - 4. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
  - 5. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
  - 6. Provide standard (open) strike plates for interior doors of residential units where wood door frames are used.
- B. Lock Throw: Provide 5/8-inch (16-mm) minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
  - 1. Provide 1/2-inch (13-mm) minimum throw of latch for other bored and preassembled types of locks and 3/4-inch (19-mm) minimum throw of latch for mortise locks. Provide 1-inch (25-mm) minimum throw for all dead bolts.
- C. Flush Bolt Heads: Minimum of 1/2-inch- (13-mm-) diameter rods of brass, bronze, or stainless steel with minimum 12-inch- (300-mm-) long rod for doors up to 84 inches (2100 mm) in height. Provide longer rods as necessary for doors exceeding 84 inches (2100 mm) in height.
- D. Exit Device Dogging: Except on fire-rated doors where closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to keep the latch bolt retracted, when engaged.
- E. Rabbeted Doors: Where rabbeted door stiles are indicated, provide special rabbeted front on lock and latch units and bolts.

## 2.08 PUSH/PULL UNITS

- A. Exposed Fasteners: Provide manufacturer's standard exposed fasteners for installation, thrubolted for matched pairs but not for single units.
- B. Concealed Fasteners: Provide manufacturer's special concealed fastener system for installation, thru-bolted for matched pairs but not for single units.

## 2.09 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
  - 1. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.
  - 2. Provide parallel arms for all overhead closers, except as otherwise indicated.
- B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.
- C. Combination Door Closers and Holders: Provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.
  - 1. Provide integral smoke detector device in combination door closers and holders complying with UL 228.
- D. Flush Floor Plates: Provide finished metal flush floor plates for floor closers except where thresholds are indicated and cover plate is specified to be an integral part of threshold. Finish floor plate to match hardware sets, unless otherwise indicated.
- E. Recessed Floor Plates: Provide recessed floor plates where no thresholds are indicated and floor closers are located in an area of resilient flooring, stone flooring, or terrazzo. Recess plates to receive an insert of the floor finish material of the normal thickness as indicated. Provide extended spindle on closer as may be necessary to accommodate thickness of floor finish.
  - 1. Where terrazzo floor finish includes metal divider or expansion strips, match exposed ring of recessed floor plate on closer with metal of floor strips.
- F. Provide grey resilient parts for exposed bumpers.
- G. Provide black resilient parts for exposed bumpers.

# 2.10 DOOR TRIM UNITS

- A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
- B. Fabricate edge trim of stainless steel to fit door thickness in standard lengths or to match height of protection plates.
- C. Fabricate protection plates not more than 1-1/2 inches (38 mm) less than door width on hinge side and not more than 1/2 inch (13 mm) less than door width on pull side by height indicated.
  - 1. Metal Plates: Brass or bronze, 0.062 inch (U.S. 16 gage) (1.6 mm).

## 2.11 HARDWARE FOR INTERIOR SLIDING DOORS

- A. General: Provide manufacturer's standard hardware for interior sliding doors when not furnished as part of complete door package.
- B. Operating Hardware for Bipassing Doors: Provide manufacturer's complete set consisting of extruded aluminum overhead track, adjustable hangers (carriages), bumpers, and floor guides designed to accommodate the number, size, thickness, and weight of door leaves indicated. Provide flush pulls for each door leaf.
- C. Operating Hardware for Pocket Doors: Provide manufacturer's complete set consisting of extruded aluminum or galvanized steel overhead track, adjustable hangers (carriages), galvanized steel split-jambs and split-studs, wood nailers for head track, jambs and studs, galvanized steel brackets for assembly and attachment to floor and wall framing, bumpers, and nylon floor guides designed to accommodate the number (single and biparting), size, thickness, and weight of door leaves indicated. Provide flush pull and edge pull for each door leaf.

## 2.12 HARDWARE FOR BIFOLD DOORS

- A. General: Provide manufacturer's standard hardware for interior bifold doors when not furnished as part of complete door package.
- B. Operating Hardware: Provide manufacturer's complete sets consisting of overhead extruded aluminum track; captive nylon shoe or roller guides; rubber bumpers in track; and adjustable pivots, hinges, and door aligners all designed to accommodate the number, size, thickness, and weight of door leaves indicated.
  - 1. Provide light-duty sets designed for leaves weighing up to 25 lb (11.34 kg).
  - 2. Provide medium-duty sets designed for leaves weighing up to 35 lb (15.88 kg).
  - 3. Provide heavy-duty sets designed for leaves weighing up to 75 lb (34 kg).
  - 4. Provide extra-heavy-duty sets designed for leaves weighing up to 125 lb (56.7 kg) and 48 inches (1200 mm) in width with a minimum thickness of 1 inch (25 mm).
- C. Trim Hardware: Provide the following items as needed for operating bifold doors:
  - 1. Pulls: Manufacturer's standard pull, one per pair of leaves.
  - 2. Pulls: Single knob pull with dummy rose matching design and finish of knobs for swing doors, by manufacturer of locks and latches.

## 2.13 WEATHERSTRIPPING AND SEALS

- A. General: Provide continuous weatherstripping on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.
- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Weatherstripping at Jambs and Heads: Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semimortised, and of following metal, finish, and resilient bumper material:
- 1. Extruded aluminum with color anodized finish as selected from manufacturer's standard color range, 0.062-inch (1.6-mm) minimum thickness of main walls and flanges.
- 2. Sponge neoprene conforming to MIL R 6130, Class II (Closed Cell).
  - a. Grade A: 30 to 150 deg F (-1 to 65 deg C), oil-resistant and selfextinguishing.
  - b. Grade C: 67 to 170 deg F (19 to 77 deg C), low temperature.
- 3. Expanded neoprene: Cellular rubber conforming to ASTM D 1056 Type 2 (closed-cell); Class B (low-swell, oil-resistant); Grade 2 (compression-deflection of 5 9 psi (35 60 kPa)); and self-extinguishing in following size:
  - a. 3/16 x 5/8 inch (5 x 16 mm).
  - b. 1/4 x 3/4 inch (6 x 19 mm).
  - c. 3/8 x 1-1/4 inches (10 x 32 mm).
- 4. Solid neoprene conforming to MIL R 6855, Class II, Grade 40.
  - a. Flexible, hollow bulb or loop insert.
- D. Weatherstripping at Door Bottoms: Provide threshold consisting of contact-type resilient insert and metal housing of design and size shown and of following metal, finish, and resilient seal strip:
  - 1. Extruded aluminum with color anodized finish as selected from manufacturer's standard color range, 0.062-inch (1.6-mm) minimum thickness of main walls and flanges.
  - 2. Solid neoprene wiper or sweep seal complying with MIL R 6855, Class II, Grade 40.

# 2.14 THRESHOLDS

- A. General: Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile as shown or scheduled. All entry/exit doors to have ADA thresholds.
- B. Exterior Hinged or Pivoted Doors: Provide units not less than 4 inches (100 mm) wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames, and as follows:
  - 1. For in-swinging doors provide units with interlocking lip and interior drain channel; include hook on bottom edge of door and drain pan.
  - 2. For out-swinging doors provide units with interlocking lip and with hook on bottom edge of door to act as weather bar.
  - 3. For out-swinging doors provide rabbeted type units with replaceable weatherstrip insert in stop.

#### 2.15 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if no latch or lock sets).
- B. Provide finishes as determined by the Interior Designer.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

DOOR HARDWARE SECTION 08710 - 12

- D. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze, and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer."
- E. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.
- F. The designations used in schedules and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.
  - 1. Rust-Resistant Finish: For iron and steel base metal required for exterior work and in areas shown as "High Humidity" areas (and also when designed with the suffix RR), provide 0.2-mil- (0.005-mm-) thick copper coating on base metal before applying brass, bronze, nickel, or chromium plated finishes.

# PART 3 - EXECUTION

# 3.01 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Architect.
  - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
  - 2. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."
- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers."
- F. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

# 3.02 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.
  - 1. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to

DOOR HARDWARE SECTION 08710 - 13 acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

- B. Clean adjacent surfaces soiled by hardware installation.
- C. Instruct Owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes.
- D. Six-Month Adjustment: Approximately six months after the date of Substantial Completion, the Installer, accompanied by representatives of the manufacturers of latchsets and locksets and of door control devices, and of other major hardware suppliers, shall return to the Project to perform the following work:
  - 1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
  - 2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
  - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
  - 4. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

# 3.03 HARDWARE SCHEDULE

A. General: Provide hardware for each door to comply with requirements of hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

## 3.04 SUBCONTRACTOR COORDINATION

- A. Door and hardware suppliers shall work with security systems subcontractor to coordinate work and allow for installation of electronic systems either during or after construction.
- B. Any conflicts between door hardware and security systems shall be adjudicated by the General Contractor.

#### HARDWARE SCHEDULE

LOCK SET: Match existing unless otherwise directed by Owner.

PASSAGE SET: Match existing unless otherwise directed by Owner.

# END OF SECTION

# SECTION 08800 GLAZING

# PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **1.02 DESCRIPTION OF WORK**

- A. This Section includes glazing for the following products, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Window units.
  - 2. Glass Doors

# 1.03 RELATED SECTIONS

- A. Division 8 Section "Wood doors".
- B. Division 8 Section "Stile and Rail Wood Doors".

# 1.04 **DEFINITIONS**

- A. Manufacturer is used in this Section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced glazing standard.
- B. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's directions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.
- C. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's directions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated glass standard.
- D. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use due to causes other than glass breakage and improper practices for maintaining, and cleaning insulating glass. Evidence of failure is the obstruction of vision by dust, moisture, or film on the interior surfaces of glass. Improper practices for maintaining and cleaning glass do not comply with the manufacturer's directions.

#### 1.05 SYSTEM PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems that are produced, fabricated, and installed to withstand normal thermal movement, wind loading, and impact loading (where applicable), without failure including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; and other defects in construction.

- B. Glass Design: Glass thicknesses indicated on Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
  - 1. Minimum glass thickness, nominally, of lites in exterior walls is 6 mm.
  - 2. Tinted and heat-absorbing glass thicknesses for each tint indicated are the same throughout Project.
  - 3. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following:
    - a. 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E 1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E 1300 based on type of glass.
    - b. 1 lite per 1000 for lites set over 15 degrees off vertical and under action of wind or snow.
- C. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass-framing members and glazing components. Base engineering calculation on materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.
  - 1. Temperature Change (Range): 120 F deg (67 C deg), ambient; 180 F deg (100 C deg), material surfaces.

#### 1.06 SUBMITTALS

- A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.
- B. Product data for each glass product and glazing material indicated.
- C. Samples for verification purposes of 12-inch (300 mm) square samples of each type of glass indicated except for clear monolithic glass products, and 12-inch (300 mm) long samples of each color required (except black) for each type of sealant or gasket exposed to view. Install sealant or gasket sample between two strips of material representative in color of the adjoining framing system.
- D. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
  - 1. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.
- E. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.

- F. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.
- G. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
- H. Maintenance data for glass and other glazing materials to include in Operating and Maintenance Manual specified in Division 1.
- I. Submit required documentation to show compliance with State of Florida Building Code requirements and Miami-Dade Notice of Approval.

# 1.07 QUALITY ASSURANCE

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. FGMA Publications: "FGMA Glazing Manual."
  - 2. AAMA Publications: AAMA TIR-A7 "Sloped Glazing Guidelines" and "Glass Design for Sloped Glazing."
  - 3. LSGA Publications: "LSGA Design Guide."
  - 4. SIGMA Publications: TM-3000 "Vertical Glazing Guidelines" and TB-3001 "Sloped Glazing Guidelines."
- B. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
  - 1. Subject to compliance with requirements, provide safety glass permanently marked with certification label of Safety Glazing Certification Council (SGCC) or other certification agency acceptable to authorities having jurisdiction.
- C. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- D. Fire-Resistive Glazing Products for Window Assemblies: Products identical to those tested per ASTM E 163, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Insulating Glass Certification Program: Provide insulating glass units permanently marked either on spacers or at least one component lite of units with appropriate certification label of inspecting and testing agency indicated below:
  - 1. Insulating Glass Certification Council (IGCC).
  - 2. Associated Laboratories, Inc. (ALI).
  - 3. National Certified Testing Laboratories (NCTL).
- F. Glazier Qualifications: Engage an experienced glazier who has completed glazing similar in material, design, and extent to that indicated for Project with a record of successful inservice performance.
- G. Single-Source Responsibility for Glass: Obtain glass from one source for each product indicated below:

- 1. Primary glass of each (ASTM C 1036) type and class indicated.
- 2. Heat-treated glass of each (ASTM C 1048) condition indicated.
- 3. Laminated glass of each (ASTM C 1172) kind indicated.
- 4. Insulating glass of each construction indicated.
- H. Single-Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.
- I. Preconstruction Compatibility and Adhesion Testing: Submit to sealant manufacturers, samples of each glass, gasket, glazing accessory, and glass-framing member that will contact or affect glazing sealants for compatibility and adhesion testing as indicated below:
  - 1. Use test methods standard with sealant manufacturer to determine if priming and other specific preparation techniques are required for rapid, optimum glazing sealants adhesion to glass and glazing channel substrates.
    - a. Perform tests under normal environmental conditions during installation.
  - 2. Submit not less than nine pieces of each type and finish of glass-framing members and each type, class, kind, condition, and form of glass (monolithic, laminated, insulating units) for adhesion testing, as well as one sample of each glazing accessory (gaskets, setting blocks and spacers) for compatibility testing.
  - 3. Schedule sufficient time to test and analyze results to prevent delay in the Work.
  - 4. Investigate materials failing compatibility or adhesion tests and get sealant manufacturer's written recommendations for corrective measures, including using special primers.
  - 5. Testing is not required when glazing sealant manufacturer can submit required preparation data that is acceptable to Architect and is based on previous testing of current sealant products for adhesion to and compatibility with submitted glazing materials.
- J. Pre-Installation Conference: Conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings."

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
  - 1. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricator's recommendations for venting and sealing to avoid hermetic seal ruptures.

#### 1.09 **PROJECT CONDITIONS**

- A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Install liquid sealants at ambient and substrate temperatures above 40 deg F (4 deg C).

### 1.10 WARRANTY

- A. General: Warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.
- B. Manufacturer's Warranty on Coated Glass Products: Submit written warranty signed by coated glass manufacturer agreeing to furnish replacements for those coated glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
  - 1. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- C. Manufacturer's Warranty on Laminated Glass: Submit written warranty signed by insulating glass manufacturer agreeing to furnish replacements for those laminated glass units that deteriorate as defined in the "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to glass manufacturer's published instructions.
  - 1. Warranty Period: Manufacturer's standard but not less than 5 years after date of Substantial Completion.
- D. Manufacturer's Warranty on Insulating Glass: Submit written warranty signed by manufacturer of insulating glass agreeing to furnish replacements for insulating glass units that deteriorate as defined in "Definitions" article, f.o.b. point of manufacture, freight allowed Project site, within specified warranty period indicated below. Warranty covers

only deterioration due to normal conditions of use and not to handling, installing, protecting, and maintaining practices contrary to glass manufacturer's published instructions.

1. Warranty Period: Manufacturer's standard but not less than 10 years after date of Substantial Completion.

#### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, products manufactured by the following;
  - 1. Viracon
  - 2. PPG Industries
  - 3. Guardian Industries
  - 4. Pilkington/ Libby Owens Ford
  - 5. Cardinal Glass Industries
  - 6. Oldcastle Glass
  - 7. Vetrotech Saint Gobain

# 2.02 PRIMARY FLOAT GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class as indicated below, and Quality q3 (glazing select).
  - 1. Class 1 (clear) unless otherwise indicated.
  - 2. Class 2 (tinted, heat-absorbing, and light-reducing) where indicated.
  - 3. Class as indicated in each Product Data Sheet at end of this Section.
- B. Refer to Primary Clear Float Glass Product Data Sheet for Class 1 uncoated tinted glass for monolithic glazing.
- C. Refer to Primary Tinted Float Glass Product Data Sheet for tint color and nominal performance characteristics of Class 2 uncoated tinted glass for monolithic glazing relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.
- D. Refer to coated glass product requirements for tint color and performance characteristics of coated tinted glass for monolithic glazing relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.
- E. Refer to requirements for sealed insulating glass units for performance characteristics of assembled units composed of tinted glass, coated or uncoated, relative to visible light transmittance, U-values, shading coefficient, and visible reflectance.

# 2.03 HEAT-TREATED FLOAT GLASS PRODUCTS, GENERAL

- A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- B. Fabrication Process: By vertical (tong-held) or horizontal (roller-hearth) process, at manufacturer's option, except provide horizontal process where indicated as tongless or free of tong marks.

#### 2.04 HEAT-TREATED FLOAT GLASS

- A. Uncoated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), kind as indicated below.
  - 1. Kind HS (heat strengthened) where indicated.
  - 2. Kind FT (fully tempered) where indicated.
- B. Uncoated, Tinted, Heat-Treated Float Glass: ASTM C 1048, Condition A (uncoated surfaces), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality q3 (glazing select), with tint color and performance characteristics for 6 mm thick glass matching those indicated for annealed primary tinted float glass; kind as indicated below:
  - 1. Kind HS (heat strengthened) where indicated.
  - 2. Kind FT (fully tempered) where indicated.
- C. Coated, Clear, Heat-Treated Float Glass: ASTM C 1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), with coating type and performance characteristics complying with requirements specified under coated glass products; kind as indicated below:
  - 1. Kind HS (heat strengthened) where indicated.
  - 2. Kind FT (fully tempered) where indicated.

- D. Coated, Tinted, Heat-Treated Float Glass: ASTM C 1048, Condition C (other coated glass), Type I (transparent glass, flat), Class 2 (tinted heat-absorbing and light-reducing), Quality q3 (glazing select), with kind, coating type, and performance characteristics complying with requirements specified under coated glass products.
- E. Available Manufacturers: Subject to compliance with requirements, manufacturers offering heat-treated glass products that may be incorporated in the Work include, but are not limited to, the following companies.
  - 1. AFG Industries, Inc.
  - 2. Artistic Glass Products Co.
  - 3. Cardinal IG.
  - 4. Saint-Gobain.
  - 5. Falconer Glass Industries.
  - 6. Guardian Industries Corp.
  - 8. PPG Industries, Inc.
  - 9. Spectrum Glass Products, Inc.
  - 10. Tempglass.
  - 11. Viracon, Inc.
  - 12. Fire Lite Glass Inc. mfg by Nippon Elec. Co.
  - 13. Oldcastle Glass

# 2.05 PATTERNED GLASS PRODUCTS

- A. Patterned Glass: ASTM C 1036, Type II (patterned and wired glass, flat), Class 1 (clear), Form 3 (patterned), Quality q8 (glazing), Finish f1 (patterned one side), of pattern indicated in Rolled Glass Product Data Sheet at end of this Section.
- B. Tempered Patterned Glass: ASTM C 1048, Kind FT (fully tempered), Type II (patterned glass, flat), Class 1 (clear), Form 3 (patterned), Quality q8 (glazing), Finish f1 (patterned one side), of pattern in Patterned Glass Product Data Sheet at the end of this Section.

#### 2.06 LAMINATED GLASS PRODUCTS

- A. Laminated Glass Products: Comply with ASTM C 1172 for kinds of laminated glass indicated and other requirements specified, including those in Laminated Glass Product Data Sheet at the end of this Section. Refer to primary and heat-treated glass requirements relating to properties of glass products comprising laminated glass products.
- B. Interlayer: Interlayer material as indicated below, in clear or colors, and of thickness indicated with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
  - 1. Interlayer Material: Polyvinyl butyral sheets.
  - 2. Available Products: Subject to compliance with requirements, the plastic interlayer products that may be incorporated in the Work include, but are not limited to, the following:
    - a. Polyvinyl Butyral Interlayer:
      - 1) Saflex, Monsanto Co.
        - 2) Butacite, E. I. du Pont de Nemours & Co., Inc.
- C. Laminating Process: Fabricate laminated glass to produce glass free of foreign substances and air or glass pockets as follows:
  - 1. Laminate lites with polyvinyl butyral interlayer in autoclave with heat plus pressure.

2. Laminate lites with urethane acrylate resin by exposing assembled units to ultraviolet light after pumping interlayer material into space between lites.

# 2.07 INSULATING GLASS PRODUCTS

- A. Sealed Insulating Glass Units: Preassembled units consisting of organically sealed lites of glass separated by dehydrated air spaces complying with ASTM E 774 and with other requirements indicated, including those in Insulating Glass Product Data Sheet at the end of this Section.
  - 1. For properties of individual glass lites making up units, refer to requirements specified elsewhere in this Section applicable to types, classes, kinds, and conditions of glass products comprising lites of insulating glass units.
  - 2. Provide heat-treated, coated float glass of kind indicated or, if not otherwise indicated, Kind HS (heat strengthened) where recommended by manufacturer to comply with system performance requirements specified and Kind FT (fully tempered) where safety glass is designated or required.
  - 3. Performance characteristics designated for coated insulating glass are nominal values based on manufacturer's published test data for units with lites 6 mm thick and nominal 1/2-inch (13 mm) dehydrated space between lites, unless otherwise indicated.
  - 4. U-values are expressed as Btu/hr x sq. ft. x deg F (W/sq. m x K).
  - 5. Shall comply with ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation. Units shall be certified for compliance by the IGCC in accordance with the above ASTM test method

# 2.08 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
  - 1. Compatibility: Select glazing sealants and tapes of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturer's recommendations for selecting glazing sealants and tapes that are suitable for applications indicated and conditions existing at time of installation.
  - Colors: Provide color of exposed joint sealants to comply with the following:
    a. Provide selections made by Architect from manufacturer's full range of standard colors for products of type indicated.
- B. Elastomeric Glazing Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer indicated that comply with ASTM C 920 requirements indicated on each Elastomeric Glazing Sealant Product Data Sheet at the end of this Section, including those referencing ASTM classifications for Type, Grade, Class and Uses.
  - 1. Additional Movement Capability: Where additional movement capability is specified in Elastomeric Glazing Sealant Product Data Sheet, provide products, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, with the capability to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- C. Glazing Sealant for Fire-Resistant Glazing Products: Identical to product used in test assembly to obtain fire-resistive rating.

# 2.09 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent, nonstaining and nonmigrating in contact with nonporous surfaces, with or without spacer rod as recommended by tape and glass manufacturers for application indicated, packaged on rolls with a release paper backing, and complying with AAMA 800 for products indicated below:
  - 1. AAMA 804.1.
  - 2. AAMA 806.1.
  - 3. AAMA 807.1.
- B. Expanded Cellular Glazing Tape: Closed-cell, polyvinyl chloride foam tape, factory coated with adhesive on both surfaces, packaged on rolls with release liner protecting adhesive, and complying with AAMA 800 for product 810.5.
- C. Available Products: Subject to compliance with requirements, glazing tape that may be incorporated in the Work include, but is not limited to, the following:
  - 1. Back-Bedding Mastic Glazing Tape Without Spacer Rod:
    - a. PTI 303 Glazing Tape (shimless), Protective Treatments, Inc.
    - b. S-M 5700 Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
    - c. Tremco 440 Tape, Tremco Inc.
    - d. Extru-Seal, Pecora Corp.
    - e. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.
    - f. Dyna-Seal, Pecora Corp.
    - g. PTI 626 Architectural Sealant Tape, Protective Treatments, Inc.
    - h. S-M 5710 H.P Poly-Glaze Tape Sealant, Schnee-Morehead, Inc.
    - i. SST-800 Tape, Tremco, Inc.
  - 2. Back-Bedding Mastic Glazing Tape With Spacer Rod:
    - a. PTI 303 Glazing Tape (with shim), Protective Treatments, Inc.
    - b. Pre-shimmed Tremco 440 Tape, Tremco, Inc.
    - c. PTI 606 Architectural Sealant Tape, Protective Treatments, Inc.
  - 3. Expanded Cellular Glazing Tape:
    - a. Norseal V-980 Closed-Cell Glazing Tape, Norton Company.

#### 2.10 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials involved for glazing application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85 plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side-walking).
- F. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, nonextruding, nonoutgassing, strips of closed-cell plastic foam of density, size, and shape to control sealant depth and otherwise contribute to produce optimum sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire-resistive rating.

# 2.11 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.
- B. Clean cut or flat grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.

# PART 3 - EXECUTION

# 3.01 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

# 3.02 **PREPARATION**

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

#### 3.03 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass from edge damage during handling and installation as follows:
  - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
  - 2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.

- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches (1250 mm) (length plus height) as follows:
  - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.
  - 2. Provide 1/8-inch (3 mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Square cut wedge-shaped gaskets at corners and install gaskets in manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

# 3.04 TAPE GLAZING

- A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each lite is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

# 3.05 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

# 3.06 PROJECT SCHEDULE

All products shall comply with ASTM Standards and requirements in Part 2 above.

DELETE -The following schedule should be edited to suit the project. The first "architect recommended" insulated glazing system consists of a Light Gray colored glass with a high performance glazing panel that meets and excedes code minimums at a slight premium over the standard recommended and darker glazing panel.

# DELETE - (FIRST CHOICE – LIGHT GRAY "RECOMMENDED" HIGH VISIBILITY CODE COMPLIANT SYSTEM) DELETE NOT USED ITEMS BELLOW

#### **PRODUCT DATA SHEET 1 - INSULATING LOW-E VISION GLASS**

(This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) \*KEEP IN FOR COST CONTROL\*

- A. Insulating Light Gray Low E Vision Glass:
  - 1. 1" VNE30-63 as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼″ Optigray HS
    - b. Coating: VNE-63 on #2 Surface
    - c. Airspace: ½″ Black Finish
    - d. Interior Glass Ply: ¼″ Clear HS
  - 2. Performance Requirements
    - a. Visible Light Transmittance: 44%
    - b. Exterior (Vis-Out) Reflectance: 7%
    - c. Winter U-Value: 0.29
    - d. Summer U-Value: .26
    - e. Solar Heat Gain Coefficient: 0.23
    - f. Light to Solar Gain Ratio: 1.91

# **PRODUCT DATA SHEET 2 – INSULATING LOW-E SPANDREL GLASS**

(This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) A. Insulating Light Gray Low –E Spandrel Glass:

- 1. 1" VNE30-63 w/ V9933 Warm Gray Spandrel as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼" Optigray HS
  - b. Coating: VNE-63 on #2 Surface
  - c. Airspace: ½" Black Finish
  - d. Interior Glass Ply: ¼" Clear HS with V933 Warm Gray Spandrel #4
- 2. Performance Requirements
  - a. Winter U-Value: 0.29
  - b. Summer U-Value: .26

# **PRODUCT DATA SHEET 3 – INSULATING IMPACT-RATED VISION GLASS**

(This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) A. Insulating Laminated Light Gray Low –E Vision Glass:

- 1. 1 5/16"" VNE30-63 as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼″ Optigray HS
  - b. Coating: VNE-63 on #2 Surface
  - c. Airspace: ½″ Black
  - d. Interior Ply #1: ¼″ Clear HS
  - e. Interlayer: .090 PVB (or as required per framing test report)
  - f. Interior Ply #2: ¼" Clear HS
  - 2. Performance Requirements
    - a. Visible Light Transmittance: 43%
    - b. Exterior (Vis-Out) Reflectance: 7%
    - c. Winter U-Value: 0.29
    - d. Summer U-Value: .26
    - e. Solar Heat Gain Coefficient: 0.23
    - f. Light to Solar Gain Ratio: 1.87

# PRODUCT DATA SHEET 4 - INSULATING IMPACT-RATED SPANDREL GLASS

- (This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) A. Insulating Laminated Light Gray Low –E Spandrel Glass:
  - 1. 1 5/16" VNE30-63 as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼″ Optigray HS
    - b. Coating: VNE-63 on #2 Surface
    - c. Airspace: ½" Black Finish
    - d. Interior Glass Ply 1: ¼″ Clear HS
    - e. Interlayer: .090 PVB (or as required by framing test report)
    - f. Interior Glass Ply 2: ¼" Clear HS with V933 Warm Gray Spandrel #6
  - 2. Performance Requirement
    - a. Winter U-Value: .29
    - b. Summer U-Value: .26

# PRODUCT DATA SHEET 5 – LAMINATED IMPACT – RATED VISION GLASS

(This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) A. Laminated Light Gray Low –E Vision Glass:

- 1. 1" VLE30-70 as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼″ Optigray HS
  - b. Coating: VLE-70 #2 Surface
  - c. Interlayer: .090 PVB (or as required by framing test report)
  - d. Interior Glass Ply: ¼" Clear HS

- 2. Performance Requirements
  - a. Visible Light Transmittance: 48%
  - b. Exterior (Vis-Out) Reflectance: 8%
  - c. Winter U-Value: .95
  - d. Summer U-Value: .87
  - e. Solar Heat Gain Coefficient: .42
  - f. Light to Solar Heat Gain: 1.14

#### PRODUCT DATA SHEET 6 – LAMINATED IMPACT – RATED SPANDREL GLASS

(This insulated glass panel is equal to a PPG (Solar Ban) SB-70XL or a Guardian SNX-62/29 on Gray Glass.) A. Laminated Light Gray Low – E Spandrel Glass:

- 1. 1" VLE30-70 as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼″ Optigray HS
  - b. Coating: VLE-70 #2 Surface
  - c. Interlayer: .090 PVB (or as required by framing test report)
  - d. Interior Glass Ply: ¼" Clear HS with V933 Warm Gray Spandrel #4
  - 2. Performance Requirements
    - a. Winter U-Value: .95
    - b. Summer U-Value: .87

# DELETE - The second insulated glazing system consists of a Dark Gray colored glass with a tinted glazing panel that meets FBC energy code minimums using a standard, darker glazing panel.

# DELETE - (SECOND CHOICE - DARK GRAY "STANDARD" CODE MINIMUM SYSTEM)

#### **PRODUCT DATA SHEET 1 - INSULATING LOW-E VISION GLASS**

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.) \*KEEP IN FOR COST CONTROL\*

- A. Insulating Gray Low E Vision Glass:
  - 1. 1" VE3-2M as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼″ Gray HS
    - b. Coating: VE-2M on #2 Surface
    - c. Airspace: ½" Black Finish
    - d. Interior Glass Ply: ¼″ Clear HS
  - 2. Performance Requirements
    - a. Visible Light Transmittance: 35%
    - b. Exterior (Vis-Out) Reflectance: 6%
    - c. Winter U-Value: 0.29
    - d. Summer U-Value: .26
    - e. Solar Heat Gain Coefficient: 0.24
    - f. Light to Solar Gain Ratio: 1.46

#### **PRODUCT DATA SHEET 2 – INSULATING LOW-E SPANDREL GLASS**

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.)

Insulating Gray Low –E Spandrel Glass:

Α.

1.

- 1" VE3-2M w/ V933 Warm Gray Spandrel as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼″ Gray HS
  - b. Coating: VE-2M on #2 Surface
  - c. Airspace: ½" Black Finish
  - d. Interior Glass Ply: ¼" Clear HS with V933 Warm Gray Spandrel #4
- 2. Performance Requirements
  - a. Winter U-Value: 0.29
  - b. Summer U-Value: .26

# PRODUCT DATA SHEET 3 - INSULATING IMPACT-RATED VISION GLASS

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.)

A. Insulating Laminated Gray Low –E Vision Glass:

1.

- 1 5/16" VE3-2M as manufactured by Viracon.
  - a. Exterior Glass Ply: ¼" Gray HS
  - b. Coating: VE-2M on #2 Surface
  - c. Airspace: ½″ Black
  - d. Interior Ply #1: ¼" Clear HS
  - e. Interlayer: .090 PVB (or as required per framing test report)
  - f. Interior Ply #2: ¼" Clear HS
- 2. Performance Requirements
  - a. Visible Light Transmittance: 33%
  - b. Exterior (Vis-Out) Reflectance: 6%
  - c. Winter U-Value: .29
  - d. Summer U-Value: .26
  - e. Solar Heat Gain Coefficient: 0.24
  - f. Light to Solar Gain Ratio: 1.38

# PRODUCT DATA SHEET 4 - INSULATING IMPACT-RATED SPANDREL GLASS

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.)

- A. Insulating Laminated Gray Low –E Spandrel Glass:
  - 1. 1 5/16" VE3-2M with V933 Warm Gray Spandrel as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼″ Gray HS
    - b. Coating: VE-2M on #2 Surface
    - c. Airspace: ½" Black Finish
    - d. Interior Glass Ply 1: ¼" Clear HS
    - e. Interlayer: .090 PVB (or as required by framing test report)
    - f. Interior Glass Ply 2: ¼" Clear HS with V933 Warm Gray Spandrel #6
  - 2. Performance Requirement
    - a. Winter U-Value: .29
    - b. Summer U-Value: .26

# PRODUCT DATA SHEET 5 – LAMINATED IMPACT – RATED VISION GLASS

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.)

- A. Laminated Gray Low –E Vision Glass:
  - 1. 1" VLE3-70 as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼" Gray HS
    - b. Coating: VLE-70 #2 Surface
    - c. Interlayer: .090 PVB (or as required by framing test report)
    - d. Interior Glass Ply: ¼" Clear HS
  - 2. Performance Requirements
    - a. Visible Light Transmittance: 34%
    - b. Exterior (Vis-Out) Reflectance: 6%
    - c. Winter U-Value: .96
    - d. Summer U-Value: .87
    - e. Solar Heat Gain Coefficient: .39
    - f. Light to Solar Heat Gain: .87

# PRODUCT DATA SHEET 6 - LAMINATED IMPACT - RATED SPANDREL GLASS

(This is equal to a PPG (Solar Ban) SB-60 or Guardian SN-68 on Gray Glass.)

- A. Laminated Gray Low E Spandrel Glass:
  - 1. 1" VLE3-70 with V933 Warm Gray Spandrel as manufactured by Viracon.
    - a. Exterior Glass Ply: ¼" Gray HS
    - b. Coating: VLE-70 #2 Surface

- c. Interlayer: .090 PVB (or as required by framing test report)
- d. Interior Glass Ply: ¼" Clear HS with V933 Warm Gray Spandrel #4
- 2. Performance Requirements
  - a. Winter U-Value: .96
  - b. Summer U-Value: .87

KEEP THE FOLOWING SELECTIONS FOR INTERIOR GAZING AS REQUIRED AND ADD OTHER SPECIALIZED GASS REQUIREMENTS ON A PER PROJECT BASIS

#### PRODUCT DATA SHEET 7 – LAMINATED GLASS NO. 7 (INTERIOR WINDOWS & DOORS)

A. Laminated Glass: 9/16" nominal thickness consisting of ¼" heat strengthened tinted exterior light, ¼" heat strengthened clear interior light, bonded with 0.090" polyvinyl butyral sheet.

#### **PRODUCT DATA SHEET 8 – FIRE-RATED GLASS NO. 8**

A. Underwriters Laboratories label fire-rated glass.

B. Fire Rated Glass: Glass shall be equal to FireLite Nt as supplied by Technical Glass Products, Kirkland, Washington, 1-800-426-0279, 1-800-451-9857 fax, e-mail sales @fireglass.com, web site www.fireglass.com.

- 1. Properties:
  - a. Thickness 3/16" Firelite
  - b. Film: 3M Scotchshield Ultra Film.
  - c. Weight: 2.4 pounds per square foot.
  - d. Approximate Visible Transmission: 88 percent.
  - e. Approximate Visible Reflection: 7 percent.
  - f. Hardness: 700 (Vicker's scale).
  - g. Fire Rating: 20 minutes or as noted on the drawings
  - h. Impact Safety Resistance: ANSI Z97.1 and CPSC 16CFR1201 (Cat. I & II).
  - i. Positive Pressure Test: passes UL 10C
  - j. Surface Finish: Standard (unpolished).
- C. Maximum Sheet Size: 48 inches by 96 inches.
- D. Labeling: Permanently label each piece of fire rated glazing with the UL logo and fire rating.
- E. Fire Rating: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with UL9, 10B and 10C and NFPA 257.

#### PRODUCT DATA SHEET 9 – INSULATING GLASS NO. 9 (EXTERIOR WINDOWS & DOORS)

- A. Insulating Gray Low E Vision Glass: Manufacturer's standard insulating glazing system in conformance with Florida Building Code 5<sup>th</sup> Edition (2014) Energy Conservation Chapter 4 [CE] Commercial Energy Efficiency, Table C402.3 for climate zone indicated., 7/8" thick. Comprised of:
  - 1. 3/16" annealed exterior glass, tint on surface #2
  - 2. 11/32" air gap filled with argon gas
  - 3. 1/8" clear annealed glass
  - 4. 0.090" PVB interlayer
  - 5. 1/8" clear annealed glass interior
- B. NFRC Requirements Provide for Climate Zone 2, windows and exterior door lights capable of complying with the following totals:
  - 1. U-Factor: Windows Fixed Fenetration 0.50, Operable 0.65, Entrance Door 0.83 minimum performance requirement.

- 2. Solar Heat Gain Coefficient (SHGC): 0.25 in accordance with NFRC 200.
- 3.. Visible Transmittance (VT): 0.66 in accordance with NFRC 200.

# PRODUCT DATA SHEET 10 – INSULATING IMPACT-RATED GLASS NO. 10

(EXTERIOR STOREFRONT WINDOWS & DOORS)

- A. Insulating Gray Low E Vision Glass: Manufacturer's standard insulating glazing system in conformance with Florida Building Code 6<sup>th</sup> Edition (2017) Energy Conservation Chapter 4 [CE] Commercial Energy Efficiency, Table C402.3 for climate zone indicated., 7/8" thick. Comprised of:
  - 1. Properties:
    - a. 3/16" annealed exterior glass, tint on surface #2
    - b. 11/32" air gap filled with argon gas
    - c. 1/8" clear annealed glass
    - d. 0.090" PVB interlayer
    - e. 1/8" clear annealed glass interior
- B. NFRC Requirements Provide for Climate Zone 2, windows and exterior door lights capable of complying with the following totals:
  - 1. Properties:
    - a. U-Factor: Windows Fixed Fenetration 0.50, Operable 0.65, Entrance Door 0.83 minimum performance requirement.
    - b.. Solar Heat Gain Coefficient (SHGC): 0.25 in accordance with NFRC 200.
    - c. Visible Transmittance (VT): 0.66 in accordance with NFRC 200.

# END OF SECTION

# SECTION 09290 GYPSUM BOARD ASSEMBLIES

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## **1.02 DESCRIPTION OF WORK**

- A. This Section includes the following:
  - 1. Non-load-bearing steel framing members for gypsum board assemblies.
  - 2. Gypsum board assemblies attached to steel framing.
  - 3. Gypsum board bonded adhesively to interior concrete and masonry substrates.
  - 4. Cementitious backer units installed with gypsum board assemblies.
  - 5. Glass-mat, water-resistant gypsum backing board installed with gypsum board assemblies.

# 1.03 RELATED SECTIONS

A. Division 6 Section "Rough Carpentry" for wood framing and furring, and gypsum sheathing applied over wood framing.

#### 1.04 **DEFINITIONS**

A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

#### 1.05 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
- B. Fire Resistance: Provide gypsum board assemblies with fire-resistance ratings indicated.

#### 1.06 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

## 1.07 QUALITY ASSURANCE

- A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
- B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.
- D. Fire-Test-Response Characteristics: Where fire-resistance-rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:
  - 1. Fire-Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 3. Deflection and Firestop Track: Top runner provided in fire-resistance-rated assemblies indicated is labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Mockups: Prior to finishing gypsum board assemblies, construct mockups of at least 100 sq. ft. (9 sq. m) in surface area to demonstrate aesthetic effects of finishes as well as qualities of materials and execution. Simulate finished lighting conditions for review of in-place unit of Work.
  - 1. Construct mockups for each of the following applications:
    - a. Wall surfaces indicated to receive non-textured paint finishes.
    - b. Ceiling surfaces indicated to receive non-textured paint finishes.
    - c. Surfaces indicated to receive textured paint finishes.
    - d. Surfaces indicated to receive textured finishes and textured finishes specified in this Section.
  - 2. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
    - a. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
    - b. Notify Architect one week in advance of the dates and times when mockups will be constructed.
    - c. Demonstrate the proposed range of aesthetic effects and workmanship.
    - d. Obtain Architect's approval of mockups before start of final unit of Work.
    - e. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
      - 1) When directed, demolish and remove mockups from Project site.
      - 2) Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.
    - f. Gypsum board used on exterior walls to be mold resistant.

# 1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

# 1.09 **PROJECT CONDITIONS**

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

# PART 2 - PRODUCTS

# 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Gypsum Board and Related Products:
    - a. Domtar Gypsum.
    - b. Georgia-Pacific Corp.
    - c. National Gypsum Co.; Gold Bond Building Products Division.
    - d. United States Gypsum Co.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work where proprietary gypsum wallboard is indicated include, but are not limited to, the following:
  - 1. Gyprock Fireguard C Gypsum Board; Domtar Gypsum.
  - 2. Firestop Type C; Georgia-Pacific Corp.
  - 3. Fire-Shield G; National Gypsum Co.; Gold Bond Building Products Division.
  - 4. SHEETROCK Brand Gypsum Panels, FIRECODE C Core; United States Gypsum Co.
  - 5. SHEETROCK Brand Gypsum Panels, ULTRACODE Core; United States Gypsum Co.

# 2.02 GYPSUM BOARD PRODUCTS

- A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.
  - 1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36 and as follows:
  - 1. Type: Regular for vertical surfaces, unless otherwise indicated.
  - 2. Type: Type X where required for fire-resistance-rated assemblies.
  - 3. Type: Sag-resistant type for ceiling surfaces.
  - 4. Type: Proprietary type as required for specific fire-resistance-rated assemblies.

- 5. Edges: Tapered.
- 6. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
- 7. Thickness: 5/8 inch (15.9 mm) where indicated.
- C. Gypsum Board Base Layer(s) for Multilayer Applications: Gypsum wallboard, ASTM C 36, and as follows:
  - 1. Type: Regular for vertical surfaces, unless otherwise indicated.
  - 2. Type: Type X where indicated or required for fire-resistance-rated wall assemblies.
  - 3. Type: Type C where indicated or required for fire-resistance-rated ceiling assemblies.
  - 4. Type: Sag-resistant for ceiling surfaces, unless otherwise indicated.
  - 5. Type: Proprietary type matching that indicated for face layer and as required for specific fire-resistance-rated assemblies.
  - 6. Edges: Manufacturer's standard.
  - 7. Thickness: 1/2 inch (12.7 mm), unless otherwise indicated.
  - 8. Thickness: 5/8 inch (15.9 mm) where indicated.
- D. Water-Resistant Gypsum Backing Board: ASTM C 630 and as follows:
  - 1. Type: Regular, unless otherwise indicated.
  - 2. Type: Type X where required for fire-resistance-rated assemblies and where indicated.
  - 3. Thickness: 5/8 inch (15.9 mm), unless otherwise indicated.
  - 4. Thickness: 1/2 inch (12.7 mm) where indicated.
- E. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C 1178, of type and thickness indicated below:
  - 1. Type and Thickness: Regular, 1/2 inch (12.7 mm) thick, unless otherwise indicated.
  - 2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick, where required for fire-resistance-rated assemblies and where indicated.
  - 3. Available Product: Subject to compliance with requirements, a product that may be incorporated in the Work includes, but is not limited to, "Dens-Shield Tile Backer" manufactured by Georgia-Pacific Corp.

#### 2.03 TRIM ACCESSORIES

- A. Accessories for Interior Installation: Corner bead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:
  - 1. Material: Formed metal or plastic, with metal complying with the following requirement:
    - a. Steel sheet zinc coated by hot-dip process or rolled zinc.
  - 2. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:
    - a. Corner bead on outside corners, unless otherwise indicated.
    - b. LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
    - c. L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
    - d. U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.

- e. One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
- B. Accessory for Curved Edges: Corner bead formed of metal, plastic, or metal combined with plastic, with either notched or flexible flanges that are bendable to curvature radius.
- C. Accessories for Exterior Installations: Corner bead, edge trim, and control joints formed from steel sheet zinc coated by hot-dip process or rolled zinc complying with ASTM C 1047, in shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
  - 1. Corner bead on outside corners, unless otherwise indicated.
  - 2. Edge trim complying with shape LC-bead per Fig. 1, unless otherwise indicated.
  - 3. One-piece control joint formed from rolled zinc with V-shaped slot and removable strip covering slot opening.

# 2.04 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
- B. Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
  - 1. Use pressure-sensitive or staple-attached, open-weave, glass-fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated.
- C. Joint Tape for Cementitious Backer Units: As recommended by cementitious backer unit manufacturer.
- D. Setting-Type Joint Compounds for Gypsum Board: Factory-packaged, job-mixed, chemicalhardening powder products formulated for uses indicated.
  - 1. Where setting-type joint compounds are indicated as a taping compound only or for taping and filling only, use formulation that is compatible with other joint compounds applied over it.
  - 2. For prefilling gypsum board joints, use formulation recommended by gypsum board manufacturer.
  - 3. For filling joints and treating fasteners of water-resistant gypsum backing board behind base for ceramic tile, use formulation recommended by gypsum board manufacturer.
  - 4. For topping compound, use sandable formulation.
- E. Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.
  - 1. Ready-Mixed Formulation: Factory-mixed product.
    - a. Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
    - b. Topping compound formulated for fill (second) and finish (third) coats.
    - c. All-purpose compound formulated for both taping and topping compounds.
- F. Joint Compound for Cementitious Backer Units: Material recommended by cementitious backer unit manufacturer.

#### 2.05 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834 and the following requirements:
  - 1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
- B. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
- C. Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Acoustical Sealant for Exposed and Concealed Joints:
    - a. PL Acoustical Sealant; ChemRex, Inc.; Contech Brands.
    - b. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
    - c. SHEETROCK Acoustical Sealant; United States Gypsum Co.
  - 2. Acoustical Sealant for Concealed Joints:
    - a. BA-98; Pecora Corp.
    - b. Tremco Acoustical Sealant; Tremco, Inc.

#### 2.06 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
- B. Laminating Adhesive: Special adhesive or joint compound recommended for laminating gypsum panels.
- C. Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.
- D. Fastening Adhesive for Wood: ASTM C 557.
- E. Fastening Adhesive for Metal: Special adhesive recommended for laminating gypsum panels to steel framing.
- F. Steel drill screws complying with ASTM C 1002 for the following applications:
  - 1. Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
- G. Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- H. Steel drill screws of size and type recommended by unit manufacturer for fastening cementitious backer units.
- I. Gypsum Board Nails: ASTM C 514.
- J. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.

- K. Foam Gaskets: Closed-cell vinyl foam adhesive-backed strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit metal stud size indicated.
- L. Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
  - 1. Mineral-Fiber Type: Fibers manufactured from glass, slag wool, or rock wool.
- M. Thermal Insulation: Material indicated below, of thickness and width to fill voids formed by Z-furring members:
  - 1. Unfaced Mineral-Fiber Blanket Insulation: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).

# 2.07 TEXTURE FINISHES

- A. Available products: Subject to compliance with requirements, products that may be incorporated into the work include, but are not limited to, the following:
  - 1. Polystyrene Aggregate Finish:
    - a. United States Gypsum Company; Sheetrock brand Tuf-Tex wall and ceiling texture.
    - b. National Gypsum Company; Proformwall and ceiling spray.

# PART 3 - EXECUTION

#### 3.01 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

# 3.02 PREPARATION

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.
  - 1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.
- B. Do not use power actuated nailers into post tensioned slab.
- C. All structural anchors are to be approved by KEM Engineers.

#### 3.03 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

<b>GYPSUM BOARD ASSEMBLIES</b>
SECTION 09290 - 7

- C. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- D. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- E. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
- F. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Attach gypsum panels to framing provided at openings and cutouts.
- H. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Instead, float gypsum panels over these members using resilient channels or provide control joints to counteract wood shrinkage.
- I. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches (813 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- J. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- K. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
  - 1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- L. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- M. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.
- N. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-

flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- O. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
  - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- P. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

## 3.04 GYPSUM BOARD APPLICATION METHODS

- A. Single-Layer Application: Install gypsum wallboard panels as follows:
  - 1. On ceilings, apply gypsum panels prior to wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated, and provide panel lengths that will minimize end joints.
  - 3. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.
    - b. Stagger abutting end joints not less than one framing member in alternate courses of board.
    - c. At stairwells and other high walls, install panels horizontally.
  - 4. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
- B. Wall Tile Substrates: For substrates indicated to receive thin-set ceramic tile and similar rigid applied wall finishes, comply with the following:
  - 1. Install cementitious backer units to comply with ANSI A108.11 at showers, tubs, and where indicated.
  - 2. Install cementitious backer units to comply with ANSI A108.11 at locations indicated to receive wall tile.
  - 3. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
  - 4. Install glass-mat, water-resistant gypsum backing board panels to comply with manufacturer's installation instructions at locations indicated to receive wall tile. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
  - 5. Install water-resistant gypsum backing board panels at showers, tubs, and where indicated. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or penetrations.
  - 6. Install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
- C. Multilayer Application on Ceilings: Apply gypsum board indicated for base layers prior to applying base layers on walls/partitions; apply gypsum wallboard face layers in same sequence. Offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints. Apply base layers at right angles to framing members, unless otherwise indicated.
- D. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring

member with base-layer joints. Stagger joints on opposite sides of partitions.

- 1. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- E. Acoustical Tile Base: Where gypsum panels form the base for adhesively applied acoustical tile, install gypsum wallboard panels with tapered edges taped and finished to produce a flat surface.
- F. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
  - 1. Fasten with screws.
- G. Multilayer Fastening Methods: Apply base layers of gypsum panels and face layer to base layers as follows:
  - 1. Fasten both base layers and face layers separately to supports with screws.
  - 2. Fasten base layers with screws and face layer with adhesive and supplementary fasteners.
  - 3. Fasten base layers to wood supports with nails and face layer with adhesive and supplementary fasteners.
- H. Direct-Bonding to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's recommendations, and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- I. Exterior Soffits and Ceilings: Apply exterior gypsum soffit board panels perpendicular to supports, with end joints staggered over supports.
  - 1. Install with 1/4-inch (6.4-mm) open space where panels abut other construction or structural penetrations.
  - 2. Fasten with corrosion-resistant screws.
- J. For curved partitions, install gypsum panels as follows:
  - 1. Select gypsum panel lengths and cut them as required to produce one unbroken panel covering each curved surface plus 12-inch- (300-mm-) long straight sections at ends of curves and tangent to them.
  - 2. Wet gypsum panels on surfaces that will become compressed when panels are installed over a curve and where curve radius prevents using dry panels. Comply with gypsum board manufacturer's recommendations relative to curve radii, wetting methods, stacking panels after wetting, and other preparations that precede installing wetted gypsum panels.
  - 3. Apply gypsum panels horizontally with wrapped edges perpendicular to studs. On convex sides of partitions, begin installation at one end of curved surface and fasten gypsum panels to studs as they are wrapped around the curve. On concave side, start fastening panels to stud at center of curve and work outward to panel ends. Fasten panels to framing with screws spaced 12 inches (300 mm) o.c.
  - 4. For double-layer construction, apply gypsum board base layer horizontally and fasten to studs with screws spaced 16 inches (400 mm) o.c. Center gypsum board face layers over joints in base layer and fasten to studs with screws spaced 12 inches (300 mm) o.c.
  - 5. Allow wetted gypsum panels to dry before applying joint treatment.

#### 3.05 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner bead at external corners.
- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
  - 1. Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
  - 2. Install L-bead where edge trim can only be installed after gypsum panels are installed.
  - 3. Install U-bead where indicated.
  - 4. Install aluminum trim and other accessories where indicated.
- D. Install control joints at locations indicated or per Gypsum mfg. recommendations.
- E. Install control joints according to ASTM C 840 and manufacturer's recommendations and in specific locations approved by Architect for visual effect.

#### 3.06 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, flanges of corner bead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.
- D. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
- E. Base for Acoustical Tile: Where gypsum board is indicated as a base for adhesively applied acoustical tile, install joint tape and a 2-coat compound treatment, without sanding.
- F. Finish water-resistant gypsum backing board forming base for ceramic tile to comply with ASTM C 840 and gypsum board manufacturer's directions for treatment of joints behind tile.
- G. Finish glass-mat, water-resistant gypsum backing board to comply with gypsum board manufacturer's directions.
- H. Finish cementitious backer units to comply with unit manufacturer's directions.
- I. Gypsum board finish levels.
  - 1. Level 4: Embed tape and apply first, second and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated. Sand between each layer application.

#### 3.10 APPLYING TEXTURE FINISHES

- A. Surface preparation and primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment to provide a uniform texture, light orange peel texture, free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming in contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite the precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish MFR's recommendations.

# 3.7 FIELD QUALITY CONTROL

- A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
  - 1. Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.
  - 2. Prior to notifying Architect, complete the following in areas to receive gypsum board ceilings:
    - a. Installation of 80 percent of lighting fixtures, powered for operation.
    - b. Installation, insulation, and leak and pressure testing of water piping systems.
    - c. Installation of air duct systems.
    - d. Installation of air devices.
    - e. Installation of mechanical system control air tubing.
    - f. Installation of ceiling support framing.

# 3.12 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

# **END OF SECTION**

# SECTION 09900 PAINTING AND COATINGS

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.

#### 1.02 DESCRIPTION OF WORK

- A. Surface preparation
- B. Surface finish schedule
  - 1. Exposed exterior items and surfaces.
  - 2. Exposed interior items and surfaces.
  - 3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- C. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
  - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.
  - 2. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
- D. Prefinished items include the following factory-finished components:
  - 1. Architectural woodwork and casework.
  - 2. Acoustical wall panels.
  - 3. Metal toilet enclosures.
  - 4. Metal lockers.
  - 5. Unit kitchens.
  - 6. Elevator entrance doors and frames.
  - 7. Elevator equipment.
  - 8. Finished mechanical and electrical equipment.
  - 9. Light fixtures.
  - 10. Distribution cabinets.
- E. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
  - 1. Foundation spaces.
  - 2. Furred areas.
  - 3. Ceiling plenums.
  - 4. Utility tunnels.
  - 5. Pipe spaces.
  - 6. Duct shafts.
  - 7. Elevator shafts.

- F. Finished metal surfaces include the following:
  - 1. Anodized aluminum.
  - 2. Stainless steel.
  - 3. Chromium plate.
  - 4. Copper.
  - 5. Bronze and brass.
- G. Operating parts include moving parts of operating equipment and the following:
  - 1. Valve and damper operators.
  - 2. Linkages.
  - 3. Sensing devices.
  - 4. Motor and fan shafts.
- H. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

# 1.03 RELATED WORK

- A. Section 09260 Gypsum Board Systems
- B. Section 09955 Vinyl Coated Fabric Wall Covering.

# 1.04 **REFERENCES**

- A. ANSI/ASTM D16 Definitions of Terms Relating to Paint, Varnish Lacquer, and Related products.
- B. ASTM D2016 Test Method for Moisture Content of Wood.

#### 1.05 **DEFINITIONS**

- A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.
  - 1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
  - 2. Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.
  - 3. Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
  - 4. Semi-gloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
  - 5. Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.

# 1.06 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three (3) years' experience.
- B. Applicator: Company specializing in commercial painting and finishing with three (3) years documented experience.

#### **1.07 REGULATORY REQUIREMENTS**

A. Conform to all applicable codes for flame/fuel/smoke rating requirements for finishes.

#### 1.08 SUBMITTALS

- A. Submit product data under provisions of Section 01300.
- B. Provide product data on all finishing products.
- C. Submit samples under provisions of Section 01300.

#### 1.09 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site under provisions of Section 01600.
- B. Store and protect products under provisions of Section 01600.
- C. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- D. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, clean-up, color designation, and instructions for mixing and reducing.
- E. Store paint materials at minimum ambient temperature of 45 degrees Fahrenheit (7 degrees Celsius) and a maximum of 90 degrees Fahrenheit (32 degrees Celsius), in well ventilated area, unless required otherwise by manufacturer's instructions.
- F. Take pre-cautionary measures to prevent fire hazards and spontaneous combustion.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 65 degrees Fahrenheit for 24 hours before, during and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply high exterior coatings during rain or snow, or humidity, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees Fahrenheit (7 degrees Celsius) for interiors; 50 degrees Fahrenheit (10 degrees Celsius) for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees Fahrenheit (18 degrees Celsius) for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide adequate lighting levels at substrate surface.

#### 1.11 EXTRA STOCK

A. Provide a five (5) gallon container of each exterior color and surface texture to Owner.

- B. Provide a one (1) gallon container of each interior color and type of paint used to Owner.
- C. Label each container with color, texture and room locations, in addition to the manufacturer's label.

#### PART 2 PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS – PAINT

- A. Sherwin-Williams (Basis of Design)
- B. Pittsburgh Paint
- C. PPG (acquired Glidden)
- D. Benjamin Moore
- E. Substitutions: Under provisions of Section 01600.

#### 2.02 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. Accessory Materials: Linseed Oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- D. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- E. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- F. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

#### 2.03 SCHEDULE

- A. All paint to be supplied and installed by Contractor.
- B. Refer to interior finish schedule and exterior building elevations provided by Architect or Interior Designer.
# **PART 3 - EXECUTION**

#### 3.01 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer and provide written confirmation exterior stucco surfaces have acceptable moisture content.
- B. Provide written confirmation of mill thickness from manufacturer on Elastomeric application coats.

# 3.02 GENERAL SCHEDULE

- A. STUCCO and Fiber Cement Board
  1 Coat of LOXON Concrete 7 Masonry Primer, A24W8300
  2 Coats of SuperPaint Exterior Acrylic Satin, A89 Series @ 4.0 mils wet, 1.5 mils dry per coat.
- B. EXTERIOR WOOD TRIM STAIN
   2 Coats WoodScapes Semi-Transparent Stain, A15T5 Series
- C. EXTERIOR WOOD TRIM PAINT
  1 Coat SW Exterior Oil-Based Wood Primer, Y24W8020 @ 4.0 mils wet, 2.3 mils dry per coat
  2 Coats SuperPaint Exterior Acrylic Gloss, A84-100 Series @ 4.0 mils wet, 1.4 mils dry per coat
- EXTERIOR PARAPET WALL
   2 Coats of LOXON XP Waterproofing System, A24-1400 Series @ 14.0-18.0 mils wet, 6.0-8.0 mils dry per coat
- E. STEEL DOORS AND FERROUS METALS
   1 Coat of Kem Kromik Universal Metal Primer, B50NZ6 @ 6.0-8.0 mils wet, 3.0-4.0 mils dry
   2 Coats of Pro Industrial Warebased Alkyd Urethane Semi-Gloss Enamel, B53-1150 Series,
   @ 4.0-5.0 mils wet, 1.4-1.7 mils dry per coat
- F. GALVANIZED AND NON-FERROUS METALS
  Clean with paint manufacturer's recommended product
  1 Coat of Pro-Cryl Universal Metal Primer, B66-310 @ 5.0-10.0 mils wet, 2.0-4.0 mils dry
  2 Coats of Pro Industrial Warebased Alkyd Urethane Semi-Gloss Enamel, B53-1150 Series,
  @ 4.0-5.0 mils wet, 1.4-1.7 mils dry per coat

# G. EXTERIOR WOOD DOORS PAINTED 1 Coat of SW Exterior Oil-Based Wood Primer, Y24W8020 @ 4.0 mils wet, 2.3 mils dry per coat (tops and bottoms) 2 Coats of Pro Industrial Warebased Alkyd Urethane Semi-Gloss Enamel, B53-1150 Series, @ 4.0-5.0 mils wet, 1.4-1.7 mils dry per coat

- H. INTERIOR WALLS
   1 Coat of ProMar 200 Zero VOC Latex Primer, B28W2600 @ 4.0 mils wet, 1.0 mil dry
   2 Coats of ProMar Ceiling Paint Interior Latex Flat, A27W5050 @ 4.0 mils wet, 1.2 mils dry at drywall
- I. INTERIOR WALLS WITH VINYL WALLCOVERING

#### PAINTING AND COATINGS SECTION 09900-5

- 1 Coat of Premium Wall & Wood Primer, B28W8111 @ 4.0 mils wet, 1.8 mils dry
- J. INTERIOR WOOD TRIM AND INTERIOR DOORS STAINED
   1 Coat of Sealer (Door tops and bottoms)
   1 Coats of WoodClassics Semi-Transparent Oil Stain, A49-200
   1 Coats Wood Classics Polyurethane Varnish Gloss, A67V1
   1 Coats Wood Classics Polyurethane Varnish Satin, A67F1
- K. INTERIOR METAL, FIBERGLASS AND PLASTIC AND WOOD DOORS
   1 Pro-Cryl Universal Primer, B66-310 @ 5.0-10.0 mils wet, 2.0-4.0 mils dry
   Coats of Pro Industrial Warebased Alkyd Urethane Semi-Gloss Enamel, B53-1150 Series, @
   4.0-5.0 mils wet, 1.4-1.7 mils dry per coat
- INTERIOR CEILINGS

   Coat ProMar 200 Zero VOC Latex Primer, B28W2600 @ 4.0 mils wet, 1.0 mil dry
   Coats of ProMar Ceiling Paint Interior Latex Flat, A27W5050 @ 4.0 mils wet, 1.2 mils dry at drywall
   (Use SW Tuff Surface, A44W50"knock down" finish at exposed concrete planks)
- M. INTERIOR PRECAST CONCRETE CEILINGS SW Tuff Surface, A44W50 spray knock down texture. Key joints shall be infilled flush with cover-coat Compound by United States Gypsum Company.
- N. Fill deep voids or offsets with sheetrock brand "Durabond" joint compound
- O. INTERIOR WET WALLS BEHIND PLUMBING FIXTURES (Janitor closets with floor sinks and restroom fixtures without other surfacing)
   1 Coat of ProMar 200 Zero VOC Latex Primer, B28W2600 @ 4.0 mils wet, 1.0 mil dry
   2 Coats of Pro Industrial Pre-Catalyzed Epoxy Eg-Shel, K45-150 Series @ 4.0 mils wet, 1.5 mils dry per coat

END OF SECTION

# SECTION 09912 INTERIOR PAINTS AND COATINGS

#### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

A Interior paint and coatings systems including: paint, stains, transparent coatings, and opaque finishes

# 1.2 **RELATED SECTIONS**

- A Division 1 General Data
- B Division 6 Architectural Wood and Plaster Coating
- C Division 8 Doors and Windows

# 1.3 **REFERENCES**

- A SSPC-SP 1 Solvent Cleaning
- B SSPC-SP 2 Hand Tool Cleaning
- C SSPC-SP 3 Power Tool Cleaning
- D SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete

# 1.4 SUBMITTALS

- A Submit under provisions of Section 01300 Submittals
- B Product Data: Manufacturer's data sheets on each paint and coating product should include:
  - 1 Product characteristics
  - 2 Surface preparation instructions and recommendations
  - 3 Primer requirements and finish specification
  - 4 Storage and handling requirements and recommendations
  - 5 Application methods
  - 6 Cleanup Information
- C Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.
- D Coating Maintenance Manual: upon conclusion of the project, the Contractor or paint manufacture/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

# 1.5 MOCK-UP

Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of painting on the project.

- A Finish surfaces for verification of products, colors, & sheens
- B Finish area designated by Architect
- C Provide samples that designate prime & finish coats
- D Do not proceed with remaining work until the Architect approves the mock-up samples

# 1.6 DELIVERY, STORAGE, AND HANDLING

A Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacture's name, label, and the following list of information:

Product name and type (description) Application & use instructions Surface preparation VOC content Environmental handling Batch date Color number

- B Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- C Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

# 1.7 **PROJECT CONDITIONS**

A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not apply coatings under environmental conditions outside manufacturer's absolute limits.

# **PART 2 - PRODUCTS**

# 2.1 MANUFACTURERS

- A Preferred Manufacturer:
  - 1. Sherwin Williams: <u>www.sherwin-williams.com</u>
  - 2. Benjamin Moore & Co: <u>www.benjaminmoore.com</u>
  - 3. PPG Paint: <u>www.ppg.com</u>
  - 4. MDC: <u>www.mdcwall.com</u>
- B Substitutions: Requests for substitutions will be considered in accordance with provisions of Section 01600 Product Requirements. When submitting request for substitution, provide complete product data specified above under Submittals, for each substitute product.

# 2.2 APPLICATION/SCOPE

A Use this article to define the scope of painting if not fully defined in a Finish Schedule or on the drawings. This article must be carefully edited to reflect the surfaces actually found on the project. In some cases, it may be enough to use the first paragraph that says, in effect, "paint everything" along with a list of items not to paint, without exhaustively defining all the different surfaces and items that must be painted.

- B If the project involves repainting some but not all existing painted surfaces, be sure to indicate the extent of the repainting.
- C The descriptions of each system can also be used to further refine the definition of what is to be painted, stained, or clear finished.
- D Surfaces to Be Coated:

Concrete: Poured, Precast, Tilt-Up, Cast-In-Place, Cement Board, Plaster Concrete: Floors Masonry: (CMU - Concrete, Split Face, Scored, Smooth, etc.) Metal: Aluminum/ Galvanizing Metal Ferrous: (Structural Steel, Joists, Trusses, Beams, Partitions, etc.) Wood: Walls, Ceilings, Doors, Trim, etc Wood: Floors-Painted Drywall: Drywall board, Gypsum board

# 2.3 SCHEDULE - Final color and sheen to be selected by Owner.

- A CONCRETE (Walls & Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place)
  - 1. Latex Systems
    - a. Low Sheen Finish

1st Coat: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300 (8 mils wet, 3.2 mils dry)

2nd Coat: S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series

3<sup>rd</sup> Coat: S-W ProMar 200 Zero VOC Latex Low Sheen Enamel, B24-2600 Series (4 mils wet, 1.6 mils dry per coat)

# B. CONCRETE- FLOORS (Non-Vehicular)

- 1. Concrete Stain (Water Base)
  - a. Low Luster Finish Opaque
     1st Coat: S-W H&C Concrete Stain Solid Color Water Based
     2nd Coat: S-W H&C Concrete Stain Solid Color Water Based (50-300 sq/ft per gallon)
- C. METAL Ferrous- (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Sashes, Doors, Partitions)
  - 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry)

2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)

- D. WOOD- (Walls, Ceilings, Doors, Trim, Partitions, Frames)
  - 1. Latex Systems
    - a. Semi-Gloss Finish

1st Coat: S-W Premium Wall & Wood Primer, B28W8111 (4 mils wet, 1.8 mils dry)

2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)

- 2. Stain, Sealer & Varnish
  - a. Clear Finish

1st Coat: S-W Wood Classics 250 Oil Stain, A49-800 Series Or S-W Wood Classics Interior Oil Stain, A49 Series 2nd Coat: S-W Wood Classics FastDry Sanding Sealer, B26V43 3rd Coat: S-W Wood Classics FastDry Varnish, Gloss or Satin, A66 Series (4 mils wet, 1.3 mils dry per coat)

# E. DRYWALL (Walls, Ceilings, Gypsum Board, Plaster Board, etc.)

- 1. Latex Systems
  - a. Egg-Shell Finish
    - 1st Coat: S-W Harmony Interior Latex Primer, B11 Series (4 mils wet, 1.3 mils dry per coat)
    - 2nd Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series

3rd Coat: S-W Harmony Interior Latex Eg-Shel, B9 Series (4 mils wet, 1.7 mils dry per coat)

Alternate:

1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry)

2nd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series 3rd Coat: S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series (4 mils wet, 1.7 mils dry per coat)

# F. Interior Precast Concrete Ceilings

- 1. Decorative spray knock-down texture.
- 2. Key joints shall be infilled flush with covercoat.
- 3. Compound by United States Gypsum Company.
- 4. Fill deep voids or offsets with sheet rock brand durabond joint compound.

# 2.4 MATERIALS - GENERAL REQUIREMENTS

- A Paints and Coatings General:
  - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

# B Primers:

1. Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

# 2.5 ACCESSORIES

- A Coating Application Accessories:
  - 1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and cleanup materials required, per manufacturer's specifications.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A Do not begin application of coatings until substrates have been properly examined and prepared. Notify Architect of unsatisfactory conditions before proceeding.
- B If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.
- D Previously Painted Surfaces: Verify that existing painted surfaces do not contain lead based paints, notify Architect immediately if lead based paints are encountered.

# 3.2 SURFACE PREPARATION

**WARNING!** Removal of old paint by sanding, scraping or other means may generate dust or fumesthat contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as a properly fitted respirator (NIOSH approved) and proper containment and cleanup.

For more information, call the National Lead Information Center at 1-800-424-LEAD (in US) or contact your local health authority. Removal must be done in accordance with EPA Renovation, Repair and Painting Rule and all related state and local regulations. Care should be taken to follow all state and local regulations which may be more strict than those set under the federal RRP Rule.

- A Proper product selection, surface preparation and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.
- B Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.
- C The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
- D Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry a minimum of 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

# E Methods

1 Aluminum

Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.

2 Block (Cinder and Concrete)

Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.

On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

3 Concrete, SSPC-SP13 or NACE 6

This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.

#### 4 Cement Composition Siding/Panels

Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.

5 Drywall—Interior

Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.

6 Galvanized Metal

Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

7 Plaster

Must be allowed to dry thoroughly for at least 30 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.

8 Steel: Structural, Plate, etc.

Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.

9 Solvent Cleaning, SSPC-SP1

Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.

10 Hand Tool Cleaning, SSPC-SP2

Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this

process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

11 Power Tool Cleaning, SSPC-SP3

Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

12 White Metal Blast Cleaning, SSPC-SP5 or NACE 1

A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

13 Commercial Blast Cleaning, SSPC-SP6 or NACE 3

A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

14 Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4

A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.

15 Power Tool Cleaning to Bare Metal, SSPC-SP11

Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.

16 Near-White Blast Cleaning, SSPC-SP10 or NACE 2

A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.

- 17 High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials SSPC-SP12 or NACE 5 This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
- 18 Water Blasting, NACE Standard RP-01-72 Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.

# 19 Wood

Must be clean and dry. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

# 3.3 INSTALLATION

- A Apply all coatings and materials with the manufacturer's specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B Do not apply to wet or damp surfaces.
  - 1 Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
  - 2 Test new concrete for moisture content.
  - 3 Wait until wood is fully dry.
- C Apply coatings using methods recommended by manufacturer.
- D Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to the application of each coat.

# 3.4 **PROTECTION**

- A Protect finished coatings from damage until completion of project.
- B Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

# **END OF SECTION**

# SECTION 10306 FIRE EXTINGUISHER CABINETS

#### PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

# 1.02 SUMMARY

- A. Section Includes:
  - 1. Fire protection cabinets for the following:
    - a. Portable fire extinguishers.
    - b. Alternate cabinet styles (provide individual pricing for each).
- B. Related Sections:
  - 1. Division 09 painting Sections for field painting fire protection cabinets.
  - 2. Division 10 Section "Fire Extinguishers."

#### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
  - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Initial Selection: For each type of fire protection cabinet indicated.
- D. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

# 1.04 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire- resistance rating of walls where they are installed.

# 1.05 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.

# 1.06 SEQUENCING

A. Apply vinyl lettering on field-painted, fire protection cabinets after painting is complete.

# PART 2 - PRODUCTS

# 2.01 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
  - 1. Sheet: ASTM B 209 (ASTM B 209M).
  - 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.

# 2.02 FIRE PROTECTION CABINET

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. J. L. Industries, Inc., a division of Activar Construction Products Group. (Model 1017 – S21-PUF-LDCVBFE - Basis of Design)
    - b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
    - c. Larsen's Manufacturing Company.
    - d. Modern Metal Products, Division of Technico Inc.
    - e. Potter Roemer LLC.
    - f. Watrous Divison, American Specialties, Inc.
- B. Cabinet Construction: Nonrated or 1-hour fire rated.
  - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Steel sheet.
  - 1. Shelf: Same metal and finish as cabinet.
- BASE BID
  - D. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.
    - 1. Rolled-Edge Trim:  $2 \frac{1}{2}''$  to 3-inch backbend depth.
  - E. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
    - 1. Alternate #1: Trimless with Concealed Flange: Surface of surrounding wall finishes flush with exterior finished surface of cabinet frame and door, without overlapping trim attached to cabinet. Provide recessed flange, of same material as box, attached to box to act as drywall bead.
    - 2. Alternate #2: Exposed Flag Trim: One piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return

at outer edge (backbend).

- F. Cabinet Trim Material: Steel sheet.
- G. Door Material: Steel sheet.
- H. Door Style: Flush opaque panel, frameless, with no exposed hinges.
- I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide projecting door pull and friction latch.
  - 2. Provide concealed hinge permitting door to open 180 degrees.
- J. Accessories:
  - 1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked- enamel finish.
  - 2. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
  - 3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
    - a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER".
      - 1) Location: Applied to cabinet door. 2) Application Process: Silkscreened. 3) Lettering Color: Black. 4) Orientation: Vertical.
- K. Finishes:
  - 1. Manufacturer's standard baked-enamel paint for the following:
    - a. Exterior of cabinet door and trim except for those surfaces indicated to receive another finish.
    - b. Interior of cabinet and door.

# 2.02 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  - 1. Weld joints and grind smooth.
  - 2. Provide factory-drilled mounting holes.
  - 3. Prepare doors and frames to receive locks.
  - 4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
  - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
  - 2. Fabricate door frames of one-piece construction with edges flanged.
  - 3. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## 2.03 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# 2.04 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling".
- B. Factory Prime Finish: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
- C. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.
  - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

# PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Examine roughing-in for hose and cabinets to verify actual locations of piping connections before cabinet installation.
- B. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.02 PREPARATION

A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

#### 3.03 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
  - 1. Fire Protection Cabinets: 54 inches above finished floor to top of cabinet.

- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semi-recessed fire protection cabinets.
  - 2. Provide inside latch and lock for break-glass panels.
  - 3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
  - 4. Fire-Rated, Cabinets:
    - a. Install cabinet with not more than 1/16-inch tolerance between pipe OD and knockout OD. Center pipe within knockout.
    - b. Seal through penetrations with firestopping sealant as specified in Division
       07 Section "Penetration Firestopping."
- C. Identification: Apply vinyl lettering at locations indicated.

# 3.04 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factoryfinished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

# **END OF SECTION**

# SECTION 10307 FIRE EXTINGUISHERS

#### PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

# 1.02 SUMMARY

- A. Section includes portable, fire extinguishers and mounting brackets for fire extinguishers.
- B. Related Sections:
  - 1. Division 10 Section "Fire Extinguisher Cabinets."

# 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.
- C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.
- D. Warranty: Sample of special warranty.

# 1.04 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- C. Provide fire extinguishers approved, listed, and labeled by FMG.

# 1.05 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

# 1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

FIRE EXTINGUISHERS SECTION 10307 - 1

- 1. Failures include, but are not limited to, the following:
  - a. Failure of hydrostatic test according to NFPA 10.
  - b. Faulty operation of valves or release levers.
- 2. Warranty Period: 6 years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. Buckeye Fire Equipment Company.
    - e. Fire End & Croker Corporation.
    - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - g. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    - h. Larsen's Manufacturing Company.
    - i. Moon-American.
    - j. Pem All Fire Extinguisher Corp.; a division of PEM Systems, Inc.
    - k. Potter Roemer LLC.
    - I. Pyro-Chem; Tyco Safety Products.
  - 2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance and recharging.
- B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A: 60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

# 2.2 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked- enamel finish.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Amerex Corporation.
    - b. Ansul Incorporated; Tyco International Ltd.
    - c. Badger Fire Protection; a Kidde company.
    - d. Buckeye Fire Equipment Company.
    - e. Fire End & Croker Corporation.
    - f. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    - g. Larsen's Manufacturing Company.
    - h. Potter Roemer LLC.

# **PART 3 - EXECUTION**

# 3.01 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  - 1. Mounting Brackets: 54 inches or as indicated on drawings above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

# **END OF SECTION**

# SECTION 15010 GENERAL MECHANICAL PROVISIONS

#### PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 00 and Division 01 Specification Sections, apply to this and the other sections of Division 15.

#### 1.02 SUMMARY

- A. Section includes:
  - 1. General administrative and procedural requirements, as well as basic mechanical materials and methods.
  - 2. Submittals.
  - 3. Coordination drawings.
  - 4. Record documents.
  - 5. Operation and Maintenance manuals.
  - 6. Rough-ins.
  - 7. Mechanical installations.
  - 8. Cutting and patching.
  - 9. Concrete equipment base construction requirements.
  - 10. Equipment nameplate data requirement.
  - 11. Labeling and identifying mechanical systems and equipment is specified in "Identification for HVAC Piping and Equipment."
  - 12. Non-shrink grout for equipment installations.
  - 13. Field-fabricated metal and wood equipment supports.
  - 14. Installation requirements common to equipment specification Sections.
  - 15. Touchup painting and finishing.

#### 1.03 ACRONYMS

A. The following list of abbreviations are utilized within the specifications and are provided as a reference:

AABC	Associated Air Balance Council
ADA	American Disability Act
ADC	Air Diffusion Council
AGA	American Gas Association
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
BOCA	Building Officials and Code Administrators
CS	Commercial Standard

#### GENERAL MECHANICAL PROVISIONS SECTION 15010 - 1

# SECTION 16010

# SUPPLEMENTARY GENERAL CONDITIONS

# PART 1 - GENERAL

# 1.01 RELATED WORK

A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

# 1.02 QUALITY ASSURANCE

- A. Supervisory Qualifications: The electrical work on the project shall be under the direct supervision of a licensed Journeyman.
- B. Qualifications of Installers:
  - 1. For the actual fabrication, installation, and testing of the work of this section, uses only thoroughly trained and experienced personnel who are completely familiar with the requirements of this work and with the installation recommendations of the manufacturers of the specified items.
  - 2. In acceptance or rejection of installed electrical systems, no allowance will be made for lack of skill on the part of the installers.

# 1.03 DRAWINGS

- A. The intent of the drawings and specifications is to obtain a complete and satisfactory installation. An attempt to separate and completely define the work of Division 16000 has been made. Separate divisional drawings and specifications shall not relieve the Electrical Contractor from full compliance of the work of his trade indicated on any drawings or in any section of the specifications.
- B. Examine all drawings and specifications carefully prior to submitting a bid. The Electrical Contractor will be required to install, and/or connect with appropriate services all items or equipment furnished by others as shown on any of the drawings without additional expense to the owner.
- C. Architectural drawings take precedence over Mechanical or Electrical drawings with reference to building construction. Mechanical and Electrical drawings are diagrammatic, but shall be followed as closely as actual building construction and work of other trades permit.
- D. Changes from drawings necessary to make the work of the electrical contractor conform to the building as constructed, or to fit work of other trades, or to comply with the rules of bodies having jurisdiction, shall be made by the Electrical Contractor at his own expense.
- E. Field coordinate with other trades in ample time to build all chases and openings, set all sleeves, inserts and concealed materials and provide clearances that may be required.
- F. The term, "provide" used in this Section of the specifications, shall include all labor, materials and equipment necessary to install any item or system indicated on either plans or specifications, including items called for, implied or normally part of the

equipment or system. The finished installation shall be complete and fully operational before final acceptance.

- G. The Architect or Engineer reserves the right to make any reasonable changes (approximately six feet) in the location of outlets, fixtures, switches, receptacles, or equipment prior to the rough-in of such without any additional cost to the Owner.
- H. The Electrical Contractor is responsible for and shall pay for all access panels required in the architectural finishes or surfaces to provide access to the junction and pull boxes, ballasts, terminal cabinets or other devices provided and located by the Electrical Contractor. The access panel shall be installed by the trade constructing the base to which the access panel will be installed.
- I. The Electrical Contractor is responsible for design, fabrication and erection of all supplementary structural framing required for attachment of hangers or other devices to support electrical equipment.
  - 1. Framing members shall be designed for their actual loads, with allowable stresses set forth in AISC specifications and the AISC code, without excessive deflection and with consideration for rigidity under vibration. Supplementary framing, including design loads, member size and location shall be clearly shown on shop drawings for construction of supplementary framing.
  - 2. No cutting or drilling of holes in structural member will be permitted, except where written permission has been obtained from the Architect.

# 1.04 EXPLANATION TO BIDDERS

A. No oral explanations in regard to the meaning of drawings and specifications will be made and no oral instructions will be given before the award of the contract. Discrepancies, omissions or doubts, as to the meaning of drawings and specifications, should be communicated in writing to the Engineer for interpretation. Bidders should act promptly and allow sufficient time for a reply to reach them before the submission of their bids. Any interpretation made by the Engineer will be in the form of an addendum to the specifications, which will be forwarded to all bidders. Receipt of the addendum shall be acknowledged by the bidder on his bid form.

# 1.05 BID REQUIREMENTS

- A. Before submitting his proposal, the bidder is required to visit the site of the proposed work and familiarize himself with the nature and extent of the work and any local conditions that may, in any manner, affect the work to be done or the equipment, materials and labor required, He is also required to carefully examine the plans and specifications and to inform himself thoroughly regarding any and all conditions and requirements that may, in any manner, affect the work to be performed under the contract. Ignorance on the part of the Contractor will in no way relieve him of the obligations and responsibilities assumed under the contract.
- B. In assembling his bid, the Contractor shall assemble a price based on these specifications and drawings as shown, and with all materials and equipment exactly as specified. This figure shall be known as the "Base Bid". All prices must have this base bid clearly stated to be considered. Alternate equipment may be quoted as an "add" or "deduct" item from the base bid in accordance with the specifications on substitutions.

C. If asked, the Contractors bidding on this project shall show evidence of having recently completed a similar job of like size and complexity. If the low bid contractor does not have sufficient financial resource, skilled labor, technical competence, or experience, he shall be not awarded the contract.

# 1.06 SUBSTITUTIONS

- A. Each bidder represents that his bid is based upon the materials and equipment described in this Division of the specifications.
  - No substitutions will be considered unless a written request has been submitted to the Architect for approval twenty days prior to receipt of bids. Substitutions requested after that date will receive no consideration. Submittal shall include the name of the materials or equipment for which it is to be substituted, substituted equipment model numbers, drawings, cuts, performance and test data and any other data or information necessary for the Architect to determine that the equipment meets all specifications and requirements. If the Architect approves any proposed substitutions, such approval will be set forth in writing.
  - 2. Substituted equipment with all accessories installed or optional equipment where permitted and approved, must conform to space requirements. Any substituted equipment that cannot meet space requirements, whether approved or not, shall be replaced at the Contractor's expense. Any modifications of related systems of this or other trades as a result of substitutions shall be made at the Contractor's expense and Contractor shall so state in his written request for substitution.
  - 3. Approved equal manufacturers or products may be provided elsewhere in these specifications and drawings. These are manufacturers or items which are known to be functionally equivalent to basis of design manufacturers and equipment. These alternatives are provided to produce a competitive bidding yielding a better value for the consumer. These items may and often do vary in specific characteristics, connections, and required services. The contractor remains liable and responsible for all coordination of other related systems, equipment, services, etc. There are a number of possible ramifications from utilizing other than the design basis equipment outside of changes to connection sizes and styles. These changes will need to be performed by the electrical and other contractors or they will need to contract with the engineer(s) of record to provide new coordinated drawings. All of these associated costs for utilizing equipment not selected on drawings as basis of design are to be borne by the contractor.

# 1.07 BID ALLOWANCES

A. Provide allowances in Electrical subcontract bid as may be directed to provide and install the quantity of fixtures of type noted in the luminaire schedule at the unit material cost indicated, or for other items requested.

# 1.08 SUBMITTALS

- A. Submit items for this Division as follows:
  - 1. Submit all Division 16000 submittals per section at one time and in one integral group. Piece-by-piece submission of individual items will not be acceptable. The Architect/Engineer may check the contents of each submittal set upon initial delivery and if not complete as set forth herein,

submittal sets may be returned to the Contractor without review and may not be accepted until made complete.

- 2. Any delays arising directly or indirectly from deliverance of submittals in a timely manner shall be the Contractor's responsibility. Allow ten (10) working days from date of receipt for Architect/Engineer's review.
- B. Submittal items shall include materials, apparatus and equipment as indicated under each Section of this Division and in compliance with the General Conditions.
- C. Shop drawings shall include sufficient information to indicate compliance with specifications. Data shall include illustrations, catalog sheets, drawings and certifications. Each sheet shall show the manufacturer's name or trademark.
- D. At the time of each submission, the Contractor shall call the Architect/Engineer's attention to any deviations from the Contract Documents and shall plainly mark the deviations on the shop drawings.
- E. Manufacturer's Names and Catalog Numbers: In some instances, specific references have been made to one or more manufacturers' name and catalog numbers. It should be noted that such use does not indicate that the material and equipment specified is necessarily an "off the shelf" item. Variances may be due to the requirement of a desired finish, material or other modification. The Electrical Contractor shall ascertain that such modifications are fully considered.
- F. Submittal cover sheet shall bear the stamp of the General Contractor indicating the review of the submittal contents to meet the intent of the construction documents.

# 1.09 FAMILIARITY WITH LAWS AND CODES

A. The bidder is assumed to be familiar with all Federal, State and Local laws, ordinances, rules and regulations that in any manner affect the work. Ignorance on the part of the bidder will in no way relieve the bidder from responsibility to meet these requirements.

# 1.10 ORDINANCES AND REGULATIONS

- A. All work shall conform with all Federal, State and Local laws, ordinances or regulations governing the installation of the specified equipment. If the work as laid out, indicated or specified is contrary to or conflicts with local laws, ordinances or regulations, the Contractor shall report these conflicts to the Architect/Engineer before submitting a bid. The Architect/Engineer will then issue instructions to all bidders to clarify the conflict.
- B. If the Contractor fails to notify the Architect/Engineer of conflicts or omissions as noted above, all changes required to comply with local ordinances and regulations shall be made without additional expense to the Owner.

# 1.11 PERMITS AND FEES

- A. The Electrical Contractor shall obtain all necessary permits and inspections required for the electrical portion of the work and shall pay all charges incidental thereto.
- B. The Electrical Contractor shall deliver to the Architect/Engineer all certificates of inspection issued by Authorities Having Jurisdiction

# 1.12 CODES AND INSPECTIONS

- A. The installation shall comply with all laws applicable to the electrical installations, which are enforced by the authority having jurisdiction. The codes applicable to this project are shown on the architectural documents.
- B. In any specific case where different sections of any aforementioned codes or these plans and specifications specify different materials, methods of construction or other requirements, the most restrictive shall govern. In the case of any conflict between a general provision and a special provision, the special provision shall govern.
- C. All materials shall be listed by a nationally recognized testing laboratory, as conforming to its standards, where such a standard has been established for the particular type of material in question.
- D. Where Contract Document requirements are in excess of code requirements and are permitted under the code, the Contract Documents will govern.

# 1.13 SINGULAR AND PLURAL REFERENCES

A. Singular references in specifications shall not be construed as requiring one (1) device if multiple devices are indicated on the drawings.

#### 1.14 MATERIALS

- A. Materials and equipment shall be new and in good condition. The commercially standard items of equipment and the specific names mentioned herein are intended to fix the standards of quality and performance necessary for the proper functioning of the electrical work.
- B. Since manufacturing methods vary, reasonable minor equipment variations are expected. However, performance and material requirements for the specified equipment are the minimum acceptable standards. The Architect/Engineer retains the right to judge equality of equipment that deviates from the specifications.

# 1.15 IDENTIFICATION OF EQUIPMENT

- A. All electrical equipment shall be identified by means of nameplates permanently attached to the equipment. Nameplates shall be engraved laminated plastic with letters at least 3/8" high.
- B. Nameplate designations shall correspond to the identifications on the "record drawings".
- C. Refer also to Specification Sections 16160 for additional nameplate requirements.

# 1.16 OPERATING AND MAINTENANCE BOOKS

- A. The Electrical Contractor shall provide the Owner's Representative with operating instructions and maintenance data books for all equipment and materials furnished under this division. Provide Engineer with receipt of transfer to Owner.
- B. The Electrical Contractor shall submit to the Architect/Engineer, final competition before final inspection, an electronic copy of operating and maintenance data in a single PDF file for review. All data shall be assembled and completely indexed into one volume and shall identify the size, model, and features indicated for each item.

- C. The following information shall be included where applicable:
  - 1. Identifying name and mark number
  - 2. Locations (Where several similar items are used, provide a list.)
  - 3. Complete nameplate data
  - 4. Certified record drawings and shop drawings
  - 5. Parts lists
  - 6. Wiring diagrams
  - 7. Manufacturers' operating and maintenance instructions, with all nonapplicable information deleted.
  - 8. Equipment warranties.

# 1.17 DATE OF COMPLETION AND TESTING OF MECHANICAL/ELECTRICAL SYSTEMS

A. The date for all the final acceptance tests by the Engineer shall be sufficiently in advance of the contract completion date to permit the execution of any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper functioning of all equipment. Any such modifications shall be completed within the number of days allotted for completion of the contract. Re-tests shall not relieve the Contractor for this Division of his contract completion date responsibility.

# 1.18 GUARANTEE AND SERVICE

- A. In addition to the guarantee of equipment by the manufacturer of each piece of equipment specified herein, the Electrical Contractor shall also guarantee such equipment and shall be held for a period of one (1) year from final acceptance test for necessary adjustments and/or replacements of all defective equipment, and materials and workmanship without expense to the Owner.
- B. The Contractor shall furnish maintenance and service for one (1) year from final acceptance of the contract for all portions of the system. Such service for the one year period includes the following:
  - 1. Necessary adjustment and/or replacement of all defective equipment and materials furnished.
- C. Service and replacement of light bulbs shall be limited to thirty days after final acceptance of the job.
- D. Upon expiration of each of these limits noted herein, the maintenance, including labor and material costs, shall be at the Owner's expense.

# 1.19 ACCEPTANCE

- A. As a precedent to requesting a final inspection and release of retained monies, the Electrical Contractor shall:
  - 1. Complete all work required under the electrical section of the specifications.
  - 2. Submit four (4) certified copies of final test data to the Architect/Engineer.
  - 3. Furnish a complete set of "as built" reproducible tracings of the Contractor's work to the Architect/Engineer.
  - 4. Submit four (4) copies of operating and maintenance books to the Architect/ Engineer.

- 5. Provide resolution to all issues noted on Engineers' Field Reports and Final Punch lists.
- 6. Provide all copies of certificates of inspection issued by Authorities Having Jurisdiction.

# END OF SECTION

# SECTION 16047 ELECTRICAL DEMOLITION

# PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work specified in this section.
- B. Materials and equipment for patching and extending work shall be as specified in individual sections.

# 1.02 DESCRIPTION OF WORK

- A. The extent of general building demolition work is shown on the architectural drawings. Coordinate the required electrical work with the general demolition.
- B. Demolition includes complete wrecking of all electrical equipment devices, raceways, wiring and fixtures and removal and disposal of demolished materials.
  - 1. Demolition shall be accomplished in a workmanlike manner to allow possible reuse of demolished lighting fixtures applicable as noted on the Drawings.
  - 2. Electrical demolition shall follow the intent of the architectural drawings. In general, all electrical devices and materials in walls or ceilings scheduled for demolition shall be disconnected and removed.
- C. Interior demolition includes complete wrecking of electrical work above ceiling, and finishes, and removal and disposal of demolished materials, as shown on drawings and herein specified.
- D. The Owner shall have the option of retaining any items removed. The Contractor shall deliver these items to the Owner's designated storage areas in good condition. Any items not retained by the Owner shall be disposed of off-site by the Contractor.
- E. Existing conditions as shown diagrammatically on drawings are taken from limited project site survey and/or by the Engineer and in part are unverified. Field conditions will govern. All existing conditions must be verified prior to bid. No change orders will be accepted due to difficulties involved in completing demolition work above ceilings if condition could have been verified prior to bid.

# 1.03 JOB CONDITIONS

- A. Conditions of Structures: The Owner assumes no responsibility for actual condition of structures to be demolished.
  - 1. Conditions of the structures existing at time of inspection for bidding purposes will be maintained by Owner in so far as is practical. However, variations within structure may occur by Owner's removal and salvage operations prior to start of demolition work.
  - 2. The demolition drawings are schematic and provided as an aid in bidding. The Contractor shall visit the site and determine the actual conditions prior to bidding. Such visits shall be in addition to a Pre-bid Conference.
- B. Partial Removal: Items of salvage value to Contractor shall be removed from structure as work progresses. Such salvaged items must be transported from site as they are removed.

- 1. Storage or sale of removed items on site will not be permitted.
- C. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, occupied area, and other adjacent occupied or used facilities.
- D. Protections: Ensure safe passage of persons around or through area of demolition. Conduct operations to prevent injury to other demolition contractors.
- E. Utility Services: Maintain existing utilities during demolition process, keep in service, and protect against damage.
- F. Salvage Items: The following items noted shall be retained by the Contractor for reinstallation under this contract by the Electrical Contractor.
  - 1. CCTV System Monitor Switcher and Cameras
  - 2. Wander management and patient monitoring Systems

The Electrical Contractor shall document in writing any existing damage to salvageable items prior to removal. All supports, fasteners and mounting accessories required for reinstallation shall be the responsibility of the Electrical Contractor.

# PART 2 - PRODUCTS

Not Used

# **PART 3 - EXECUTION**

# 3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation and existing record documents.
- D. Report discrepancies to The Hensley Engineering (THE) Group before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

# 3.02 **PREPARATION**

- A. Lockout and tag all affected power circuits to comply with procedures outlined in NFPA 70E National Electrical Safety Code (NESC).
- B. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- C. Safety and protection of occupants and staff shall be observed to comply with NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations.
- D. Coordinate utility service outages with utility company.
- E. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

- F. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- F. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify Owner before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Notify Owner at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
- H. Existing Special Systems: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.

# 3.03 DEMOLITION

- A. Remove all branch and feeder wire back to service panelboard.
  - 1. Where walls, ceilings, or floors are to remain, remove devices and wire from raceways, saw-cut raceways flush with finish surface and fill with patching compound.
- B. All lighting fixtures to be salvaged or relocated shall be removed and stored on-site.
- C. Contractor shall be responsible for updating all panelboard directories which have circuits removed. Removed circuits shall have circuit breakers marked spare.
- D. Contractor shall be responsible for proper removal of all inactive low voltage communication cabling.
- E. Lockout and tagging of power circuits shall follow procedures outlined in NFPA 70E (NESC)
- F. Patient and staff safeguarding shall be followed as outlined in NFPA 241.
- G. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- H. Disconnect and remove abandoned panelboards and distribution equipment.
- I. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- J. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

- K. Repair adjacent construction and finishes damaged during demolition and extension work.
- L. Existing smoke detectors located within the limits of the area of this work may be replaced with heat detection devices to prevent false alarms from airborne dust from construction operations.
- M. Contractor shall ensure all existing electrical boxes, cables and conduits remaining above the finished ceiling after demolition work is completed are properly covered, supported and in compliance with all current codes.

# 3.04 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove from site debris, rubbish, and other materials resulting from demolition operations. Pay all fees related to removal and dumping.
  - 1. Dispose of interior demolition debris.
  - 2. Burning of removed materials from demolished will not be permitted on site
- B. Removal: Transport materials removed from demolished structures and dispose off-site each day.

# 3.05 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. The Contractor shall be responsible for repairing adjacent construction and finishes damaged during demolition and/or modification. The Contractor shall be responsible for the removal of ceiling tiles required in the demolition work and for the replacement of damaged tiles and reinstallation of new tiles prior to completion.
- C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

# **END OF SECTION**

# SECTION 16110 RACEWAYS

# PART 1 - GENERAL

# 1.01 RELATED DOCUMENTS

- A. The General Provisions of the contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.
- B. Refer to Supplementary General Conditions.

# 1.02 DESCRIPTION OF WORK

A. The work included under this Section of these specifications consists of furnishing all materials and equipment and performing all labor and services necessary for the complete installation of the system of conduits for power and lighting service, including all related system and accessories as shown by the drawings and herein after specified.

# 1.03 **DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. RMC: Rigid metallic conduit.
- C. ENT: Electrical non-metallic tubing.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquid-tight flexible metal conduit.
- G. LFNC: Liquid-tight flexible nonmetallic conduit.
- H. RNC: Rigid non-metallic conduit.

# PART 2 - PRODUCTS

# 2.01 BUSHINGS, LOCKNUTS AND CONNECTORS

- A. Where rigid conduit enters a box of any description, the conduit shall be secured to the box with a locknut on the outside and a similar nut and bushings on the inside.
- B. Where electric metallic tubing enters such boxes, the connection between the connector and the box shall be made tight by an approved manner both on the inside and the outside of the box.
- C. Conduit terminations at the boxes shall be provided with bushings. Bushings for conductors through #8 AWG shall be galvanized, non-insulating type; for #6 AWG and larger conductors, bushings shall be insulated and selected for the size conduit involved.

# 2.02 CONDUIT

- A. Manufacturers:
  - 1. Allied Tube & Conduit
  - 2. AFC Cable Systems, Inc.
  - 3. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 4. Electri-Flex Co.
  - 5. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
  - 6. LTV Steel Tubular Products Company.
  - 7. Manhattan/CDT/Cole-Flex.
  - 8. O-Z Gedney, Unit of General Signal
  - 9. Wheatland Tube Co.
- B. All conduit installed in concrete floor slabs shall be Underwriter's approved hot-dipped rigid galvanized steel conduit or Schedule 40 PVC conduit.
- C. All conduit installed underground shall be Schedule 40 rigid polyvinyl chloride (PVC) or hot-dipped rigid galvanized steel conduit coated with an asphaltum paint approved by the Architect.
- D. All conduit installed exposed in exterior areas above finished grade shall be Underwriter's approved rigid hot-dipped galvanized steel. Conduit installed exposed in interior areas above finished floor shall be Underwriter's approved hot-dipped rigid galvanized steel or electrical metallic tubing, unless otherwise noted on the drawings.
- E. All conduit installed in or above ceilings or stud partitions shall be electrical metallic tubing.
- F. PVC Schedule 40 conduit shall not be used above grade or within the bulding anywhere on the project.
- G. Electrical Metallic Tubing: All electrical metallic tubing shall be galvanized and conform to all pertinent requirements of the National Electrical Code.
- H. All flexible metallic conduit installed in wet or damp locations shall be liquid-tight (PVC extruded cover) and all installations in dry locations shall be flexible steel conduit (no cover), unless specifically noted otherwise.
- I. PVC Conduit: All polyvinyl chloride conduit shall be heavy-wall Schedule 40, with factory made bends, couplings and fittings.
- J. Connectors and Couplings: For electrical metallic tubing, compression, galvanized steel, or set screw type fittings shall be used. For rigid steel conduit, threaded couplings and locknuts and bushings shall be used. For PVC, PVC couplings and fittings shall be used. Where PVC underground conduit connects to steel conduit, suitable threaded conduit adapter fittings shall be used. For flexible conduit, liquid-tight fittings shall be used with liquid-tight flexible conduit and compression fittings shall be used with flexible steel conduit
- K. Conduit serving patient care/occupied areas shall be rigid galvanized steel or electrical metallic tubing. Patient care/occupied areas shall include, but not be limited to, the following: physical therapy rooms, patient rooms, patient toilet rooms, dining areas and similar areas that may be used as an area of refuge.

# RACEWAYS SECTION 16110 - 2

# PART 3 - EXECUTION

# 3.01 INSPECTION

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify the electrical installation may be made in complete accordance with all pertinent codes and regulations and the original design.

# 3.02 DISCREPANCIES

- A. In the event of discrepancy, immediately notify the Architect/Engineer.
- B. Do not proceed with the installation in areas of discrepancy until all such discrepancies have been fully resolved.

# 3.03 **PREPARATION**

- A. Coordinate the installation of electrical items with the work schedules of other trades to prevent unnecessary delays in the total work.
- B. Do not proceed with the installation in areas where there is any discrepancy until all such discrepancies have been fully resolved.

# 3.04 INSTALLATION OF RACEWAYS AND FITTINGS

- A. All conduit penetrating a fire or smoke wall shall be sealed with an approved firestop material to preserve the rating of the firewall.
- B. All conduit shall be concealed unless otherwise shown on the drawings. Concealed conduit run above the ceiling shall be supported from the roof structure, i.e., roof trusses, bar joints and shall be totally independent from ceiling and/or rated membrane construction. Where a ceiling of the lay-in type is used, the conduit must be installed high enough to permit removal of ceiling panels.
- C. Exposed conduit shall be run parallel with or at right angles to the building walls and supported from the walls or ceilings with straps or clamps secured with wood screws for wood construction, machine screws for metal construction, and expansion anchors with bolts for masonry or concrete slab construction, All exposed conduit runs shall be subject to approval.
- D. Conduit shall be continuous from outlet to outlet and from outlet to cabinet, junction or pull box. Conduits shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from point of service to all outlets.
- E. Approved Appleton, Crouse-Hinds, or O.Z. Manufacturing Company expansion fittings shall be installed in all rigid conduit and EMT runs, where such conduit runs extend across expansion joints in the building.
- F. No conduit shall be trapped except where shown on the drawings.
- G. At rigid steel couplings, conduits shall be threaded so that they meet in the coupling. Right and left couplings shall not be used. Conduit couplings of the Erickson type shall be used at locations requiring such joints.

# RACEWAYS SECTION 16110 - 3

- H. Conduit shall be secured in place and protected to prevent damage to work during construction. The ends of all conduit runs shall be plugged to avoid filling with plaster, etc. All conduit shall be blown out and/or swabbed clear of water and trash prior to pulling wire.
- I. Flexible conduit shall be used only where indicated on the drawings, or where specified otherwise.
- J. Conduit connections from outlet boxes, junction boxes, conduit, switch boxes, or motor controller to rotating or vibrating machinery or equipment shall be made with flexible conduit which shall be as short as possible with a maximum length of 36 inches.
- K. Conduit connections from outlet boxes to recessed lighting fixtures shall be made with 3/8" flexible conduit which shall have a maximum length of 72 inches, unless otherwise noted.
- L. Where underground PVC conduit turns up to run above grade, the elbow and all conduit from the elbow up shall be rigid galvanized steel. Where the PVC conduit is encased in concrete, the transition to steel conduit shall be made within the concrete casing.
- M. All telephone conduit routed to the telephone terminal wood backboard shall be terminated with an end bushing within six (6) inches of the edge of the backboard.
- N. All conduit penetrating a fire or smoke wall shall be sealed with an approved firestop material to preserve the rating of the firewall.
- O. All boxes and enclosures including conduits for emergency circuits shall be spot painted so that they will be readily identified as a component of an emergency circuit. Colors to be as follows:

Yellow	-	Life Safety Branch
Orange	-	Critical Branch
Green	-	Equipment Branch
Red	-	Fire Alarm System
Purple	-	Other Emergency System wiring not covered above
		(Generator feeders, transfer switches, etc.)

P. All metal feeder raceways associated with essential system shall have terminations equipped with grounding bushings in accordance with NEC 517-19.

# END OF SECTION

# SECTION 16120 CONDUCTORS AND CABLES

# PART 1 – GENERAL

# 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Supplementary General Conditions.
- C. Refer to Raceways.

# 1.02 REFERENCE STANDARDS

- A. NECA 1 Standard for Good Workmanship in Electrical Construction, current edition, including all revisions; National Electrical Contractors Association.
- B. NFPA 70 National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 83 Thermoplastic-Insulated Wires and Cables, current edition, including all revisions.
- D. UL 44 Thermoset-Insulated Wires and Cables; current edition, including all revisions.
- E. UL 486C Splicing Wire Connectors, current edition, including all revisions; Underwriters Laboratories.
- F. UL 493 Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables, current edition, including all revisions; Underwriters Laboratories.
- G. UL 1569 Metal-Clad Cables, current edition, including all revisions; Underwriters Laboratories.
- H. ASTM B 3 Standard Specification for Soft or Annealed Copper Wire, latest edition; American Society for Testing and Materials.
- I. ASTM B 8 Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft, latest edition; American Society for Testing and Materials.
- J. ASTM B 787/B 787M Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation, latest edition; American Society for Testing and Materials.
- K. Where application of applicable codes, trade association standards or publications appears to be in conflict with the requirements of this section, an interpretation shall be obtained from the Architect/Engineer.

# 1.03 DESCRIPTION OF WORK

A. The work included under this Section of these specifications consists of furnishing all materials and equipment and performing all labor and service necessary for the complete installation of the system of conductors for power and lighting service, including all related

raceways, devices, systems and accessories as shown by the drawings and herein after specified.

B. Commencement of work signifies this Installer's acceptance of existing conditions. In the acceptance or rejection of the finished installation, no allowance shall be made for lack of workmen skill.

# PART 2 – PRODUCTS

# 2.01 MANUFACTURERS

- A. Cerro Wire LLC: www.cerrowire.com.
- B. Industrial Wire & Cable, Inc: www.iewc.com.
- C. Southwire Company: www.southwire.com.
- D. Alcan Aluminum Corporation; Alcan Cable Div.: www.alcan.com.
- E. American Insulated Wire Corp.; a Leviton Company: www.aiwc.com.
- F. General Cable Corporation: www.generalcable.com.

# 2.02 MATERIALS

- A. Provide products that comply with requirements of NFPA 70 and that are listed and classified by Underwriters Laboratories (UL) as suitable for the purpose indicated.
- All conductors #2 AWG and smaller shall be soft-drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B 3, ASTM B 8, or ASTM B 787/B 787M, with 600 volt insulation.
  - 1. Conductors #1 AWG and larger shall be permitted to be electrical grade compacted aluminum with 600 volt insulation, unless noted otherwise.
  - 2. Terminate aluminum conductors with tin-plated aluminum-bodied compression connectors. Fill connector body with anti- oxidant compound before installing conductor.
- C. Conductors and conduit sizes specified are based on copper AWG up to 4/0 and circular mils above 4/0.
  - 1. Conductor sizes 10 AWG and smaller shall be solid; Conductors #8 AWG and larger shall be stranded.
  - 2. Stranded conductors may only be terminated with UL or ETL Listed type terminations or methods. Stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device or must be terminated in an approved back wired method.
  - 3. Conductors #6 and smaller shall be NEC standard dual rated Type THWN or THW thermoplastic, approved for operation at 75 degrees Celsius in dry and wet locations and 90 degrees Celsius within electric discharge lighting equipment as permitted in NEC 410.
  - 4. Use only building wire with Type THWN insulation in raceway or serviceentrance cable.
  - 5. Conductors #4 and larger shall be NEC Standard rated Type THWN approved for operation at 75 degrees Celsius in dry and wet locations.
D. Type MC HCF medical grade cable shall be permitted throughout facility and shall meet all requirements per the appropriate article of the NEC.

## 2.03 ALUMINUM CONDUCTORS

- A. The following requirements shall be met when Aluminum conductors are utilized:
  - 1. Aluminum alloy conductors shall be compact stranded conductors of a recognized Aluminum Association 8000 Series aluminum alloy conductor material (AA-8000 series alloy).
  - 2. It is the responsibility of the contractor to increase the size of the conduit, wire gutter, or enclosure, if necessary, to accommodate the aluminum conductors and meet allowable code requirements.
  - 3. It is the responsibility of the contractor to increase the size of the aluminum conductor to match the ampacity of the copper conductor circuit shown on the Drawings.
  - 4. The contractor shall submit a feeder schedule to the Engineer for all conductor substitutions indicating the aluminum conductor wire size and the conduit size. The contractor shall not begin the installation until written approval is granted by the Engineer.
  - 5. All aluminum conductors shall terminate on a mechanical screw-type connector or mechanical compression-type connector. Connector shall be dual rated (AL7CU or AL9CU) and Listed by UL for use with aluminum and copper conductors, and sized to accept aluminum conductors of the required ampacity. When using compression-type connectors, the lugs shall be marked with wire size, die index, number and location of crimps and shall be suitably color-coded. Using a suitable stripping tool, remove insulation from the required length of the conductor. Wire brush the conductor and apply a listed antioxidant joint compound. Tighten or crimp the connection per the connector manufacturer's recommendation. Wipe off any excess antioxidant joint compound.
  - 6. When terminating aluminum conductors to aluminum bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be anodized alloy and conform to current ANSI and ASTM chemical and mechanical property limits. Nuts shall be aluminum alloy and conform to current ANSI standards. Washers shall be flat aluminum alloy, Type A plain, standard wide series conforming to current ANSI standards. Install all hardware per manufacturer's recommendations.
  - 7. When terminating aluminum conductors to copper bus, prepare a mechanical screw-type or compression-type connection. Bolts shall be plated or galvanized medium carbon steel; heat treated, quenched and tempered equal to current ASTM standard or SAE grade 5. Nuts shall conform to current ANSI standards. Washers shall be steel, Type A plain, standard wide series conforming to current ANSI standards. Belleville conical spring washers shall be of hardened steel, cadmium plated or silicone bronze. Lubricate and tighten the hardware per manufacturer's recommendations.
  - 8. The final tightening torque shall be recorded for all aluminum conductor mechanical screw-type connections and provided in report form, in the completed O&M manuals.
  - 9. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
  - 10. The contractor shall perform an infrared survey of all aluminum conductor connections after the installation is complete and in normal service. Infrared

surveys shall be performed during periods of maximum possible loading with at least 30% of rated load of the equipment being inspected. All connections with elevated temperatures shall be corrected by the contractor. The infrared survey results shall be provided in report form, in the completed O&M manuals.

- B. No copper-to-aluminum transitions permitted when splicing onto existing copper feeders.
- C. Insulation shall have a 600-volt rating.
- D. Installation of all hardware shall be per manufacturer's instructions and use of oxidation compound shall follow manufacturer's recommendations.

## PART 3 – EXECUTION

## 3.01 INSTALLATION

- A. Minimum size conductor installed shall be #12 AWG for all applications, except for special system circuits and where specifically noted otherwise.
- B. All lighting and receptacle branch circuit conductors shall be color coded. Feeder cables and service entrance conductors shall be color coded by use of colored plastic tape applied within six (6) inches of each conductor end. All color coding shall be with the same color being used with its respective phase or bus through the entire job as follows:

208/120 Volts		I I	480/277 Volts	
Phase A	Black	] [	Phase A	Brown
Phase B	Red	[	Phase B	Orange
Phase C	Blue	1 [	Phase C	Yellow
Neutral	White	1 [	Neutral	Grey
Ground	Green	1 [	Ground	Green

- C. No wires or cables shall be pulled into the conduit until the conduit system is complete and plastering is applied and dried. This does not refer to a white finish coat of plaster, which may be applied after the wires are pulled.
- D. All wiring for lighting and receptacles branch circuits shall be run as single-phase, two-wire circuits with equipment grounding conductor. A common neutral shall be permitted for multi-wire circuits where the available electrical service is three-phase, provided the circuits are supplied from different phases. If it is necessary that more circuits be placed in any run, a separate neutral must be provided for additional two-wire, three-wire or four-wire branch circuits.
  - 1. No more than 6 current carrying conductors of multi-outlet circuits shall be permitted to be installed in a single raceway, regardless of size of conductors or raceway.
  - 2. Install conductors at each outlet, with at least 6 inches (150 mm) of slack conductor length.
- E. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with solderless pressure connectors and insulated with vinyl electrical tape and friction tape, if insulation is not provided in pressure type connector used.
  - 1. All conductors shall be properly terminated in accordance with torque requirements specified in manufacturer's instructions.

- 2. Aluminum terminations shall be treated with an oxide inhibiting compound prior to torqueing.
- 3. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than #10 are connected to any terminal, CU/AL terminal lugs shall be bolted to the conductors.
- 4. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.
- 5. Install 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet.
- 6. Install 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet.
- 7. Cables shall be selected on the basis of their purpose and UL Listing. Generally, use Types "THWN and "THHN" in building interiors and other dry locations. Outdoors and underground in raceways, use Type "THWN".
- 8. The use of shared branch neutrals is not permitted. Separate neutral conductors shall be pulled for all branch circuits served by a single pole and where required for two (2) and three (3) pole circuit breakers.
- F. All wire and cables for power, lighting, control and signal shall be continuous from origin to destination with proper splices as specified. At the end of these wires and cables, only sufficient slack shall be left as may be required for making proper connections. There shall be no unnecessary slack, but not less than 6 inches of slack at any junction box, outlet, device or terminal.
- G. Where conductors are to be connected directly to the devices without the use of lugs, such as occurs at side connections of lighting switches and plug receptacles, the conductors shall be formed into suitable loops to fit around the terminal screws.
- H. Where wires and cables are connected to metallic surfaces, the coated surfaces of the metal shall be polished before installing the mechanical connectors. The lacquer coating of conduits shall be removed where ground clamps are to be installed.
- I. The conductors terminating at each wired outlet shall be left not less than six (6) inches long at their outlet fitting to facilitate the installation of devices or fixture. Where more than one pair of conductors enters an outlet, the several pairs of conductors shall be neatly spliced and made mechanically and electrically secure. The conductors shall be not less than six (6) inches long at any junction box, outlet, device or terminal.
- J. Branch circuit wiring which supplies more than one fluorescent fixture through the wireway of other fixtures shall be approved for use at 90 degrees Celsius. Such fixture wireways shall be U.L. listed for through wiring.
- K. Wall switch outlets shall be wired to provide control of outlets indicated. All connections to single pole switches shall be made so that the "OFF" operation of the switch opens the ungrounded leg.
- L. Each wire in a pull box, junction box or equipment wire chamber shall be labeled with the proper panel letter and circuit number identification, and where two or more wires are spliced, each shall be labeled. Labels shall be printed numbers and letters on suitable plastic tape. Wires and cables shall be identified by suitable Brady or approved equal adhesive label tapes.

- M. Tighten electrical connectors and terminals according to manufacturer's published torquetightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- N. Type MC Cable may be used where approved by the local AHJ (Authority having jurisdiction) and allowed by the NEC.
- O. Type MC Cable shall not be used for branch circuit homeruns, where more than three (3) conductors (phase/neutral/ground) are required, where exposed or in lengths exceeding twenty feet.
- P. Type MC Cable shall be protected and supported herein in accordance with the NEC.

# SECTION 16131 JUNCTION AND PULL BOXES

### PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Supplementary Conditions.

## 1.02 DESCRIPTION OF WORK

A. The work included under this Section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary for the installation of junction and pull boxes, including all related systems and accessories as shown by the drawings and hereinafter specified.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Junction and pull boxes 100 cubic inches in volume or smaller shall be standard outlet boxes. Those 150 cubic inches or larger shall be constructed as specified for cabinet construction and shall be furnished with covers. Boxes shall be coated inside and out to prevent corrosion.
- Boxes shall be sized in accordance with the requirements of the National Electrical Code, and junction boxes not used for service entrance duty shall not be smaller than four (4) inches square and 1-1/2 inches in depth with covers accessible at all times. Boxes on concealed conduit shall be set with covers flush with the finished plaster line, unless otherwise shown.

### 2.02 MANUFACTURERS

- A. Hubbell RACO.
- B. Thomas & Betts Steel City.
- C. Appleton Electric.
- D. Arcade Metal Stamping.
- E. Unity Manufacturing.
- F. Communications Integrators, Inc.
- G. Hubbell Wiring Devices-Kellems.
- H. Legrand Walker.
- I. Hubbell Killark.
- J. Eaton Cooper Industries Crouse Hinds.

## **PART 3 - EXECUTION**

#### 3.01 INSTALLATION

- A. Junction boxes and pull boxes made of code gauge steel shall be furnished and installed where such boxes may be necessary to facilitate the pulling or splicing of cables. Boxes must be made accessible. Conduits shall enter these boxes through tight fitting clearance holes. Where required, suitable supports shall be provided in all pull boxes to support feeders passing through the boxes so that feeder conductors will not remain unsupported for a distance greater than three (3) feet.
- B. Junction boxes shall have only the holes necessary to accommodate the conduits at point of installation. All boxes shall have suitable provisions to secure covers.
- C. Junction boxes shall be securely attached to the building construction, using wood screws for wood construction, bolts for metal construction, and expansion anchors with bolts for masonry or concrete construction. Boxes flush mounted in tile or masonry construction shall be secured in place with cement mortar. Boxes flush mounted in ceiling shall be supported from building structure independent of the ceiling construction.

## SECTION 16134 BOXES

## PART 1 - GENERAL

## 1.01 SECTION INCLUDES

- A. Wall and ceiling outlet boxes.
- B. Floor boxes.
- C. Junction and pull boxes.

## 1.02 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Section 16010 for Supplementary Conditions.

### 1.03 **REFERENCE STANDARDS**

- A. NECA 1 Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association, latest edition.
- B. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association, latest edition.
- C. NEMA OS 1 Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association, latest edition.
- D. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association, latest edition.
- E. NFPA 70 National Fire Protection Association National Electrical Code; most recent edition adopted by authority having jurisdiction (AHJ), including all applicable amendments and supplements.

### 1.04 DESCRIPTION OF WORK

- A. The work included under this Section consists of furnishing all material and equipment and performing all labor and services necessary for the installation of outlet boxes, including all related systems and accessories as shown by the drawings and herein specified.
- B. Boxes shall be sized in accordance with the requirements of the National Electrical Code (NEC), and junction boxes not used for service entrance duty shall not be smaller than four (4) inches square and 1-1/2 inches in depth with covers accessible at all times. Boxes on concealed conduit shall be set with covers flush with the finished plaster line, unless otherwise shown.
- C. Junction and pull boxes 100 cubic inches in volume or smaller shall be standard outlet boxes and this specification. Those 150 cubic inches or larger shall be constructed as specified for cabinet construction and shall be furnished with covers. Boxes shall be coated inside and out to prevent corrosion.

## BOXES SECTION 16134 - 1

## PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Hubbell RACO
- B. Thomas & Betts Steel City
- C. Appleton Electric
- D. Legrand Walker
- E. Hubbell Killark
- F. Eaton Cooper Industries Crouse Hinds

#### 2.02 MATERIALS

- A. At each outlet shown, furnish and install a box of suitable size and construction to serve the purpose properly. Furnish and install plaster rings where required in connection with adjacent plaster finish where these occur. In unfinished masonry walls, furnish and install handy boxes of such size as to permit them from being completely covered by the device plate. Boxes throughout shall be galvanized steel. All unused knockouts in boxes shall be filled or capped before plates or devices are installed.
- B. Ceiling outlets shall be four (4) inch octagonal boxes of the appropriate depth and furnished with 3/8" fixture studs fastened through from back of boxes. For plaster surfaces, furnish and install plaster rings and ears.
- C. At each switch or receptacle outlet shown, provide outlet box of (4) inches square and 1 <sup>1</sup>/<sub>2</sub> "in depth with extension ring as necessary for devices contained.
- D. Outlet boxes for all exposed work shall be of the cast type and manufactured by an approved vendor selected from the above list.
- E. Stamped steel outlet boxes shall be manufactured by an approved vendor selected from the above list.
- F. Cast metal outlet boxes shall be manufactured by an approved vendor selected from the above list.
- G. Service fittings shall be as manufactured by those listed above.

## 2.03 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.
- C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
- D. Wall Plates for Finished Areas: As specified in Wiring Devices.

#### 2.04 FLOOR BOXES

A. Floor Boxes: NEMA OS 1, fully adjustable, 1-1/2 inches (38 mm) deep.

- B. Material: Formed steel.
- C. Service Fittings: As specified in Wiring Devices.
- D. Coordinate the installation of electrical items with the schedules for work of other trades to prevent unnecessary delays in the total work.
- E. Provide all trenching and backfilling required in connection with the work of this Section.

#### 2.05 PULL AND JUNCTION BOXES

- A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
- B. Hinged Enclosures: As specified in Cabinets and Enclosures.
- C. Surface Mounted Cast Aluminum Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
- D. In-Ground Cast Aluminum Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
- E. Fiberglass Hand-holes: Die molded glass fiber hand holes:

#### 2.06 HINGED-COVER ENCLOSURES

- A. NEMA 250, Type 1, with continuous hinge cover and flush latch
- B. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

### 2.07 CABINETS

- A. NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge.
- B. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Boxes shall have only the holes necessary to accommodate the conduits at point of installation. All boxes shall have suitable provisions to secure covers.
- C. Each outlet and device box shall have sufficient depth to permit the equipment being installed within it to be properly mounted and it shall have sufficient clearance to prevent damage to any conductors, devices or other equipment installed within the box.
- D. Boxes shall be securely attached to the building construction, using wood, screws for wood construction bolts for metal construction, and expansion anchors with bolts for masonry or concrete construction. Boxes flush mounted in tile or masonry construction

shall be secured in place with cement mortar. Boxes flush mounted in ceiling shall be supported from building structures independent of the ceiling construction.

- E. All outlet boxes shall be flush mounted within the wall regardless of wall construction, unless they are specifically shown as being used with exposed conduit.
- F. The edge of all outlet box extension rings shall be flush with the surface in which they are recessed. The Contractor shall be attentive to boxes set in masonry walls. The devices that fit into the outlet boxes shall be screwed tight before the cover plates are installed. The cover plates shall <u>not</u> be used as a means of tightening the devices in place.
- G. Flush mounted outlet boxes in all exposed masonry walls shall be masonry boxes or shall be 4 inch square boxes with square cornered tile covers. The boxes or box covers shall have square edges and shall have the device holes inside the box.
- H. Extra deep type concrete boxes shall be used in concrete walls and slabs to permit entering and leaving of conduits and to avoid steel reinforcing rods.
- I. Wall switch outlets shown at door locations shall be installed on the lock side of the door, 4 inches from the jamb, unless otherwise indicated on the drawings. Door swings shall be verified from architectural drawings.
- J. Outlet boxes designated for information management shall be 4 inches square and shall have raised covers with rectangular opening in center.
- K. Outlets shall be located approximately as shown on the plans. Exact mounting heights for all outlets shall be determined at the building site and shall be verified by the Contractor from architectural drawings which indicate casework and other architectural conditions. Outlets shall be located so as not to split the top of wainscot, backsplashes, or to be obstructed by equipment of any type indicated or specified. Where outlets are shown on the drawings as being adjacent and different mounting heights are specified for each, they shall be mounted one directly over the other, on the centerline of the group or on the centerline of the room.
- L. Outlet boxes and conduit work which is exposed to the weather, and for vapor-tight lighting fixtures and devices shall be cast corrosion resistant type with threaded conduit hubs to accommodate the conduit size entering.
- M. Outlets for the attachment of lighting fixtures shall be provided with fixture studs securely anchored to the boxes. Where outlet boxes are used to support lighting fixtures, the outlet boxes shall be firmly anchored to the structural members of the building.
- N. Outlets installed in a common wall and are intended to serve each side of the wall shall <u>not</u> be installed back to back but shall be staggered in the wall. Openings in wall common to both sides of walls shall not be acceptable.
- O. Outlet boxes which serve separate patient rooms but require installation in common walls as in a typical headwall of a patient room, shall be "staggered" with a wall stud separating each. Back to back box installation will not be permitted.
- P. Outlet boxes installed in rated walls shall not exceed 16 square inches unless enclosed by a fire putty pad or fire rated "5-sided box".

- Q. The aggregate area of all boxes in a rated wall and not enclosed by a "5-sided box" shall not exceed 100 square inches in 100 square feet of wall as measured from floor to structural deck or rated membrane.
- R. Outlet boxes with openings on opposite faces of rated walls shall have a horizontal separation of 24" minimum unless enclosed by a "5-sided box" or a box with 4 sides and a back.
- S. In the event of any discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- T. Junction boxes and pull boxes made of code gauge steel shall be furnished and installed where such boxes may be necessary to facilitate pulling or splicing cables and conductors. Boxes shall be accessible. Conduits shall enter these boxes through tight fitting clearance holes. Where required, suitable supports shall be provided for all pull boxes to support feeders passing through the boxes so that feeder conductors will not remain unsupported for a distance greater than three (3) feet.

### SECTION 16140 WIRING DEVICES

### PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. Section Includes:
  - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
  - 2. Receptacles with integral USB charger.
  - 3. Receptacles with integral Arc Fault Circuit Interrupter, AFCI.
  - 4. Receptacles with integral surge-suppression units.
  - 5. Tamper-resistant receptacles.
  - 6. Weather-resistant receptacles.
  - 7. Snap switches and wall-box dimmers.
  - 8. Solid-state fan speed controls.
  - 9. Wall-switch and exterior occupancy sensors.
  - 10. Communications outlets.
  - 11. Pendant cord-connector devices.
  - 12. Cord and plug sets.
  - 13. Floor service outlets, poke-through assemblies, service poles, and multi-outlet assemblies.

### 1.03 **DEFINITIONS**

- A. AFCI: Arc fault circuit interrupter.
- B. EMI: Electromagnetic interference.
- C. GFCI: Ground-fault circuit interrupter.
- D. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- E. RFI: Radio-frequency interference.
- F. UTP: Unshielded twisted pair.

## 1.04 ADMINISTRATIVE REQUIREMENTS

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
- B. Cord and Plug Sets: Match equipment requirements.

#### 1.05 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

## 1.06 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

## 1.07 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

### PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; Wiring Device-Kellems (Hubbell) or a comparable product by one of the following:
  - 1. Leviton Manufacturing Co., Inc.
  - 2. Pass & Seymour/Legrand (Pass & Seymour).
- B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

## 2.02 GENERAL WIRING-DEVICE REQUIREMENTS

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.
- C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
  - 1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
  - 2. Devices shall comply with the requirements in this Section.

### 2.03 STRAIGHT-BLADE RECEPTACLES

- A. Convenience Receptacles, Heavy Duty 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
- B. USB Charging Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 1310, and FS W-C-596. Compatible with USB 1.1/2.0/3/0 devices, including Apple products.
- C. Arc Fault Convenience Receptacles, 125 V, 15A and 20A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

- D. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
  - Description: Labeled shall comply with NFPA 70, "Health Care Facilities" Article, Tamper-Resistant Convenience Receptacles, 125 V, 20 A. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
- E. Weather Resistant and Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.
  - Description: Labeled shall comply with NFPA 70, "Health Care Facilities" Article, Tamper-Resistant Convenience Receptacles, 125 V, 20 A. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498 Supplement sd, and FS W-C-596.

## 2.04 GFCI RECEPTACLES

- A. General Description:
  - 1. Straight blade, non-feed through type.
  - 2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
  - 3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
- B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:
- C. Tamper-Resistant GFCI Convenience Receptacles, 125 V, 20 A:

### 2.05 PENDANT CORD-CONNECTOR DEVICES

- A. Description:
  - 1. Matching, locking-type plug and receptacle body connector.
  - 2. NEMA WD 6 Configurations L5-20P and L5-20R, heavy-duty grade, and FS W-C-596.
  - 3. Body: Nylon, with screw-open, cable-gripping jaws and provision for attaching external cable grip.
  - 4. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

### 2.06 CORD AND PLUG SETS

- A. Description:
  - 1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
  - 2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
  - 3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

## 2.07 TOGGLE SWITCHES

- A. Comply with NEMA WD 1, UL 20, and FS W-S-896.
- B. Switches, 120/277 V, 20 A:
  - 1. Single Pole:
  - 2. Double Pole:
  - 3. Three Way:
  - 4. Four Way:
- C. Pilot-Light Switches, 20 A:
  - 1. Description: Single pole, with neon-lighted handle, illuminated when switch is "off."
- D. Key-Operated Switches, 120/277 V, 20 A:
- E. Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors.
- F. Key-Operated, Single-Pole, Double-Throw, Momentary-Contact, Center-off Switches: 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

### 2.08 DECORATOR-STYLE DEVICES

- A. Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, and UL 498.
- B. Tamper-Resistant Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.
- C. Tamper-Resistant and Weather-Resistant Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5 20R, and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section, when installed in wet and damp locations.
- D. GFCI, Non-Feed Through Type, Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498, and UL 943 Class A.
- E. GFCI, Tamper-Resistant and Weather-Resistant Convenience Receptacles: Square face, 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, UL 498, and UL 943 Class A.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.
- F. Toggle Switches, Square Face, 120/277 V, 20 A: Comply with NEMA WD 1, UL 20, and FS W-S-896.

G. Lighted Toggle Switches, Square Face, 120 V, 20 A: Comply with NEMA WD 1 and UL 20.
1. Description: With neon-lighted handle, illuminated when switch is "off."

## 2.09 **RESIDENTIAL DEVICES**

- A. Residential-Grade, Tamper-Resistant Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R, and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section.
- B. Weather-Resistant and Tamper-Resistant Convenience Receptacles, 125 V, 15 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-15R and UL 498.
  - 1. Description: Labeled to comply with NFPA 70, "Receptacles, Cord Connectors, and Attachment Plugs (Caps)" Article, "Tamper-Resistant Receptacles in Dwelling Units" Section, when installed in wet and damp locations.
- C. Fan Speed Controls:
  - 1. Modular, 120-V, full-wave, solid-state units with integral, quiet on-off switches and audible frequency and EMI/RFI filters.
  - 2. Comply with UL 1917.
  - 3. Continuously adjustable [slider] [toggle switch] [rotary knob], [5 A] [1.5 A].
  - 4. Three-speed adjustable [**slider**] [**rotary knob**], 1.5 A.
- D. Telephone Outlet:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Wiring Device Kellems: NSJ5E Jack, NS614 Frame with NP 26 Wall Plate, or comparable product by one of the following:
    - a. Cooper Wiring Devices, Inc.; Division of Cooper Industries, Inc.
    - b. Leviton Manufacturing Co., Inc.
  - 2. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with **Category 6e.** Comply with UL 1863.
- E. Combination TV and Telephone Outlet:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Wiring Device Kellems; NSJ5E Jack, SFGRF Connector, NS614 Frame with NP 26 Wall Plate or comparable product by one of the following:
    - a. Cooper Wiring Devices, Inc.; Division of Cooper Industries, Inc.
    - b. Leviton Manufacturing Co., Inc.
  - 2. Description: Single RJ-45 jack for 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with **Category 6e**. Comply with UL 1863.

### 2.10 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable **slider**]; with single-pole or three-way switching. Comply with UL 1472.

- 21088.00
- C. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.

## 2.11 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: Smooth, high-impact thermoplastic 0.035-inch thick, satin-finished, or Type 302 stainless steel 0.04-inch thick.
  - 3. Material for Unfinished Spaces: Galvanized steel.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weatherresistant, thermoplastic with lockable cover and per detail.

## 2.12 PREFABRICATED MULTIOUTLET ASSEMBLIES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Hubbell Incorporated; Wiring Device-Kellems; [Plug Trak HBL20, HBL24 series steel] [HBLALU20, HBLALU24 Alumium] [Plug Trak PT 20 series PVC] or a comparable product by one of the following:
  - 1. Wiremold / Legrand.
- B. Description:
  - 1. Two-piece surface painted steel, brushed aluminum or PVC raceway, with factory-wired multioutlet harness.
  - 2. Components shall be products from single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- C. Raceway Material: Painted Metal.
- D. Multioutlet Harness:
  - 1. Receptacles: 20 A, 125-V, NEMA WD 6 Configuration 5-20R receptacles complying with NEMA WD 1, UL 498, and FS W-C-596.
  - 2. Receptacle Spacing: 6 inches.
  - 3. Wiring: No. 12 AWG solid, Type THHN copper, two circuit, connecting alternating receptacles.

### 2.13 FINISHES

- A. Device Color:
  - 1. Wiring Devices Connected to Normal Power System: Color shown on the construction documents unless otherwise indicated or required by NFPA 70 or device listing.
  - 2. Wiring Devices Connected to Emergency Power System: Red
  - 3. Isolated-Ground Receptacles: As specified above, with orange triangle on face.
- B. Wall Plate Color: For plastic covers, match device color.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. Comply with NECA 1, including mounting heights listed on the construction documents.

- B. Coordination with Other Trades:
  - 1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
  - 2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 4. Install wiring devices after all wall preparation, including painting, is complete.
- C. Conductors:
  - 1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
  - 2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
  - 3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
  - 4. Existing Conductors:
  - 5. Cut back and pigtail, or replace all damaged conductors.
    - a. Straighten conductors that remain and remove corrosion and foreign matter.
    - b. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
  - D. Device Installation:
    - 1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
    - 2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
    - 3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
    - 4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
    - 5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
    - 6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
    - 7. When conductors larger than No. 12 AWG are installed on or 20-A circuits, splice No. 12 AWG pigtails for device connections.
    - 8. Tighten unused terminal screws on the device.
    - 9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
  - E. Receptacle Orientation:
    - 1. Install ground pin of vertically mounted receptacles up and on horizontally mounted receptacles to the right.

- 2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Dimmers:
  - 1. Install dimmers within terms of their listing.
  - 2. Verify that dimmers used for fan speed control are listed for that application.
  - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
- H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

## 3.02 GFCI RECEPTACLES

A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

## 3.03 IDENTIFICATION

- A. Comply with Section "Identification for Electrical Systems."
- B. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.04 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
  - 2. Test Instruments: Use instruments that comply with UL 1436.
  - 3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
- B. Tests for Convenience Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
  - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
  - 6. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

- C. Test straight-blade convenience outlets in patient-care areas for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz.
- D. Wiring device will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

# SECTION 16160 IDENTIFICATION FOR ELECTRICAL SYSTEMS

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Underground-line warning tape.
  - 5. Warning labels and signs.
  - 6. Instruction signs.
  - 7. Equipment identification labels.
  - 8. Miscellaneous identification products.

### 1.03 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

### 1.04 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with NFPA 70E.
- D. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- E. Comply with ANSI Z535.4 for safety signs and labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

## PART 2 - PRODUCTS

### 2.01 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at more than 600 V:
  - 1. Black letters on a yellow field.
  - 2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch high letters.

IDENTIFICATION FOR ELECTRICAL SYSTEMS SECTION 16160 - 1 12/23/2021

- C. Colors for Raceways Carrying Circuits at 277 V up to 600V: and conduits larger than two inches:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage and system or service type.
- D. Colors for Raceways Carrying Circuits at 120 V up to 240V: and conduits larger than two inches:
  - 1. Black letters on a white field.
  - 2. Legend: Indicate voltage and system or service type.
- E. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- F. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less and conduits larger than two inches: Slit, pre-tensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by grippingaction.

## 2.02 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

### 2.03 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tapes not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## 2.04 FLOOR MARKING TAPE

A. 2-inch wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

### 2.05 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
  - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility

- 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
- 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils, consisting of a printed pigmented polyolefin film, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
- 4. Overall Thickness: 5 mils.
- 5. Foil Core Thickness: 0.35 mils.
- 6. Weight: 28 lb/1000 sq. ft. (13.7 kg/100 sq. m).
- 7. 3-Inch Tensile According to ASTM D 882: 70 lbf (311.3 N), and 4600 psi (31.7 MPa).
- B. Color and Printing:
  - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
  - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
  - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

## 2.06 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70, 70E, and 29 CFR 1910.145.
- B. Baked-Enamel Warning Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 7 by 10 inches.
- C. Metal-Backed, Butyrate Warning Signs:
  - 1. Weather-resistant, non-fading, preprinted, cellulose-acetate butyrate signs with 0.0396inch galvanized-steel backing; and with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.
  - 3. Nominal size, 10 by 14 inches.
- D. Warning label and sign shall include, but are not limited to, the following legends:
  - 1. Multiple Power Source Warning: "DANGER ELECTRICAL SHOCK HAZARD -EQUIPMENT HAS MULTIPLE POWER SOURCES."
  - 2. Workspace Clearance Warning: "WARNING OSHA REGULATION AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 48 INCHES."
  - 3. Arc Flash Protection Field Marking: All panelboards, switchgear, switchboards, panelboards motor control centers, motor control panels and electrical control panels shall be provided with a black on yellow warning sign per ANSI Z535.4 and ISO 3864. The sign shall read: "WARNING! ARC FLASH and SHOCK HAZARD. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT REQUIRED." The sign shall be prominently mounted on the front of the equipment, readily visible and indicate all relevant class information. If the equipment has multiple removable front covers, a sign shall be mounted on each cover. For flush mounted panelboards in finished spaces, the sign shall be mounted on the inside of the door or inside cover. Manufacturers' standard labels are not acceptable.

## 2.07 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
  - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

## 2.08 EQUIPMENT IDENTIFICATION NAMEPLATES

- A. Engraved, Laminated Acrylic or Melamine Nameplate: Minimum letter height shall be ½ inch. Refer to Drawings for Nameplate Detail.
- B. Fasteners for nameplates: stainless steel screws that do not change the NEMA or NRTL rating of the enclosure, adhesive labels shall not be used.

### 2.09 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

### **PART 3 - EXECUTION**

### 3.01 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways Larger than Two Inches: Each colorcoding band shall completely encircle conduit. Locate bands at changes in direction, at penetrations of walls and floors, at 30-foot maximum intervals in straight runs, in electrical rooms and vaults color shall be solid, see "Raceways" Section.
- F. System Identification Labels for Raceways carrying circuits above 600V: Locate labels at changes in direction, at penetrations of walls and floors, at 30-foot maximum intervals in straight runs, at 10-foot maximum intervals in electrical rooms and vaults, and within six inches of pull or junction boxes.

IDENTIFICATION FOR ELECTRICAL SYSTEMS SECTION 16160 - 4

- G. System Identification Labels for Raceways carrying circuits 600V and less: Locate labels at changes in direction, at penetrations of walls and floors, at 30-foot maximum intervals in straight runs.
- H. Underground-Line Warning Tape: During backfilling of trenches install continuous underground- line warning tape. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 18 inches overall.
- I. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

## 3.2 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend, system voltage, and panel/circuit number. System legends shall comply with Section 16110.
  - 1. Normal power.
  - 2. Emergency power.
  - 3. UPS.
- B. Power-Circuit Conductor Identification, 600 V or Less: .For conductors in electric rooms or vaults pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.
    - a. Color shall be factory applied.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
      - 4) Neutral: White.
      - 5) Ground: Green.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
      - 4) Neutral: Gray.
      - 5) Ground: Green with Yellow Stripe.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
    - e. Switch loops shall retain correct color code with a white tracer.
    - f. For new work in existing buildings, the existing identification method shall be used for new conductors provided it meets all requirements of this Section and the NEC.
- C. Install instructional sign including the color code for grounded and ungrounded conductors using adhesive-film-type labels.
- D. Emergency Sources: A sign shall be placed at the service entrance equipment indicating the type and location of on-site emergency power sources per NEC Art. 700.

12/23/2021

- E. Elevator Disconnects: Provide "Fed From" signs indicating the location of the supply side OCPD for each elevator power source.
- F. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- H. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
  - 1. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- I. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- J. Arc Flash warning labels shall be provided on all new electrical equipment and existing equipment that has been modified a part of a project and conform to Arc Flash report.
- K. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Bakedenamel warning signs or Metal-backed, butyrate warning signs.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
    - c. Other equipment as indicated on the Drawings.
- L. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- M. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch high letters for emergency instructions at equipment used for power transfer and load shedding.
- N. Provide permanent nameplates for all pull and junction boxes identifying circuits, voltage, and source.
- O. Wiring device identification: comply with Section 16140 2.01.
- P. Equipment Identification Nameplates: On each unit of equipment, install unique designation

nameplate that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply nameplates to Switchgears, Switchboards, Distribution Panels, Panelboards, Transformers, Individual Starters, Contactors, Disconnect Switches, Transfer Switches, Control Panels and Similar Equipment. Systems include power, lighting, and control systems unless equipment is provided with its own identification.

- 1. Colors for equipment nameplates:
  - a. NORMAL power system:
    - 1) 120V 240V: black letters on white background.
    - 2) 277V 600V: black letters on orange background.
    - 3) 600V and up: black letters on yellow background.
    - b. Emergency (EM) & Essential (ES) 480/277V loads as defined by NEC Art. 700 – Red letters w/black outline on Orange background.
    - c. LIFE SAFETY loads as defined by NEC Art. 700: white letters on red background.
    - d. Emergency (EM) & Essential (ES) 208/120V as defined by NEC Art. 700 Red letters on white background.
    - e. LEGALLY REQUIRED loads as defined by NEC Art. 701(elevators, smoke control, HVAC, etc.):
    - f. OPTIONAL STANDBY loads as defined by NEC Art. 702 (Labs, HVAC, etc.): Red letters on white background.
- 2. Labeling Instructions:
  - a. Identify the piece of equipment, the source, voltage characteristics, and the load served
  - b. Indoor Equipment: Engraved, laminated acrylic or melamine nameplate. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high.
  - c. Outdoor Equipment: Engraved, laminated acrylic or melamine nameplate. Unless otherwise indicated, provide a single line of text with one-inch high letters on 3-inch high label; where two lines of text are required, use labels 4 inches high.
  - d. Elevated Components: Increase sizes of nameplates and letters to those appropriate for viewing from the floor.
  - e. Fasten nameplates with appropriate stainless steel screws that do not change the NEMA or NRTL rating of the enclosure. Stick-on or adhesives are not acceptable unless the NEMA enclosure rating is compromised, then only epoxy adhesive shall be used to attach nameplates.

# SECTION 16450 GROUNDING

## PART 1 - GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Supplementary Conditions.

## 1.02 DESCRIPTION OF WORK

A. The work included under this Section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary to insure that the electrical service and electrical systems conform with the requirements of Article 250 of the NEC and as specified hereinafter.

## PART 2 - PRODUCTS

## 2.01 MATERIALS

- A. The products specified in Section 16120 apply to the work specified in this Section.
- B. Ground rods shall be a minimum of 5/8" x 10'-0" Copper-clad ground rods.
- C. Ground clamps shall be UL approved for the application.

### PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. The following systems and/or equipment shall be grounded in accordance with the rules of the National Electrical Code, the local code and as hereinafter specified.
  - 1. Building Power System
  - 2. Raceway and Conduit Systems
  - 3. Lighting Fixtures
  - 4. Non-current Carrying Metal Parts of all Motors, Panels and Other Electrically Operated Equipment.
  - 5. Telephone System
  - 6. Fire Alarm System
  - 7. Each above Ground Gas Piping System Upstream from the Equipment Shutoff Valve.
- B. The service equipment shall be bonded ahead of the main water service meter and grounded to installed ground rods using bare copper wire in steel conduit bonded at both ends. The wire shall be sized in accordance with Article 250-94 of the NEC. Copper-clad ground rods shall be driven to a depth sufficient to provide a grounding

electrode of 25 ohms maximum resistance to ground. If the resistance is greater than 25 ohms, additional ground rods shall be installed and bonded to the first electrode.

- C. Made electrodes shall consist of (3) copper ground rods. The rods shall be installed such that at least 10'-0" of length is in contact with the soil. The upper end of the electrode shall be flush with or below ground level unless the above ground end and the grounding wire attachment are protected against physical damage.
- D. All metallic conduits entering the building service panel shall be bonded together and to the system service ground. Metallic conduit systems shall be electrically continuous throughout.
- E. The system neutral conductor shall be identified throughout and shall be grounded at the building service only.
- F. An equipment grounding wire sized as per NEC shall be installed inside all conduit, and shall have green insulation.
- G. All grounding electrode connections shall be accessible for periodic inspection and testing.
- H. Isolated ground systems shall have a separate ground wire installed in the conduit which is run to the building service ground with no other interconnections between normal ground and isolated ground. Isolated ground wires shall be sized in accordance with the equipment served and shall be identified by a colored stripe on the green insulation.
  - 1. Isolated ground systems shall have a separate ground wire installed in the conduit which is run to the building service ground with no other interconnections between normal ground and isolated ground. Isolated ground wires shall be sized in accordance with the equipment served and shall be identified by a colored stripe on the green insulation.
- I. Grounding of all system equipment including, fire alarm, telephone and cable T.V. shall include bonding of the required system grounding electrode with the building service main grounding electrode at the service entrance. Minimum size bonding conductor shall be #6 AWG copper. Bonding together of all separate electrodes shall be permitted.

# SECTION 16501 LAMPS, DRIVERS AND BALLASTS

### PART 1 – GENERAL

## 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Supplementary Conditions.

## 1.02 DESCRIPTION OF WORK

- A. The work included under this Section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary for the installation of the lamps, including all related systems and accessories as shown on the drawings and hereinafter specified.
- B. Definitions:
  - 1. BF: Ballast factor is the ratio of light output of a given lamp(s) operated by the subject ballast to the light output of the same lamp(s) when operated on an ANSI reference circuit.
  - 2. CRI: Color rendering index is a measure of the ability of a light source to reproduce the colors of various objects being lit by the source. It is measured by comparing the color rendering of the test source to that of a black body radiator source, such as an incandescent lamp. CRI measurements range from 0 to 100, where 100 is the best color rendition. For example, an incandescent lamp will have a CRI of 100 and some tri-phosphor fluorescent lamps may have a CRI of 80 to 90.
  - 3. Color Temperature and Correlated Color Temperature: Related to CRI is the color temperature of the lamp, expressed in degrees Kelvin (K). The color temperature of a light source is determined by comparing its chromaticity with a theoretical, heated black-body radiator. The temperature at which the heated black-body radiator matches the color of the light source is the color temperature of that source. Many light sources, such as fluorescent lamps, do not emit light because of the temperature of the source and the emitted radiation does not follow the form of a black-body spectrum and is assigned a correlated color temperature (CCT). For example, a fluorescent lamp may be specified with a correlated color temperature of 3500 K.
  - 4. CU: Coefficient of utilization is a measure of the efficiency of a luminaire (lighting fixture) in transferring luminous energy to the working plane in a particular area. It is the ratio of lumens from a luminaire incident upon a work plane relative to the lumens emitted by the lamps within the luminaire and measures the light actually reaching the desired plane as a percentage of the total light produced by the fixture.
  - 5. Luminaire: Complete lighting fixture, including ballast or driver housing, if provided.
  - 6. LER: Luminaire efficiency rating calculated according to NEMA LE-5 or estimated from photometric data using the following formula: LER is equal to the product of rated lamp lumens times BF times luminaire efficiency, divided by input watts.
  - 7. RCR: Room cavity ratio is calculated as 2.5 times the room cavity depth (RCD) times the perimeter of the room divided by the area of the room. The room cavity

depth is the depth, in feet, from the luminaire (lighting fixture) to the work-plane.

- C. Extra Materials
  - 1. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 2. Lamps: One (1) for every 10 of each type and rating installed. Furnish at least one of each type.
  - 3. Plastic Diffusers and Lenses: One (1) for every 100 of each type and rating installed. Furnish at least one of each type.
  - 4. Battery and Charger: One (1) for each emergency lighting unit.
  - 5. Ballasts: One (1) for every 100 of each type and rating installed. Furnish at least one of each type.
  - 6. Globes and Guards: One (1) for every 20 of each type and rating installed. Furnish at least one of each type.

## PART 2 – PRODUCTS

## 2.01 LAMP MANUFACTURERS

- A. OSRAM Sylvania.
- B. Philips Lighting Co of NA.
- C. GE Lighting.
- D. Westinghouse Electric Corporation.
- E. Cree LED Lighting.
- F. Hitachi Lighting

## 2.02 BALLAST AND DRIVER MANUFACTURERS

- A. Philips Advance
- B. Universal Lighting Technologies (ULT)
- C. Philips Bodine
- D. Prescolite
- E. Osram-Motorola
- F. Lightolier
- G. GE Lighting
- H. Lutron
- I. LED Dynamics
- J. Microchip
- K. Diodes Incorporated
- L. Texas Instruments

### 2.03 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70 and NFPA 101.
- B. Color temperature requirement shall be as indicated on the drawings
- C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc
- G. All high intensity discharge lamp luminaire ballasts shall be constant wattage high power factory type, unless noted otherwise.
- H. Low-Mercury lamps shall comply with Federal toxic characteristic leaching procedure (TCLP) test and yield less than 0.2 milligrams per liter (mg/l) of mercury, when tested according to NEMA LL 1. All lamps shall have green end caps to show compliance with all applicable EPA rules and regulations.
- I. Fluorescent lamps shall be programmed start, and or pre-heat as applicable, with a minimum rated life of 20,000 hours at three (3) hours per start, unless indicated otherwise.
- J. Fluorescent lamps shall be energy saving pre-heat, T-8, programmed start, with a minimum rated life of 20,000 hours at three (3) hours per start unless indicated otherwise.
  - 1. T8 programmed-start and rapid-start low-mercury lamps shall have a minimum CRI of 82 with an average rated life of 20,000 hours, unless otherwise indicated.
  - 2. T5 programmed-start low-mercury lamps shall have a minimum CRI of 85 with an average rated life of 20,000 hours, unless otherwise indicated.
  - 3. Compact fluorescent lamps shall have a minimum CRI 80 with an average rated life of 10,000 hours at 3 hours operation per start, unless otherwise indicated.
  - 4. Color temperature for all fluorescent lamps shall be 2700 K, unless indicated otherwise in the Fixture Schedule or elsewhere on the Drawings.
- K. Incandescent lamps shall be inside frosted, unless otherwise noted, with a minimum rated life of 1,000 hours, and rated for 120 volt operation.
- L. Metal Halide lamps shall have a minimum rated life of 20,000 hours, and shall be operated through a ballast designed to the lamp wattage and supply voltage indicated on the plans.
- M. Twin tube fluorescent lamps shall have a minimum rated life of 10,000 hours and shall be operated through a ballast designed to the lamp wattage and supply voltage indicated on the plans. Lamps shall have single ended 4 pin base.
- N. LED fixtures shall be constructed to permit separate replacement of driver and lamp modules.

LAMPS, DRIVERS AND BALLASTS SECTION 16501-3

- O. LED manufacturer shall stock LED lamps from same lot as provided to ensure color matching of replacement lamps.
- P. Lumen maintenance for LED fixtures shall be certified for LM-79, LM080 and TM-21. Provide statement of test compliance from nationally recognized testing laboratory (NRTL).
- Q. Provide a minimum five (5) year warranty on entire LED fixture, including lamps, drivers and other components.
- R. Color rendering index (CRI) per IES LM-79 and Correlated color temperature (CCT) per IES LM-79 and ANSI/NEMA/ANSLG C78.377, Specification for the Chromaticity of Solid-State Lighting (SSL) Products:
  - 1. CRI equal to 90 or better,
  - 2. CCT equal to 2700 °K for general lighting and down-lighting,
  - 3. CCT equivalent to 3000 °K for accent and display lighting, and special purpose lighting.
- S. Minimum LED luminaire efficacy per IES LM-79, Approved Method: Electrical and Photometric Measurement of Solid-State Lighting Products:
  - 1. 90 lumens/watt for general lighting,
  - 2. 50 lumens/watt for accent and display lighting, down-lighting, and special purpose lighting.

### 2.04 BALLASTS AND DRIVERS

- A. Provide ballasts containing no polychlorinated biphenyls (PCBs).
- B. Minimum Efficiency/Efficacy: Provide ballasts complying with all current and applicable federal and state ballast efficiency/efficacy standards.
- C. Electronic ballast operating frequency shall be 20 KHz or higher. Lamp end-of-life detection and shutdown circuit, when electronic ballast is provided.
- D. Dimming range for fluorescent fixtures controlled by dimmers shall be 5 to 100 percent of rated lamp lumens.
- E. Fluorescent ballasts: Electronic
  - 1. Efficiency: 80 percent, as minimum.
  - 2. Power Factor: 70, or better.
  - 3. Starting Method: Programmed.
  - 4. Properties: Anti-striation Control and Universal Voltage.
- F. Compact Fluorescent Ballasts: Electronic
  - 1. Efficiency: 80 percent, as minimum.
  - 2. Power Factor: 70, or better.
  - 3. Starting Method: Preheat or programmed.
  - 4. Properties: Auto-restart and Thermally Protected.
- G. High Intensity Discharge (HID) Ballasts: Electronic.
  - 1. HID ballasts shall be constant-wattage autotransformer, pulse start or regulating high-power-factor type.
  - 2. Efficiency: 88 percent, as minimum.

## LAMPS, DRIVERS AND BALLASTS SECTION 16501-4

- 3. Power Factor: 70, or better.
- 4. Properties: Auto-restart and Thermally Protected.
- 5. Open-circuit operation will not reduce the average life of the HID ballast.
- 6. HID ballasts shall have auxiliary, instant-on, quartz system that automatically switches quartz lamp on when fixture is initially energized and when momentary power outages occur and automatically turns quartz lamp off when high-intensity-discharge lamp reaches approximately 60 percent light output.
- 7. HID ballasts shall be low-noise type with manufacturer's standard epoxyencapsulated ballast designed to minimize audible fixture noise.
- 8. HID ballasts shall have instant re-strike device as a solid-state potted module mounted inside HID fixture and shall be compatible with specified lamps, ballasts, and sockets. Re-strike range shall be 105 VAC to 130 VAC.
- H. Light Emitting Diode (LED) Drivers
  - 1. Light loss and physical failure shall comply with L70 for an expected lifetime of 50,000 hours, or better.
  - 2. Light loss and color rendering index (CRI) rating shall comply with Code 8, or 80% as a minimum.
  - 3. Power factor shall be 85%, or better, when operated at 120 VAC.
  - 4. LED modules and LED luminaires shall comply with the performance requirements of the latest versions of the International Electro-technical Commission (IEC) publically available specification (PAS) numbers 62717 and 62722.
  - 5. LED modules and LED luminaires shall have a ten (10)-year operational life while operating with a case temperature range of 0 degrees C (32 degrees F) to 62 degrees C (167 degrees F) and 90 percent non-condensing relative humidity.
  - 6. Maximum inrush current for LED module shall not exceed 2 amperes for 120V and 277V drivers and shall have no visible change in light output with a variation of +/-10 percent line voltage input.
  - 7. Compatibility of driver and LED light engine must be tested and ensured by driver manufacturer. Drivers shall track evenly across multiple fixtures and at all light levels.
  - 8. Drivers intended for outdoor applications and suitable for wet locations and rated for NEMA 4 or IP 64.
  - 9. Operating temperatures: -29 degrees C (-20 degrees F) to 66 degrees C (150 degrees F).
  - 10. Calculated mean time between failures (MTBF) shall be greater than 100,000 hours, when operating at full load and 25 degrees C, (77 degrees F) ambient temperature.
  - 11. Electrical filtering for electromagnetic compatibility (EMC), electromagnetic interference (EMI) or radio frequency interference (RFI) shall comply with federal standards established by 47 CFR Parts 2 and 15.
  - 12. Drivers shall be UL 48/1310 Class 2 certified.
  - 13. Maximum power requirements shall be less than 100 watts, unless noted otherwise.
  - 14. Driver shall have integral protection for over-current, over-voltage and short circuits.

## **PART 3 - EXECUTION**

#### 3.01 INSTALLATION

- A. Lamps installed in lighting fixtures shall be as specified in the fixture schedule on the drawings and as specified herein. All lamps shall be operating at the time of final inspection.
- B. Install luminaires securely, in a neat and workman-like manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting). All luminaires shall be installed plumb, square and aligned with building lines and with adjacent luminaires.
- C. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by the Engineer. Secure locking fittings in place. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by the Engineer or authority having jurisdiction.
- D. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by the Architectural Life Safety Plan, Engineer or authority having jurisdiction (AHJ), with ascending priority.

# SECTION 16510 INTERIOR LIGHTING

#### PART 1 - GENERAL

### 1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. LED Luminaires
- D. Exit signs.
- E. Fluorescent emergency power supply units.
- F. Luminaire accessories.

## 1.02 RELATED REQUIREMENTS

- A. Electrical Boxes.
- B. Electrical Raceways.

### 1.03 REFERENCE STANDARDS

- A. ANSI C78.379 American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns.
- B. ANSI C82.1 American National Standard for Lamp Ballast Line Frequency Fluorescent Lamp Ballast.
- C. ANSI C82.4 American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type).
- D. NECA 1 Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.
- E. NECA/IESNA 500 Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association.
- F. NECA/IESNA 502 Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association.
- G. NFPA 70 National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. NFPA 101 Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association.
- I. UL 924 Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- J. UL 1598 Luminaires; Current Edition, Including All Revisions.
#### 1.04 **DEFINITIONS**

- A. BF: Ballast factor is the ratio of light output of a given lamp(s) operated by the subject ballast to the light output of the same lamp(s) when operated on an ANSI reference circuit.
- B. CRI: Color rendering index is a measure of the ability of a light source to reproduce the colors of various objects being lit by the source. It is measured by comparing the color rendering of the test source to that of a black body radiator source, such as an incandescent lamp. CRI measurements range from 0 to 100, where 100 is the best color rendition. For example, an incandescent lamp will have a CRI of 100 and some triphosphor fluorescent lamps may have a CRI of 80 to 90.
- C. Color Temperature and Correlated Color Temperature: Related to CRI is the color temperature of the lamp, expressed in degrees Kelvin (K). The color temperature of a light source is determined by comparing its chromaticity with a theoretical, heated black-body radiator. The temperature at which the heated black-body radiator matches the color of the light source is the color temperature of that source. Many light sources, such as fluorescent lamps, do not emit light because of the temperature of the source and the emitted radiation does not follow the form of a black-body spectrum and is assigned a correlated color temperature (CCT). For example, a fluorescent lamp may be specified with a correlated color temperature of 3500 K.
- D. CU: Coefficient of utilization is a measure of the efficiency of a luminaire (lighting luminaire) in transferring luminous energy to the working plane in a particular area. It is the ratio of lumens from a luminaire incident upon a work plane relative to the lumens emitted by the lamps within the luminaire and measures the light actually reaching the desired plane as a percentage of the total light produced by the luminaire.
- E. LER: Luminaire efficiency rating calculated according to NEMA LE-5 or estimated from photometric data using the following formula: LER is equal to the product of rated lamp lumens times BF times luminaire efficiency, divided by input watts.
- F. RCR: Room cavity ratio is calculated as 2.5 times the room cavity depth (RCD) times the perimeter of the room divided by the area of the room. The room cavity depth is the depth, in feet, from the luminaire (lighting luminaire) to the work-plane.

#### 1.05 SUBMITTALS

- A. See Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: For each type of luminaire scheduled, arranged in order of luminaire designation. Include data on features, accessories, finishes, and the following:
  - 1. Physical description of luminaire, including dimensions and verification of indicated parameters.
  - 2. Battery and charger for emergency lighting units.
  - 3. Ballasts for fluorescent and high-intensity-discharge (HID) luminaires.
  - 4. Lamps to be used in each luminaire type.
  - 5. Photometric data based on laboratory tests of each lighting luminaire type with lamps, ballasts and accessories identical to those indicated for the lighting luminaire for this Project.

- 6. Energy efficiency data.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Conform to requirements of NFPA 101.

### 1.07 EXTRA MATERIALS

- A. See Product Requirements, for additional provisions.
- B. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

#### PART 2 – PRODUCTS

#### 2.01 MANUFACTURERS

- A. Metalux /Cooper
- B. Columbia
- C. Lithonia
- D. Hubbell
- E. Approved Equal

#### 2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598.
- C. Provide products that comply with requirements of NFPA 101.
- D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

### 2.03 LIGHT EMITTING DIODE (LED) LUMINAIRES

- A. Light loss and physical failure shall comply with L70 for an expected lifetime of 50,000 hours, or better.
- B. Light loss and color rendering index (CRI) rating shall comply with Code 8, or 80% as a minimum.
- C. Power factor shall be 85%, or better.
- D. LED modules and LED luminaires shall comply with the performance requirements of the latest versions of the International Electro-technical Commission (IEC) publically available specification (PAS) numbers 62717 and 62722.
- E. LED modules and LED luminaires shall have a ten (10)-year operational life while operating with a case temperature range of 32 degrees F to 167 degrees F and 90 percent non-condensing relative humidity.
- F. Maximum inrush current for LED module shall not exceed 2 amperes for 120V and 277 V drivers and shall have no visible change in light output with a variation of +/- 10 percent line voltage input.
- G. Compatibility of driver and LED light engine must be tested and ensured by driver manufacturer. Drivers shall track evenly across multiple fixtures and at all light levels.

#### 2.04 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery: Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.
- F. Provide accessories and fittings as recommended by manufacturer to properly and completely install and wire Luminaires.
- G. Electrical Characteristics: 120 volts, 60 Hz, unless otherwise indicated.
- H. Furnish products as indicated in the Luminaire Schedule included on the Drawings.

### 2.05 LUMINAIRE TYPES

A. Furnish products as indicated in Schedule included on the Drawings.

- B. Luminaire: Furnish products as indicated in the Luminaire Schedule included on the Drawings:
- C. Emergency Lighting Units: Self-contained fluorescent emergency lighting unit.
  - 1. Self-contained emergency lighting units shall comply with UL 924.
  - 2. Self-contained emergency lighting units shall have a sealed, maintenance-free, lead-acid type battery with a minimum 10 year nominal life and special warranty.
  - 3. Self-contained emergency lighting units shall have a fully automatic, solid-state type charger with a sealed transfer relay.
  - 4. Self-contained emergency lighting units shall be relay operated to automatically turn lamps on when power supply circuit voltage drops below 80 percent of nominal voltage, and automatically disconnects lamps from battery when normal voltage is restored. Relay shall also disconnect lamps from the battery when voltage approaches deep-discharge level. Battery shall be automatically recharged and floated on charger.
  - 5. Unit shall connect un-switched circuit to battery-inverter unit and switched circuit to luminaire ballast.
  - 6. Where a wire guard is specified for a self-contained emergency lighting unit, wire guard shall be heavy chrome-plated wire that protects the lamp or Luminaire head.
  - 7. Battery: 6 or 12 volt (see Luminaire Schedule), nickel-cadmium type, with 1.5 hour capacity.
  - 8. Battery Charger: Dual-rate type, with sufficient capacity to recharge discharged battery to full charge within twelve hours.
  - 9. Indicators: Lamps to indicate AC ON and RECHARGING. Voltmeter to indicate battery voltage.
  - 10. TEST switch: Transfers unit from external power supply to integral battery supply.
  - 11. Electrical Connection: Conduit connection.
  - 12. Input Voltage: 120 or 277 volts, unless otherwise shown or noted on the Drawings.
  - 13. Product: Furnish products as indicated in the Luminaire Schedule included on the Drawings

## 2.06 EXIT SIGNS

- A. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
  - 1. Number of Faces: Single or double as indicated or as required for the installed location.
  - 2. Directional Arrows: As indicated or as required for the installed location.
- B. General Requirements: Comply with UL 924, and for sign colors and lettering size, comply with requirements of authority having jurisdiction (AHJ).
- C. Internally Lighted Exit Signs:
  - 1. Lamps for AC operation shall have light-emitting diodes rated at 70,000 hours, minimum lamp life.

- D. Manufacturers:
  - 1. Shall be as shown in the Luminaire Schedule on Drawings.
- E. Exit signs shall be suitable for use as emergency lighting unit and comply with the following requirements:
  - 1. Provide luminaires complying with NFPA 101.
  - 2. Manufacturers shall be as shown in the Luminaire Schedule on Drawings.
  - 3. Directional Arrows: Universal type for field adjustment.
  - 4. Mounting: Universal, for field selection.
  - 5. Lamps: Provide manufacturer's standard lamps, as shown in the Luminaire Schedule on the Drawings.

#### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. Coordinate locations of outlet boxes as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Install luminaires securely, in a neat and workman-like manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- E. Surface Mounted Luminaires: Install plumb and square and aligned with building lines and with each other; secure to prevent movement.
- F. Suspended Ceiling Mounted Luminaires:
  - 1. Install at locations indicated on reflected ceiling plan.
  - 2. Support luminaires of all sizes independently of the ceiling grid and anchored directly to building structure. Refer to suspension details shown on drawings.
  - 3. Install clips to secure luminaires in place.
  - 4. Luminaires Recessed in Ceilings: Install to permit removal from below.
  - 5. Suspended Luminaires: Install using pendants supported from swivel hangers, with pendant length as required for indicated height.
- H. Wall Mounted Luminaires: Install at height as indicated on the drawings.
- I. Recessed Luminaires: Comply with NEMA LE-4 for ceiling compatibility of recessed luminaires. Provide flexible conduit whip in maximum length of six (6) feet for recessed luminaires for connection to external J-boxes, unless junction boxes are integral in pre-wired systems.
- J. Luminaire supports shall comply with the following requirements applicable to the support and luminaire type specified and provided.

- 1. Single Stem Hangers: One 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish shall be same as luminaire.
- 2. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single luminaire. Finish shall be same as luminaire.
- 3. Wires: Comply with ASTM A 641/A 641M, Class 3, soft temper, zinc-coated, 12 gauge (2.68 mm).
- 4. Wires In Humid Spaces: Comply with ASTM A 580/A 580M, stainless steel composition type 302 or 304, 12 gage (2.68 mm).
- 5. Rod Hangers: 3/16 inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- 6. Hook Hangers: Integrated assembly matched to luminaire and line voltage and equipped with threaded attachment, cord, and locking-type plug.
- 7. Aircraft Cable Support: Use cable, anchorages and intermediate supports recommended by luminaire manufacturer.
- K. Install accessories furnished with each luminaire.
- L. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire; use flexible conduit.
- M. Connect luminaires and exit signs to branch circuit outlets using flexible conduit.
- N. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- O. Bond products and metal accessories to branch circuit equipment grounding conductor.
- P. Install specified lamps in each luminaire, emergency lighting unit and exit sign.

#### 3.02 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by the Engineer. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by the Engineer or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by the Engineer or authority having jurisdiction.
- D. Aim and adjust luminaires as indicated.
- E. Position exit sign directional arrows as indicated.

#### 3.03 CLEANING

- A. Remove all plastic covers and protective coatings.
- B. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other

INTERIOR LIGHTING SECTION 16510 - 7 foreign material and restore finishes to match original factory finish.

- C. Clean electrical parts to remove conductive and deleterious materials.
- D. Remove dirt and debris from enclosures.
- E. Clean finishes and touch up damaged surfaces.

# **END OF SECTION**

### SECTION 16740

#### **TELEPHONE SYSTEMS**

### PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Section 16010 for Supplementary Conditions.

### 1.02 DESCRIPTION OF WORK

A. The work included under this section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary for the addition of outlets to telephone system, including all accessories as shown by the drawings and hereinafter specified.

### PART 2 PRODUCTS

### 2.01 MATERIALS

A. Refer to sections 16110 and 16134 of these specifications.

### PART 3 EXECUTION

### 3.01 INSTALLATION

- A. The telephone system shall be installed in accordance with the requirements of the telephone system supplier and utility providing service.
- B. Provide all wiring and conduit for the telephone system as follows.
  - 1. Patient Rooms 3 Pair 22 gauge UL listed type "CMR" to nearest telephone terminal board. Provide a 4" x 4" outlet box, extension ring and blank cover plate with conduit routed above the ceiling in the corridor outside the resident room, terminate with an end bushing.
  - 2. Office or Business Areas –3 Pair 22 gauge UL listed type "CMR" to nearest telephone terminal board. Provide a 4" x 4" outlet box, extension ring and blank coverplate with conduit stubbed 6" above accessible ceiling, terminate with an end bushing.
- C. Run all wiring to respective telephone terminal board and provide a 5'-0" pigtail at telephone terminal board and 1' pigtail at device location. All cable will be bundled and run in a neat workmanlike manner above the ceiling and supported from structure.
- D. All outlets and final terminations will be provided and installed by the telephone system supplier.
- E. The telephone backboard shall be 4' x 8' x ¾" plywood painted with two coats of gray enamel paint mounted directly to the wall or within a cabinet as indicated on the drawings.

## **END OF SECTION**

### SECTION 16742 VOICE/DATA NETWORK CABLE SYSTEMS

#### PART 1 – GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this section.
- B. Refer to Supplementary Conditions.

#### 1.02 DESCRIPTION OF WORK

- A. The work included under this Section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary for the addition of outlets to telephone system, including all accessories as shown by the drawings and herein after specified.
- B. The work included under this Section of these specifications consists of furnishing all material and equipment and performing all labor and services necessary to provide a complete and operational voice/data network cable system.
- C. Contractor is expected to coordinate with voice utility service provider and owner prior to any work.

### PART 2 – PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

- A. All products shall be as indicated on plans with manufacturer etc or approved equal.
- B. All products shall have a UL listing.
- C. All products and installation of products shall be in accordance with all specifications and not conflict with any discipline.
- D. All Cabling shall be plenum rated.

#### 2.02 CABLING

- A. All communications cabling used throughout this project shall comply with the requirements as outlined in the National Electric Code (NEC®) Articles 725, 760, 770, and 800 and the appropriate local codes.
- B. All copper cabling shall bear CMP (Plenum Rated) and/or appropriate markings for the environment in which they are installed.
- C. Cable Pathway
- D. In suspended ceiling and raised floor areas where duct, cable trays or conduit are not available, the Contractor shall bundle, in bundles of 50 or less, station wiring with cable ties snug, but not deforming the cable geometry.

- E. Cable bundles shall be supported via independent self-supporting means attached to building structure and at intervals of four (4) feet.
- F. Plenum rated cable ties shall be used in all appropriate areas.
- G. The Contractor shall adhere to the manufacturers' requirements for bending radius and pulling tension of all data and voice cables.
- H. Cables shall not be attached to lift out ceiling grid supports or laid directly on the ceiling grid.
- I. Cables shall not infer with fire sprinkler heads or delivery systems or any other life safety systems in the ceiling space.
- J. Cable shall be Cat 5e to data jacks indicated on plans.

### 2.03 CATEGORY 5e MODULAR PATCH PANELS

- A. The Category 5e modular patch panels shall meet or exceed the proposed Category 5e standards requirements in ANSI/TIA/EIA.
- B. The patch panels shall be 19-inch rack mountable
- C. Provide patch cord organizers between each modular patch panel
- D. Shall have horizontal routing via metal distribution rings
- E. Shall have 24 plastic clips to provide vertical pathways for patch cables

#### 2.04 COPPER PATCH CORDS

- A. Category 5e Patch Cords
- B. All patch cords shall meet or exceed ANSI/TIA/EIA and ISO/IEC Category 5e specifications.
- C. All patch cords shall be compatible with Category 5 and Category 5e systems.
- D. The patch cords shall incorporate an anti-snag feature that provides maximum protection from snagging during moves and re-arrangements.
- E. Patch cords shall be, UL-C certified and AUSTEL approved.
- F. Patch cords shall support network line speeds.
- G. Patch cords shall be available in stranded and solid conductor in lengths to 100 feet.

#### 2.05 TELECOMMUNICATION COPPER CABLE

- A. Shielded 24 AWG multi-pair copper cables are used to communication rooms for voice transmissions.
- B. Shielded
  - 1. The shielded riser rated cable shall consist of solid-copper conductors insulated with and covered by a PVC skin, be conformance tested to meet EIA/TIA 568-B for Category 3 cables, be UL® listed as CMR. The core shall be overlaid with a

corrugated aluminum sheath, which is adhesively bonded to an outer jacket of PVC plastic to form an ALVYN sheath.

- 2. The PVC sheath shall allow it to be pulled through conduit without the use of additional lubricants.
- 3. The cable shall be available in 50, 100, 150, 200, 300, 400, 600, 900, 1200, 1500, and 1800 pair counts.

### 2.06 110 PUNCH BLOCK

- A. The punch block shall support Category 5e applications and facilitate cross connection and interconnection using either cross connect wire or the appropriate category patch cords.
- B. Series of fanning strips shall be located on each side of the block for dressing the cable pairs terminated on the adjacent index strips.
- C. The wiring block shall accommodate 19- through 26-AWG conductors and shall be able to mount directly on wall surfaces with backboards or 19" free-standing frame.
- D. The punch blocks shall be fire retardant, molded plastic consisting of horizontal index strips for terminating 25 pairs of conductors each. The index strips shall be marked with five colors on the high teeth, separating the tip and ring of each pair, to establish pair location.
- E. Clear label holders with the appropriate colored inserts shall be provided with the punch blocks. The insert labels shall contain vertical lines spaced on the basis of circuit size (3-, 4-, or 5-pair) and shall not interfere with wire/patch cords.
- F. The punch blocks shall be available in 100 and 300 pair sizes and shall be available with legs.
- G. The punch block shall be able to accommodate over 500 repeated insertions without incurring permanent deformation and it shall pass the reliability test of no more than one contact failure in 10000 connections.
- H. Jumper Trough
- I. Provide a horizontal trough for the routing of patch cords and/or cross connect wire.
- J. Provide between each punch block and top and bottom of each group of punch blocks.
- K. Provide patch cord organizers between each modular patch panel
- L. Shall have horizontal routing via metal distribution rings
- M. Shall have 24 plastic clips to provide vertical pathways for patch cables

#### 2.07 OUTLETS

- A. Outlet Faceplates
- B. Flush Mount faceplates shall be available in single, duplex, triplex, quadplex, or sixplex arrangement in a single gang configuration.
  - 1. The outlets shall be capable of being installed in any modular faceplate, frame, or surface-mounted box avoiding the need for special faceplates.

VOICE/DATA NETWORK CABLE SYSTEMS SECTION 16742- 3

- Faceplates, One-Port, Two-Port, Three Port, Four Port and Six Port
   a) Ivory shall be the color
- C. Outlet Requirements.
- D. Unless otherwise noted on the floor plans or within this document, all voice and data wall outlets for 24 AWG copper cable shall be:
  - 1. Insulation displacement with eight position and eight conductor modular outlets
  - 2. Support Universal applications in a multivendor environment, accepting modular RJ-45 plugs. .
  - 3. Provide color coded inserts at each outlet, termination block and at patch panels.
  - 4. Mounted in one, two or three gang utility outlet boxes.
  - 5. Universal wiring labels EIA/TIA-T568A and EIA/TIA-T568B.

#### 2.08 EQUIPMENT RACKS

- A. General
  - 1. The equipment rack shall support the patch cords at the front of the rack provide vertical cable management, wire management, and protection for the horizontal cables inside the legs of the rack. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Each patch panel and/or piece of equipment on the rack shall be provided with wire management. Velcro cable ties shall be provided inside the rack channels to support the horizontal cable. Rack shall be black in color to match the patch panels and cable management.
- B. Free-standing rack shall have the following
  - 1. Means for providing proper strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of ANSI/TIA/EIA-568-B.
  - 2. Top cable trough with waterfall and built in patch/horizontal cable distribution separator.
  - 3. EIA hole pattern on front and rear.
  - 4. 6.5" channel depth.
  - 5. Hook and loop straps for securing bulk cables inside the vertical U-channels.
  - 6. 19" mounting with a height of 7 ft
  - 7. Vertical patch cord management.

#### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. The telephone system shall be installed in accordance with the requirements of the telephone system supplier and utility providing service.
- B. The contractor shall be responsible for providing and installing the following materials as a basis for the system:
  - 1. Fire rated painted plywood backboard, for equipment mounting and wiring termination, in each communications room.

VOICE/DATA NETWORK CABLE SYSTEMS SECTION 16742- 4

- A 4-11/16" device box, plaster ring and appropriate cover plate with a minimum <sup>3</sup>/<sub>4</sub>" conduit stubbed into ceiling space at each computer/telephone location indicated on plans.
- 3. A 4-11/16" device box, plaster ring and appropriate cover plate with a minimum <sup>3</sup>/<sub>4</sub>" conduit stubbed into ceiling space at each resident room.
- 4. Each outlet shall have a duplex type coverplate with appropriate number RJ-45 jacks as plans indicate. Refer to plans for cable requirements at each location.
- 5. All cabling shall home run from its respective outlet location to the local communications room
- C. Contractor shall coordinate. Within the main communication room location the contractor shall provide the following:
  - 1. Standard Cat 6 patch panels fastened to equipment Rack of back board.
  - 2. Flat wire shelf fastened to backboard approximately 2'-0" below Cat 6 patch panels. Hub to be provided by owner and placed on rack.
  - 3. 3 foot patch cords (quantity as required) for connection between a hub and patch panels.
  - 4. Additional wire shelf 2'-0" below the first shelf for owner provided UPS.
- D. The contractor shall be responsible for providing one seven (7) foot patch cord for every data jack outlet and a supply of fifteen (15) foot patch cords equaling in number to 50% of all data jack outlets.

### 3.02 GROUNDING AND BONDING

- A. All grounding and bonding shall meet the National Electrical Code (NEC®) as well as local codes which specify additional grounding and/or bonding requirements.
- B. Bonding and Grounding
- C. Communication bonding and grounding shall be in accordance with the NEC® and NFPA. Horizontal cables shall be grounded. Horizontal equipment includes cross connect frames, patch panels and racks, active telecommunication equipment and test apparatus and equipment. General Contractor shall provide when required by local code Bonding utilizing a #6-AWG.

#### 3.03 FIRE STOPPING

- A. Fire Stopping Openings around the exterior and interior of the sleeves or openings between floors, through rated fire and smoke walls, existing or created by the Contractor for cable pass through shall be the responsibility of the Contractor for proper sealing.
- B. Contractor shall be responsible for providing openings as indicated and necessary according to drawings.
- C. All unused conduits and openings indicated on communications plans shall be sealed by contractor.
- D. Damage Responsibility

E. Any surfaces or work disrupted as a result of work shall be repaired by this includes painting and shall be included as necessary.

### 3.04 TESTING AND DOCUMENTATION

- A. All cables shall be tested to verify satisfactory end-to-end cable performance.
- B. Cable links shall be tested for near-end crosstalk and attenuation up to and including 100 MHz.
- C. The network cable system shall be certified in writing for up to 100 MHz operation in the form of a 10-year performance warranty.
- D. The completed network cable system shall be documented in the form of "As-Built" drawings identifying the cable path, links and data jack outlets.

## END OF SECTION

# SECTION 16950 OCCUPANCY SENSORS

#### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Contractor's work to include all labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy sensor lighting control system, as described herein.
- B. Contractor/Supplier shall examine all general specification provisions and drawings for related electrical work required as work under Division 16.
- C. Contractor shall coordinate all work described in this section with all other applicable plans and specifications, including but not limited to wiring, conduit, fixtures, HVAC systems and building management systems.

#### 1.02 EQUIPMENT QUALIFICATION

- A. Products supplied shall be from a single manufacturer that has been continuously involved in manufacturing of occupancy sensors for a minimum of five (5) years. Mixing of manufacturers shall not be allowed.
- B. All components shall be U.L. listed, offer a five (5) year warranty and meet all state and local applicable code requirements.
- C. Products shall be manufactured by an ISO 9002 certified manufacturing facility and shall have a defect rate of less than 1/3 of 1%.
- D. Wall switch products must be capable of withstanding the effects of inrush current. Submittals shall clearly indicate the method used.

### 1.03 SYSTEM DESCRIPTION

- A. The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.
- B. The occupancy sensor based lighting control shall accommodate all conditions of space utilization and all irregular work hours and habits.
- C. Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with specifications. The supplier's obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier. The warranty shall commence upon the owner's acceptance of the project. Warranty on labor shall be for a minimum period of one (1) year.

### 1.04 SUBMITTALS

- A. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.
- B. Submit a lighting plan clearly marked by manufacturer showing proper product, location and orientation of each sensor.
- C. Submit any interconnection diagrams per major subsystem showing proper wiring.
- D. Submit standard catalog literature which includes performance specifications indicating compliance to the specification.
- E. Catalog sheets must clearly state any load restrictions when used with electronic ballasts.

### 1.05 SYSTEM OPERATION

- A. It shall be the contractor's responsibility to make all proper adjustments to assure owner's satisfaction with the occupancy system, or;
- B. Factory Startup (Optional): It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system. This service is provided at an additional cost.

#### PART 2 - SPECIFIC REQUIREMENTS

#### 2.01 ACCEPTABLE MANUFACTURERS

- A. Watt Stopper or Pre-approved equal: For pre-approval, provide all the information listed under section 1.04A and 1.04D a minimum of ten (10) working days prior to initial bid date.
- B. The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the electrical contractor to ensure that any price quotations received and submittals made are for sensors which meet or exceed the specifications included herein.

## 2.02 PRODUCTS

- A. All products shall be Watt Stopper product numbers:
  - Ceiling sensors: WT-605, WT-600, WT-1105, WT-1100, WT-2205, WT-2200, WT-2250, WT-2255, WP-605, WP-1105, WP-2255, WP-2205, W-500A, W-1000A, W-2000A, W-2000H, UT-300, UT-305, UT-355, WPIR, DT-200, DT-205, DT-300, DT-305, DT-355, CX-100, CX-105, Cl-200, Cl-205, Cl-300, Cl-305, Cl-355, Cl-12, Cl-24
  - 2. Wall switch sensors: PW-100, PW-100-24, PW-200, WS-200, WD-170, WD-180, WD-270, WD-280, WN-100-120, WN-100-277, UW-100, UW-100-24, UW-200, DW-100, DW-100-24, DW-200.
  - 3. Power and Auxiliary Packs: BZ-50, BZ-100, BZ-150, LC-100, C120E-P, C277E-P, S120/27-P, AT-120, AT-277
  - 4. HID Control: DM-100, DM-105, DM-105-WP

- 5. Outdoor sensors: EW-100, EW-200, EWF-105, EWF-205, EW-105-24, EW-205-24, EN-100, EN-200
- 6. Low Temperature: CB-100
- 7. Digital Time Switches: TS-400, TS-400-24
- 8. Automatic Control Switch: AS-100
- B. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
- C. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
- D. Wall switch products shall utilize Zero Crossing Circuitry which increases relay life, protects from the effects of inrush current, and increases sensor's longevity.
- E. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
- F. Where specified, wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.
- G. Where specified, vandal resistant wall switch sensors shall utilize a hard lens with a minimum 1.0mm thickness. Products utilizing a soft lens will not be considered.
- H. Passive infrared sensors shall utilize Pulse Count Processing and Detection Signature Processing to respond only to those signals caused by human motion.
- I. Passive infrared sensors shall provide high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line).
- J. Passive infrared sensors shall have a multiple segmented Fresnel lens, in a multipletier configuration, with grooves-in to eliminate dust and residue build-up.
- K. Where specified, passive infrared ultrasonic and dual technology sensors shall offer daylighting footcandle adjustment control and be able to accommodate dual level lighting.
- L. Dual technology sensors shall be wall mounted, corner mounted or ceiling mounted in such a way as to minimize coverage in unwanted areas.
- M. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
- N Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
- O. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within  $\pm$  0.005% tolerance, 32 kHz within  $\pm$  0.002% tolerance, or 40 kHz  $\pm$  0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.
- P. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.

- Q. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
- R. When specified, sensors shall utilize SmartSet<sup>™</sup> technology for automatically adjustable time delay and sensitivity settings.
- S. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
- T. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall switch until sensor is replaced. This control shall be recessed to prevent tampering.
- U. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
- V. Where specified, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.
- W. All sensors shall have UL rated, 94V-0 plastic enclosures.
- X. Outdoor sensors shall have UL 773A ratings. EWF outdoor sensors shall additionally have UL 1571 ratings.
- Y. EW-100 outdoor sensors shall cover up to 35 feet, with a field of view of 180 degrees. EW-200 shall cover up to 52.5 feet, with a field of view of 270 degrees.
   EN-100 outdoor sensors shall cover up to 35 feet, with a field of view of 90 degrees.
   EN-200 outdoor sensors shall cover up to 100 feet, with a long range lens view.
- Z. EWF outdoor sensors shall include polycarbonate lamp holders that accept PAR 20 or 38 lamps up to 150W per lamp.
- AA. Outdoor sensors shall have an operating temperature range of  $-40^{\circ}$ F to  $+130^{\circ}$ F.
- BB. To ensure complete protection from weather elements and exposure, outdoor sensors shall be manufactured with precision double-shot tooling and contain internal silicon gaskets.
- CC. HID controller shall be compatible with all types of High Intensity Discharge (HID) lamps, including Metal Halide, Metal Halide Pulse Start, and High Pressure Sodium.
- DD. HID controller shall operate with HID lamps utilizing Constant Wattage Autotransformer (CWA) type ballasts.
- EE. To avoid lamp damage during the HID power up period, the HID controller shall maintain a full light level during lamp warm up for 15 minutes.
- FF. To maximize lighting control scenarios, the HID controller shall be compatible with any 24 VDC controlling device, such as occupancy sensors, time switches, control panels, or photocells.

GG. The HID controller shall be capable of linking to other HID control modules to enable effective multizone control. More than 100 individual devices shall be capable of being connected.

### 2.03 CIRCUIT CONTROL HARDWARE - CU

- A. Control Units For ease of mounting, installation and future service, control unit(s) shall be able to externally mount through a 1/2" knock-out on a standard electrical enclosure and be an integrated, self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power. Control unit shall provide power to a minimum of two (2) sensors.
- B. Relay Contacts shall have ratings of: 13A - 120 VAC Tungsten 20A - 120 VAC Ballast 20A - 277 VAC Ballast
- C. Control wiring between sensors and controls units shall be Class II , 18-24 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums, where applicable.
- D. Minimum acceptable wire gauge from the circuit control hardware relays shall be #14 AWG.

#### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
- B. It is the contractor's responsibility to arrange a pre-installation meeting with manufacturer's factory authorized representative, at owner's facility, to verify placement of sensors and installation criteria.
- C. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

#### 3.02 FACTORY COMMISSIONING (OPTIONAL)

A. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments

and sensor placement to ensure a trouble-free occupancy-based lighting control system. This service is provided at an additional cost.

B. The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the scheduled commissioning date. Upon completion of the system fine tuning the factory authorized technician shall provide the proper training to the owner's personnel in the adjustment and maintenance of the sensors.

# **END OF SECTION**

IEEE	Institute of Electrical and Electronics Engineers
FBCM	Florida Building Code – Mechanical
FBCP	Florida Building Code – Plumbing
MSSP	Manufacturers Standards Society of the Valve and Fittings Industry
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
TEMA	Tubular Exchanger Manufacturers Association
UL	Underwriters' Laboratories

### 1.04 **DEFINITIONS**

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term product includes the terms material, equipment, system, and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes proposed by Contractor in products, materials, equipment, and methods of construction required by the Contract Documents.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named, or a product is accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, inservice performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.
- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Extended Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

### 1.05 SYSTEM DESCRIPTION

- A. Design Requirements: Contract drawings are generally diagrammatic and do not indicate all offsets, fittings, transitions, access panels and other specialties required.
  - 1. Furnish and install all items as may be required at no additional cost to fit the work to the conditions encountered.
  - 2. Arrange piping, ductwork, equipment and other work generally as shown on the contract drawings, providing proper clearances and access.

- 3. Where departures are proposed because of field conditions or other causes, prepare and submit a detailed shop drawing submittal for approval in accordance with Submittals specified below.
- 4. Subject to the provisions of Division 1, Architect may make reasonable changes in location of equipment piping and ductwork up to the time of rough-in or fabrication.

### 1.06 SUBMITTALS

- A. General: Submit each item in this Section according to the conditions of the contract and Division 01 Specification Sections.
- B. Comply with the Division 01 specifications.
- C. Shop Drawings and Product Data:
  - 1. Clearly identify all submittals:
    - a. Indicate intended application, location, etc.
    - b. Each submittal shall indicate the associated specification section, and paragraphs. Do not combine product data and shop drawing submittals from different spec sections into a single submittal package, even though they may be the same distributor, vendor or part of a single material order.
    - c. Clearly indicate the exact type, model number, size and special features of the proposed item.
    - d. Include catalog spec sheets to completely describe proposed equipment.
    - e. Factory order forms only showing the required capacities are not acceptable.
    - f. Identify all options furnished to meet specifications.
    - g. The Architect shall not select equipment ratings and/or options. Submittals not properly marked shall be returned without review.
- D. Product Substitutions: Comply with requirements of the Division 01 Specifications.
- E. Comparable Products Submission:
  - 1. Document each request for a proposed comparable product with supporting data substantiating compliance of proposed product with Basis-of-Design product.
  - 2. Use the attached "Comparable Product Submittal Form" in addition to the requirements specified herein.
  - 3. Comparable products will not be reviewed without completion of the attached form.
- F. Coordination Drawings
  - Prepare coordination drawings to a scale of 1/4" = 1'-0" or larger; detailing major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the work, including (but not necessarily limited to) the following:
    - a. Indicate the proposed locations of piping, valving, ductwork, equipment, and materials. Include the following:
    - b. Planned piping layout, including valve and specialty locations and valve stem movement.
    - c. Planned duct systems layout, including elbow radii and duct accessories.
    - d. Clearances for installing and maintaining insulation.
    - e. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.

GENERAL MECHANICAL PROVISIONS SECTION 15010 - 3

- f. Equipment connections and support details.
- g. Exterior wall and foundation penetrations.
- h. Fire-rated wall and floor penetrations.
- i. Sizes and location of required concrete pads and bases.
- j. Duct fire dampers, smoke dampers and combination fire/smoke dampers.
- k. Access doors.
- I. Clearances at electrical components in accordance with the National Electric Code.
- m. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
- n. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations. Show all wall mounted access doors for mechanical devices.
- o. Prepare reflected ceiling plans to coordinate and integrate installations, air outlets and inlets, light fixtures, communication systems components, cable trays, sprinklers, access doors and other ceiling mounted items.
- p. Coordination drawings shall at a minimum include coordination with other divisions, fire protection, plumbing and electric installers. Include fire protection piping, domestic water piping (cold water, hot water and hot water recirculation), natural gas piping, sanitary piping, sanitary vent piping, closed loop supply and return piping, ductwork, flexible duct, ceiling mounted air devices, lights, ceiling and building structural members (floor slabs, beams, joists, etc.). Coordination drawings shall be provided at a minimum for:
  - 1) First floor to fourth floor corridor. Provide floor plans and at least two sections.
  - 2) Commercial kitchen piping and ductwork layout. Provide floor plans and at least two sections.
  - 3) All Mechanical Rooms. Provide floor plans and at least two sections for each.
  - 4) Garage piping layout. Provide floor plans and at least two elevations. Indicate inverts of all piping and ductwork crossing drive aisle.
- q. Submit ductwork fabrication drawings.
- G. Closeout Submittals:
  - 1. Record Drawings: Prepare record documents in accordance with the requirements in the Division 01 Specifications. In addition to the requirements specified in Division 01, indicate the following installed conditions:
    - a. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
    - b. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Refer to Section 15075 - "Mechanical HVAC Identification." Indicate actual inverts and horizontal locations of underground piping.
    - c. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
    - d. Approved substitutions, Contract Modifications, Responses to Contractor's Request for Information, and actual equipment and materials installed.
    - e. Record the locations and invert elevations of underground installations.
  - 2. Operation and Maintenance Data: Prepare operation and maintenance data in accordance with the Division 01 Specifications. In addition to the requirements specified

in Division 01, include the following information for equipment items:

- a. List of systems and equipment requiring service manuals.
- b. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
- c. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
- d. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
- e. Servicing instructions and lubrication charts and schedules.
- f. Systems and Equipment test reports.
- H. Color Selection: Color of finishes shall be as selected by the Architect. Submit color charts of any factory finished equipment specified for color for acceptance prior to ordering.
- I. Products and Materials:
  - 1. Submit complete descriptive data for all materials as follows:
    - a. Material specifications.
    - b. Data sheets.
    - c. Samples.
    - d. Capacity ratings.
    - e. Performance curves.
    - f. Operating characteristics.
    - g. Catalog cuts.
    - h. Dimensional drawings.
    - i. Wiring diagrams.
    - j. Installation instruction.
    - k. Any other information necessary to indicate compliance with contract documents.
  - 2. Highlight submittal data specifically for application to this project.
  - 3. Submit actual operating conditions and characteristics for all equipment.
  - 4. Catalogs or catalog cuts are not acceptable unless the particular item and all relative data has been marked in such a manner as to be clearly defined.
  - 5. Color of finishes shall be as selected by the Architect. Submit colors of factory finished equipment for acceptance prior to ordering.
  - 6. No mechanical item shall be fabricated, purchased, delivered to the site or installed, until reviewed by the Engineer.
    - a. After the proposed materials have been approved, no substitution will be permitted except where approved by the Engineer.
  - 7. Provide shop drawing and product data submittals as indicated under individual specification sections.
  - 8. Provide any other data requested by the Engineer.

## 1.07 QUALITY ASSURANCE

A. Underwriter's Laboratory (UL) Requirements: All equipment containing electrical components and provided under Division 16 shall bear the Underwriter's Laboratory (UL) label, as a complete packaged system.

- 1. Equipment not provided with a UL label shall be tested in the field, certified and provided with a listed label at the installer's expense.
  - a. Field testing shall be performed by a testing agency approved by the authority having jurisdiction.
  - b. Provide services of a UL recognized, independent Electrical Testing Laboratory (ETL) to provide field inspection and testing. Provide and ETL Label on all such equipment.
- B. Fire Safe Materials: Unless otherwise indicated, materials shall conform to UL, National Fire Protection Association (NFPA) or American Society for Testing and Materials (ASTM) standards for fire safety with smoke and fire hazard rating not exceeding flame spread of 25 and smoke developed of 50.
- C. Flow rate tolerance for HVAC equipment are listed in the Testing Adjusting and Balancing Section.
- D. Equipment Vibration tolerances: Equipment shall be factory balanced and re-balanced on site after installation.

# 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the Division 01 Specifications and the requirements contained herein.
  - 1. Deliver, store, and handle products according to manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
  - 2. Schedule delivery to minimize long-term storage at Project Site and to prevent overcrowding of construction spaces.
  - 3. Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - 4. Deliver products to Project Site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  - 5. Inspect products upon delivery to ensure compliance with Contract Documents and to ensure that products are undamaged and properly protected.
  - 6. Store products in manner that will facilitate inspection and measurement.
  - 7. Store materials in a manner that will not endanger project structure.
  - 8. Store products subject to damage by elements above ground, under cover in a weather tight enclosure, with ventilation adequate to prevent condensation.
  - 9. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather protection requirements for storage.

# 1.09 **PROJECT CONDITIONS**

#### A. Outages

- 1. All mechanical outages which will interfere with the normal use of the building in any manner shall be done at such times as shall be mutually agreed upon with the Owner.
- 2. Unless otherwise specified, outages of any services required for the performance of this contract and affecting areas other than the immediate work area shall be scheduled with the Owner at least fourteen days (14) days in advance. All such outages shall be coordinated with the owner in writing. The owner reserves the right to partially occupy the building. Provide all necessary bypasses, isolation valves and dampers and other

means and methods to limit the amount of time the building is without services.

- 3. The bid price shall include the cost of all premium time required for outages and other work which interferes with the normal use of the building.
- 4. The operation of valves or switches required to achieve an outage shall be accomplished by the Contractor in the Owner's presence. Unauthorized operation of valves, power switches, or other control devices shall not be permitted.

#### 1.10 SEQUENCING

- A. Coordinate mechanical equipment installation with other building components and trades.
- B. Coordinate for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate the installation of required supporting devices and set sleeves in poured-inplace concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
- E. Coordinate connection of electrical services.
- F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
- G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces.
- H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

### 1.11 **PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
  - 1. Manufacturer's Standard Form: Modified to include project-specific information and properly executed.
  - 2. Refer to Divisions 02 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in the Division 01 Specifications.

### 1.12 DISCREPANCIES

A. Where discrepancies occur between the drawings and specifications or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included

in the contract price. The Architect shall determine the manner in which the work shall be provided, based on the design intent of the documents.

#### PART 2 - PRODUCTS

### 2.01 **PRODUCT SELECTION**

- A. General Product Requirements: Provide products that comply with Contract Documents that are undamaged and new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for complete installation and intended use and effect.
  - 2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Where products are accompanied by the term as selected, Architect will make selection.
  - 4. Where products are accompanied by the term match sample, sample to be matched is Architect's.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. General Compliance Requirements: Compliance requirements for individual products, as indicated in Contract Documents, are multiple in nature and may include generic descriptions, performance requirements, compliance with reference standards, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with.
- C. Procedures for Selecting Products: Contractor's options for selecting products are limited by Contract Document requirements, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects.
- D. Products specified by Reference Standards, Codes and Regulations: Select from among products, which can be shown to comply with referenced documents.
- E. Products specified by Naming Products and Manufacturers: Select from among products listed.
- F. Products specified by Naming One Manufacturer's Product as the Basis-of-Design with Reference to Other Manufacturers: Select either the specified Basis-of-Design product or an approved comparable product by one of the other named manufacturers.
  - 1. Comply with provisions in Comparable Products Article to obtain approval for use of a comparable product by one of the named manufacturers.
- G. Products specified by Naming One Manufacturer's Product and Indicating Option of Selecting Comparable Products by stating or Approved Equivalent or similar language: Select either the specified product or an approved comparable product.
  - 1. Comply with provisions in Comparable Products Article to obtain approval for use of a comparable product by one of the named or un-named manufacturers.
- H. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and, matches Architect's sample. Architect's decision will be final on whether proposed product matches satisfactorily.
- I. Visual Selection Specification: Where Specifications include the phrase as selected from manufacturer's standard colors, patterns, textures or similar phrase, select a product that complies

with other specified requirements. Architect will select color, pattern, and texture.

- 1. Standard Range: Where Specifications include the phrase standard range of colors, patterns, textures or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
- 2. Full Range: Where Specifications include the phrase full range of colors, patterns, textures or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

#### 2.02 COMPARABLE PRODUCTS

- A. Where Basis-of-Design products are specified by name, submit the following, in addition to other required submittals, to obtain approval of a comparable product by one of the named manufacturers:
  - 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work. Use the attached Comparable Products Submittal Form in addition to requirements listed herein.
  - 2. Detailed comparison of significant qualities of proposed product with the Basis-of-Design product in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, serviceability, visual effect, and specific features and requirements indicated.
  - 3. Evidence that proposed product provides specified warranty.
  - 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  - 5. Samples, if requested.

#### 2.03 GROUT

- A. Non-shrink, Nonmetallic Grout: ASTM C 1107, Grade B, "Packaged Dry, Hydraulic- Cement Grout (Nonshrink)".
  - 1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi (34.50MPa), 28-day compressive strength.
  - 3. Packaging: Premixed and factory-packaged.

### 2.04 ACCESS DOORS AND PANELS

- A. Provide manufactured steel door assemblies consisting of:
  - 1. Hinged door.
  - 2. Flush screwdriver camlocks and frame.
- B. Doors shall be Milcor Metal Access doors. Provide key locks where indicated.
- C. Design shall be provided for the following installations:
  - 1. Masonry or Dry Wall: Style M.
  - 2. Hard Finish Plaster: Style AP.
  - 3. Fire rated dry wall ceilings: Style CFRAD, 1 hour combustible floor ceiling system, 1 hour non-combustible floor ceiling system, 3 hour non-combustible floor ceiling system.
  - 4. Suspended ceilings: Style CT.

GENERAL MECHANICAL PROVISIONS SECTION 15010 - 9

### PART 3 - EXECUTION

### 3.01 **PREPARATION**

- A. Interface With Site Utility Companies:
  - 1. Contact UTILITY prior to any excavation or underground work.
  - 2. Contact local utility companies (gas, water, sewer, etc.) immediately upon award of contract. Do not install related equipment until fully coordinated with appropriate utilities.
  - 3. Provide all construction schedules, dates of requested services, outage windows, equipment locations, etc. necessary for utility work.

#### 3.02 INSTALLATION

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
  - 1. Coordinate mechanical systems, equipment, and materials installation with other building components.
  - 2. Verify all dimensions by field measurements.
  - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
  - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
  - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
  - 6. Where systems, materials and equipment are intended for overhead installation, and where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
  - 7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
  - 8. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
  - 9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components.
  - 10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
  - 11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 08
  - 12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
- B. Rough-In
  - 1. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

#### GENERAL MECHANICAL PROVISIONS SECTION 15010 - 10

- 2. Refer to equipment specifications in Divisions 02 through 16 for rough-in requirements.
- C. Housekeeping and Equipment Pads
  - 1. Construct pads of dimensions indicated, but not less than 4 inches larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi, 28-day compressive strength concrete and reinforcement bars. Refer to Division 03 Specifications and plan details for additional requirements.
- D. Erection of Metal Supports and Anchorage
  - 1. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
  - 2. Field Welding: Comply with AWS D1.1, "Structural Welding Code -Steel", 2001.
- E. Erection of Wood Supports and Anchorage
  - 1. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.
  - 2. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.
  - 3. Attach to substrates as required to support applied loads.
- F. Grouting
  - 1. Install nonmetallic non-shrink grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.
  - 2. Clean surfaces that come into contact with grout.
  - 3. Provide forms for placement of grout, as required.
  - 4. Avoid air entrapment when placing grout.
  - 5. Place grout to completely fill equipment bases.
  - 6. Place grout on concrete bases to provide a smooth bearing surface for equipment.
  - 7. Place grout around anchors.
  - 8. Cure placed grout according to manufacturer's printed instructions.
- G. Lintels
  - 1. Lintels shall be provided for openings in masonry, brick, concrete, etc. walls to accommodate work of this division.
    - a. Lintels shall be provided under this division when not being provided under other divisions. Lintels shall be approved by the Architect.

### 3.03 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 01 Specifications. In addition to the requirements specified in Division 1, the following requirements apply:
  - 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
- B. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
  - 1. Uncover Work to provide for installation of ill-timed Work.

- 2. Remove and replace defective Work.
- 3. Remove and replace Work not conforming to requirements of the Contract Documents.
- 4. Remove samples of installed Work as specified for testing.
- 5. Install equipment and materials in existing structures.
- 6. Upon written instructions from the Architect, uncover and restore Work to provide for Architect observation of concealed Work.
- C. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, ductwork, plumbing fixtures and trim, and other mechanical items made obsolete by the new Work.
- D. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
- E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

### 3.04 PAINTING AND FINISHING

- A. Refer to Division 09 Specifications.
- B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- C. Do not paint manufacturer's labels or tags.

#### 3.05 CONSTRUCTION

- A. Cutting, Welding, Burning
  - 1. If required, before commencing any cutting, welding, burning, brazing (pipe sweating), obtain a hot work permit from Environmental Health and Safety.
  - 2. If required, the hot work permit copy shall remain on the job site at the hot work location until such work is completed at which time the permit shall be returned to Environmental Health and Safety.

#### 3.06 PENETRATION OF WATERPROOF CONSTRUCTION

- A. Coordinate the work to minimize penetration of waterproof construction, including roofs, exterior walls and interior waterproof construction.
- B. Furnish and install drains, curbs, vent assemblies, sleeves, flashing, etc. specifically designed for application to the particular construction. Install system in accordance with the roofing manufacturer's instructions.

# 3.07 EXCAVATION AND BACKFILLING

- A. General
  - 1. Perform all necessary excavation, for installation of work under Division 15, in accordance with Division 02.

#### 3.08 CLEANING

- A. Clean surfaces prior to application of insulation, adhesives, coating, and paint.
- B. Provide factory applied finish where specified.

#### GENERAL MECHANICAL PROVISIONS SECTION 15010 - 12

- C. Protect all finishes, and restore all finishes to their original condition if damaged as a result of work under Division 15.
- D. Remove all construction marking and writing from exposed equipment, ductwork, piping and building surfaces.
- E. General: General cleaning during construction is required by the General Conditions and included in Section Temporary Facilities.
- F. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- G. Remove all mechanical clipping, wiring, nuts, bolts, etc. left on top of ceilings and ceiling tiles, in access panel, roof, etc.

### 3.09 **PROTECTION**

- A. Protect work, material and equipment from weather and construction operations before and after installation.
- B. Properly store and handle all materials and equipment.
- C. Cover temporary openings in piping, ductwork and equipment to prevent the entrance of water, dirt, debris, and other foreign matter.

#### 3.10 LUBRICATION

- A. All bearings, motors and all equipment requiring lubrication shall be provided with accessible fittings.
- B. Before turning over the equipment to the Owner, provide the following:
  - 1. Fully lubricate each item of equipment.
  - 2. Provide 1 year's supply of lubricant for each type of lubricant.
  - 3. Provide complete written lubricating instructions, together with diagram locating the points requiring lubrication.
- C. Motors and equipment shall be provided with grease lubricated roller or ball bearings with Alemite or equal extended grease fittings and drain plugs.

## 3.11 ELECTRICAL WORK

- A. It is the intent to provide a complete and operational system. The work between Division 15 and 16 is complementary and is meant to produce a single and operating system. Contractor shall make its own determination as to the distribution of responsibility among the various trades.
- B. All electrical work performed under Division 15 shall be provided in accordance with Division 16.

# 3.12 **PROVISIONS FOR ACCESS**

A. Furnish and install adequate access to all HVAC and plumbing components. The following list shall be used as a guide only:

- 1. Mechanical equipment.
- 2. Valves.
- 3. Dampers and operators.
- 4. Filters.
- 5. Heating and air conditioning units.
- 6. Controls.
- 7. Cleanouts.
- 8. Traps.
- 9. Automatic temperature control panels.
- 10. Coils.
- B. Access shall be adequate as determined by the Architect.
- C. Refer to contract drawings where panels have been specifically located.
- D. Provide additional panels for adequate access as indicated in paragraph A above.
- E. Where access is by means of lift out ceiling tiles or panels mark each panel using small colorcoded or numbered tabs. Provide an index chart for identification. Place markers in corner of grid.

### 3.13 OPERATION OF EQUIPMENT

- A. Clean all systems and equipment prior to initial operation for testing and balancing.
- B. Do not operate equipment unless all proper safety devices or controls are operational.
- C. Provide all maintenance and service for equipment, which is operated during construction.
- D. Where specified and otherwise required, provide the services of a manufacturer's factory trained service organization to start the equipment.
- E. Do not use mechanical systems for temporary services during construction unless authorized in writing by the Architect.
  - 1. Where such authorization is granted, temporary use of equipment shall not limit or otherwise affect warranties or guarantees of the work.
- F. Upon completion of work, clean and restore all equipment to new conditions and replace all filters.

#### 3.14 **DEMONSTRATION**

- A. Demonstrate operation and maintenance of equipment and systems to Owner's personnel a minimum two (2) weeks prior to date of final inspection.
  - 1. For equipment requiring seasonal operation, perform instructions for other seasons at the same time.
  - 2. Training period shall be performed within 1 two week period.
- B. Use operation and maintenance manuals and video as basis of instruction. Review contents of manual and video with personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate the following:

- 1. Start up.
- 2. Operation.
- 3. Control.
- 4. Adjustment.
- 5. Trouble shooting.
- 6. Servicing.
- 7. Maintenance.
- 8. Shutdown.
- D. Provide at least 40 hours of instruction to the operating personnel.
  - 1. This instruction period shall consist of not less than five-8 hour days.
  - 2. Time of instruction shall be designated by the Owner.
  - 3. This instruction shall be in addition to instructional requirements of specific equipment specified elsewhere in Division 15.
  - 4. Record all instruction periods. Provide the owner with three copies of the recordings in digital versatile disk (DVD) format.

## 3.15 WALL, FLOOR AND ROOF PENETRATIONS

- A. All penetrations of partitions, walls, floors and roof by ducts, piping or conduit shall be sealed and caulked. Provide U.L. listed fire stopping systems at penetrations through fire rated walls and roof.
- B. Coordinate with Architectural and Structural drawings for locations of all duct and pipe drops through floors and/or roof.

### 3.16 EQUIPMENT PROVIDED UNDER ANOTHER DIVISION AND BY OTHERS

- A. Make all system connections required to equipment furnished and installed under another division and by others.
- B. It shall be the responsibility of the Contractor to coordinate all necessary data from the equipment supplied under other Divisions.

#### 3.17 **PROJECT PUNCH OUT**

A. Architect/Engineer will perform punch out reviews and will provide the Contractor with a list of punch list items to be completed before contract close out. Each and every punch list item shall be initialed and dated by the Contractor when the work is complete. The Architect/ Engineer will not perform any punch list verification until all items have been completed, initialed, dated and the list returned to the Architect/Engineer. If any items have been initialed as being completed by the Contractor and the Architect/Engineer determines that the work is not complete, the Architect/Engineer shall be reimbursed by the Contractor at his regular hourly rate for any and all items requiring revisiting of the site by the Architect/Engineer.

## Proposed Equal Substitution Form

Project:		
Title:		
To:		
Re:		
From:		
Date:		

Project Number:

Contract For:		
Specification Title: Description:		
Section: Page: Article/Paragraph	:	
Proposed Substitution:		
Manufacturer:	Address:	Phone:
Trade Name: Model No.:		
Attached data includes product adequate for evaluation of the includes a description of changes to the C proper installation.	description, specificatio request; applicable portio ontract Documents that	ns, drawings, photographs, and performance and test data ons of the data are clearly identified. Attached data also the proposed substitution will require for its
<ul> <li>Proposed substitution has bee product.</li> <li>Same warranty will be furnish</li> <li>Same maintenance service and</li> <li>Proposed substitution will hav</li> <li>Proposed substitution does no</li> <li>Payment will be made for chat the substitution.</li> </ul>	n fully investigated and de ed for proposed substituti d source of replacement p re no adverse effect on oth t affect dimensions and fu nges to building design, i	etermined to be equal or superior in all respects to specified on as for specified product. parts, as applicable, is available. her trades and will not affect or delay progress schedule. unctional clearances. ncluding A/E design, detailing, and construction costs caused by
Submitted by:		Signed by:
Firm:	Address:	Telephone:
A/E's REVIEW AND ACTION <ul> <li>Substitution approved - Mak</li> <li>Substitution approved as no</li> <li>Substitution rejected - Use s</li> <li>Substitution Request received</li> </ul>	te submittals in accordance ted - Make submittals in a pecified materials. ed too late - Use specified	ce with Specification Section 01300. accordance with Specification Section 01631. materials.
Signed by: Date: Supporting Data Attached: Drav	vings Product Data Sampl	les Tests Reports
Note: Tenderers are advised that accompanied by technical procetechnical data includes informated by technical data accounter and the second s	at consideration will only luct data sufficient to fac ition described	<sup>7</sup> be given to "or equal" substitution proposals which are ilitate an objective review by the evaluation team. Required
I	Proposed Equal Sub	ostitution Form
Note: Tenderers are advised th unless the Tenderer submitting "basis of design", or a specified an "Equal Substitution".	at no voluntary option fo the voluntary option also equal product, or a subs	or any product will be reviewed by the evaluation team o provides a bid price on a product which is either the stitute product which in fact meets with the requirements of
Exaction Title Description		

Specification Title: Description: \_\_\_\_\_\_ Section: Page: Item ID: \_\_\_\_\_ Proposed Voluntary Option: \_\_\_\_\_

Manufacturer: Address: Phone:	
Trade Name: Model No.:	

Installer: Address: Phone:

History: New product 2-5 years old 5-10 years old More than 10 years old

Differences between voluntary option and specified product:

Point-by-point comparative data attached

Reason for not providing specified item:

Similar Installation:	
Project: Architect:	
Address: Owner:	
Date Installed:	

Proposed Voluntary Option affects other parts of Work: No Yes; explain

#### Savings to Owner for accepting Voluntary Option: (\$ ).

Supporting Data Attached: Drawings Product Data Samples Tests Reports

Note: Tenderers are advised that consideration will only be given to "or equal" substitution proposals which are accompanied by technical product data sufficient to facilitate an objective review by the evaluation team. Required technical data includes information described on each item page and that which is required by section 01631. Burden to demonstrate technical compliance with the furnished specifications lies with the Tenderer.

The Undersigned certifies:

- Proposed voluntary option has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed voluntary option will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted voluntary option which may subsequently become apparent are to be waived.
- Proposed voluntary option does not affect dimensions and functional clearances.

• Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the voluntary option.

• Coordination, installation, and changes in the Work as necessary for accepted voluntary option will be complete in all respects.

Submitted by: \_\_\_\_\_

Cience al less		
Signed by:		
0.0.000.001		

Firm:\_\_\_\_\_\_ Address:\_\_\_\_\_\_ Telephone:\_\_\_\_\_

**END OF SECTION**
## **SECTION 15800**

### **HVAC AIR DISTRIBUTION**

### PART 1 GENERAL

### 1.1 GENERAL

- A. All work under this section shall also be subject to the Requirements of Section 15010, "General Mechanical Provisions."
- B. The fabrication and installation of all ductwork, together with related equipment shall comply with the standards of the National Fire Protection Association, as set forth in NFPA Standard No. 90A, as well as with the requirements of the Sheet Metal and Air Conditioning Installer's Association, Inc. and the latest edition of the ASHRAE Guide.
- C. All duct sizes shown are net inside clear dimensions. Where internal duct lining is used, increase duct sizes accordingly to provide the indicated net free area. Unless otherwise indicated, size runouts, drops and connections to grilles, registers, diffusers, fans, water-source heat pump units, split system air handling units, louvers, filters and other equipment to the full size of the equipment connection.
- D. Minor changes may be made in duct sizes where required to fit the available space, provided the indicated net free area and approximate aspect ratio are maintained.
- E. Smoothly transition all ductwork and prevent excessive or unnecessary turbulence or pressure loss.
- F. Submit sheet metal fabrication shop drawings.
- G. All ductwork shall be cleaned following fabrication using filtered compressed air and the ends shall be sealed at the shop. Upon delivery to the site, duct ends shall remain sealed until time of actual installation. Following installation, ductwork shall be wiped down and cleaned (swept/vacuumed) in place. Partially installed ductwork shall have unfinished areas resealed in place at the end of each working day.

# PART 2 PRODUCTS

# 2.1 DUCTWORK

- A. Unless otherwise indicated or specified, fabricate ductwork of galvanized sheet steel conforming to Commercial Designation 3003 Temper H14 and Duct Sheet. Duct gauges, jointing and reinforcement shall conform to Tables 4, 5, 6 and 7 as applicable, ASHRAE Guide and Data Book and SMACNA HVAC Duct Construction Standards Metal and Flexible 2005. Construction for Ventilation and Air Conditioning Systems as published by Sheet Metal and Air Conditioning Installer's Association, Inc.
- B. Erect sheet metal ductwork in a first class, workmanlike manner secured in place rigidly and permanently. Provide suitable hangers, securely attached to building construction with bolts, clips or inserts. Hangers shall be structural shapes, flat bars or formed strap hangers; use of wire will not be permitted. Hangers shall not pass through or be inside duct. Support vertical ducts passing through floors by angles riveted to duct and resting either on floors or on brackets secured to building construction. All space around duct where they

HVAC AIR DISTRIBUTION SECTION 15800 - 1

12/23/2021

pass through walls, floors, ceilings or roofs shall be sealed tight with incombustible inert material. Do not arrange ducts so as to impair the effectiveness of fireproofing around exposed ducts passing through walls, floors or ceilings in finished areas to provide finished appearance. Provide sheet metal flanged collars around all exposed ducts passing through walls, floors or ceilings in finished areas to provide finished appearance. Seal all duct joints and seams including low pressure supply and return and exhaust ductwork with Hardcast Two Part Sealing System as manufactured by Hardcast, Inc. and no others will be acceptable. Two part sealing system shall consist of DT-TAPE with RTA-50 indoor/outdoor sealing system.

- C. Flexible connections of neoprene or other NFPA approved non-inflammable fabric shall be provided in duct system at all fan inlet and outlet connections.
- D. Provide duct turning vanes in all cut turns where center line radius is less than 1½ times width of duct and in all square elbows. Turning vanes shall be airfoil type with extended trailing edges.
- E. Provide duct collars and angle iron framework for mounting of automatic dampers.

# 2.2 DUCT SYSTEM

- A. Duct system shall be constructed as specified below.
  - 1. All ductwork: 2" w.c. duct construction, unless otherwise noted. Flexible or galvanized sheet metal ductwork from duct branch to diffusers and grills as indicated on plans.

# 2.3 DUCT CONSTRUCTION

- A. 1-1/2" Thick Duct Board
  - 1. Duct board shall be constructed of durable fiber glass fibers bonded with thermosetting resin. The airstream side of the duct board shall have a black fiber glass mat. The exterior surface shall have a fire resistant facing to extend the full width of the male edges to serve as an integral closure flap for section joints.
  - 2. Duct board shall have a maximum flame spread index of 25 and a maximum smoke developed index of 50 and meet standard ASTM E84, UL 723 and NFPA 90A and 90B.
  - 3. Maximum K-Factor: 0.23 at 75° F.
  - 4. Minimum thermal performance: R-value of 6.
- B. Single Wall Round Ductwork: Ductwork shall be single wall Type SS(75) as manufactured by Semco Manufacturing, Inc. or approved equal, uniseal duct and uniform fittings. Construct ductwork of galvanized sheet steel. Elbows 8" diameter and smaller shall be smooth formed. Larger elbows shall be 5 section type. Tees and crosses and laterals shall be conical. Make joints with sleeve type couplings, short length sheet metal screws and duct sealant. Conform to duct manufacturer's recommendations for jointing and installation. Ductwork and fittings shall be manufactured by a company regularly engaged in the construction of spiral ductwork and fittings. Manufacturers substituted for the above specified manufacturers shall submit for approval, independent published laboratory test data on all proposed ductwork and fittings showing materials of construction, air flow, pressure drop and acoustical performance characteristics.

- C. Double Wall Round Ducts and Fittings: Ductwork shall be double wall spiral round ducts as manufactured by Lindab, Inc. McGill Airflow LLC, Semco Inc. Outer Duct: comply with SMACNA HVAC Duct Construction Standards metal and flexible based on static pressure class. Traverse Joints: select joint types and fabricate according to SMACNA. Traverse Joints round duct applicable sealing requirements, materials involved, duct support intervals and other provisions. Tees and Laterals: select types and fabricate according to SMACNA for 90° Tees and Laterals and for conical tees. Inner duct minimum 0.028 inch thickness. Interstitial insulation fibrous glass liner complying with ASTM C1071 NPFA 90A or NFPA 90B and NAIMA Fibrous Glass Liner Standard. Maximum thermal conductivity 0.27 Btu in/hr. ft. °F at 75°F mean temperature coat insulation with anti-microbial coating cover insulation with polyester film Ul181 Class I.
- D. Rectangular Ductwork (2" w.g. construction):
  - 1. Make allowance for internal duct lining where required.
  - 2. Determine duct gauges for the longest duct side and use for all 4 sides. Joints and reinforcing requirements apply to the longest duct side.
  - 3. Reinforce all ducts to prevent buckling, vibration or noise as recommended in the referenced construction standards and as required to suit the installed conditions.
  - 4. Do not crossbreak duct which will receive rigid insulation covering.
  - 5. Where tap sizes of divided flow fittings are not indicated, make branch and main connection sizes proportional to their respective air flows and maintain uniform transverse velocities in the fittings.
  - 6. Make radius elbows and radius tee connection with throat radius equal to or greater than the width of the duct. Use vaned elbows where shown and where radius elbows will not fit the space in all square bends.
  - 7. Turning vanes shall be the airfoil type with extended trailing edges 36" maximum length. Where longer vanes are required, use 2 or more sets of vanes with intermediate runners securely fastened together.
  - 8. Bolts, screws, rivet or spot weld reinforcing members securely to the duct on not less than 6" centers.
  - 9. Where ducts are open ended without grilles, registers or other means of stiffening, reinforce and stiffen the open end with standing seams or an angle frame.
  - 10. Paint all cut ends on galvanized angles, rods and other uncoated surfaces with aluminum paint.
  - 11. Where ductwork is not painted or otherwise finished, remove all exposed traces of joint sealers, manufacturer's identification and other markings.
  - 12. Aluminum sheet shall be 3003 H14 alloy or duct sheet, 16,000 PSI minimum tensile strength and capable of being formed to a Pittsburgh lock seam.
  - 13. Reinforcing members for aluminum ductwork may be galvanized steel or aluminum, unless otherwise indicated. Where aluminum reinforcing is used, size the member in accordance with ASHRAE recommendations to have rigidity equivalent to listed mild steel angle sizes.
  - 14. Where aluminum ductwork is used, make allowance for increased thermal expansion. Particularly avoid direct contact between aluminum and concrete or masonry walls subject to dampness.

## 2.4 AIR VOLUME CONTROLS

A. Provide air volume control devices where indicated and where required to adjust and balance air flow in the systems.

- B. Air extraction for air outlets and branch ducts shall be the gang operated vane type, Tuttle & Bailey Vectrol, Type VLC or VLK as appropriate or approved equal, with suitable adjusting device and means of access.
- C. Manual volume dampers in ductwork shall be factory assembled units with rigid frame, opposed blade action and locking quadrant operator. Mark the extended damper shaft and align the operating handle to indicate the blade position. Dampers shall be as manufactured by American Warming and Ventilating, Inc., Ruskin or approved equal. Rectangular dampers shall be Type DAA-P-50, with steel channel frame, 16 gauge steel blades, 9" maximum blade spacing, nylon bearings, galvanized finish with aluminum paint touch up.
- D. Automatic temperature control (ATC) dampers shall be as hereinafter specified under another section.
- E. Duct turning vanes shall be Tuttle & Bailey Ducturns or approved equal.
- F. Furnish and install duct collars and angle iron frames for the installation of ATC dampers.

# 2.5 DUCT ACCESS DOORS

A. Furnish and install adequately sized duct access doors, at coils, automatic dampers and other locations where indicated and required for duct access. Doors shall be same or greater gauge as ductwork served and hinged type with approved latches and neoprene compression type gaskets. Stiffen ductwork at door openings where doors are installed in insulated ductwork, provide equivalent insulation in the door assembly. Where access doors are installed in fire rated partitions, provide fire seal access doors as manufactured by Air Balance, Inc. or approved equal, UL approved, meeting the rating of the enclosure in which the access door is installed.

#### 2.6 FLEXIBLE DUCT

- A. Flexible ductwork shall be Atco UPC #080 or approved equal, UL listed for Class 1 Air Ducts, Standard 181. Ducts shall be rated for 10" W.G. per UL 181.
- B. Limit flexible duct 6' maximum. Install flexible ducts, using all recommended fittings, couplings and accessories. Support ducts with wide straps spaced so that horizontal runs do not sag more than 3" in 3'. Cover with duct tape and fasten with duct strap clamps. 180<sup>o</sup>F bends in flexible duct are prohibited.

# 2.7 FLEXIBLE CONNECTIONS

A. Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

## 2.8 AIR TERMINAL DEVICES

A. Furnish and install air supply, return and exhaust devices of sizes and capacities as scheduled on the contract drawings. Unless otherwise indicated, catalog numbers shown are Titus products and for equipment which has been found suitable for the application. Products of Hart & Cooley/Tuttle & Bailey Inc., Carnes or Krueger will be considered only if performance characteristics, including throw, drop, pressure loss, sound pressure level, etc. are equal to or

better than the performance characteristics of the specified product. Performance characteristics as indicated above shall be included in shop drawing submittals. Shop drawings will not be reviewed unless performance data is submitted.

- B. Refer to the contract drawings for information on air terminal basis of design model number, sizes and capacities and direction of throw.
- C. Where air terminal devices are installed in duct collars or branches, furnish and install air extractors. Furnish and install control grids, volume dampers and/or other accessories necessary to ensure uniform air flow across the terminal devices. Accessories shall be of the same material as the terminal device. Install fixed blade terminals so that blades block the normal line of vision. Furnish 3 of each type of removable key operators.

#### 2.9 SPIN-IN FITTINGS

A. Furnish and install spin-in fittings where indicated on the contract drawings, Buckley Air-Tite Bellmouth Model BM with balancing damper as manufactured by Buckley Air Products, Inc. or approved equal.

#### PART 3 EXECUTION

#### 3.1 GENERAL

- A. Install all HVAC air distribution neatly where indicated in accord with manufacturer's recommendations and in accord with SMACNA recommendations and as otherwise indicated.
- B. Properly test, balance and adjust to produce quite, draftless operation to best degree possible.
- C. Balance supply air to each grille with accessible manual volume damper, if the branch duct to the grille is not accessible (hard ceiling) then install Bowden cable control from Young Regulator Company and mount the controller on top of the grille or on the adjacent wall.

#### 3.2 AIR DEVICE INSTALLATION

- A. Rectangular Diffusers: Where diffusers are the lay-in type, they shall be supported by the inverted T-bar suspension system but all ducts connected thereto shall be supported independently of the ceiling as specified under Section entitled "Ductwork". Surface mounted diffusers shall be supported by the duct run-outs or drops where sheet metal ducts are indicated and by separate hangers where flex run-outs are indicated. All rectangular ceiling diffusers shall be installed with their lines parallel and perpendicular to the building line and properly aligned with the ceiling and centered in ceiling modules.
- B. Sidewall Grilles and Registers: Mount securely to the duct system flanges using finish screws and in accordance with accepted good practice.
- C. Ceiling mounted Exhaust and Return Registers/Grilles: Mount as specified hereinbefore for surface mounted ceiling diffusers except use finished screws provided and secure to duct and finished ceiling (or finished ceiling for non-ducted returns) in accordance with the manufacturer's instructions. Where required to provide adequate support for non-ducted registers or grilles, provide appropriate mounting frame for incorporation into the ceiling system.
- D. Install all outlets and inlets as recommended by the manufacturer; in accordance with recognized industry practices; to insure that products serve intended functions.

- E. Locate ceiling air outlets and inlets as indicated on the drawings. Unless otherwise indicated, locate units in center of acoustical ceiling modules. Install square and parallel with partitions, ceiling grid members, etc.
- F. Spare Parts: Furnish to Owner, with receipt, 3 operating keys for each type of outlet and inlet that require them.
- G. Install all supply air diffusers with accessible Manual Volume Damper or with Young's Regulator if it is not accessible from ceiling.

### 3.3 DUCT INSTALLATION

- A. Coordinate ductwork with other work and install ducts at proper elevations and locations to maintain indicated ceiling heights and clearances. Provide all elbows, transitions, offsets, connections and other fittings necessary to fit the work into place or to connect to equipment or diffusers. Method of duct support connection to structure and slabs shall be approved by the Architect; submit shop drawings.
- B. Substantially support ductwork with structural shapes, flat bars or formed strap hangers securely attached to the building structure by means of bolts, clamps or inserts. Support vertical ducts by angles attached to the duct and resting on the floor or supported by brackets or hangers attached to the building structure. Strap hangers shall be 16 gauge minimum galvanized steel formed under the bottom edge of duct. Use square ¼" thick washers tight against the bend on upper strap attachments to horizontal surfaces. Place all supports external to the ductwork and out of the air stream. Provide additional supports at coils and other concentrated loads. Arrange supports so that duct weight is not transmitted to ceilings, fans or other equipment.
- C. Prevent direct contact between ductwork and building surfaces or other equipment. Where ducts pass through walls, partitions, floors, ceilings or roofs, pack and seal the space around the duct with an approved fire safe inert material.
- D. Use galvanized or corrosion resistant hangers, supports, brackets and hardware.
- E. Furnish and install NFPA approved flexible duct connections where shown and at all connections to fans. Use glass reinforced neoprene fabric, roll formed to sheet metal strips or flanges. Support adjacent ductwork to provide sufficient slack in the connection.
- F. Kitchen Hood Exhaust Duct Installations:
  - 1. Provide for thermal expansion of ductwork through 2,000-deg F temperature range.
  - 2. Install without dips or traps that may collect residues, except where traps have continuous or automatic residue removal.
  - 3. Install access openings at each change in direction and at 50-foot intervals. Locate on sides of duct 1-½ inches minimum from bottom, and fit with greasetight covers of same material as duct.
  - 4. Do not penetrate fire-rated assemblies.

# 3.4 DUCT SOUND ATTENUATORS:

- A. Install duct silencers with flanged connection outside of the airstream.
- B. Locate duct silencers in the airstream as indicated on the contract drawings and in accordance with manufacturer's published data for optimum performance location.
- C. Coordinate and label direction of airflow prior to installation.

- D. Label duct silencers for supply air or return air, etc. duty.
- E. Seal all joints as specified.

## 3.5 LEAKAGE TESTS

- A. Duct Leak Testing:
  - 1. Test the entire ductwork air distribution system.
  - 2. Disassemble, reassemble, and seal segments of systems to accommodate leak testing and for compliance of test requirements.
  - 3. Prior to installing insulation, conduct tests at static pressures equal to the maximum design pressure for each section of the system. If pressure classifications are not indicated, test entire system at the maximum system design pressure. Do not pressurize systems above the maximum design operating pressure.
  - 4. Determine leakage from entire system or from each section of the system being tested by relating leakage to the surface area of the test section.
  - 5. Maximum Allowable Leakage: As described in SMACNA HVAC Air Duct Leakage Test Manual, latest edition. Comply with requirements for leakage classification 3 for round ducts, leakage classification 12 for rectangular ducts in pressure classifications less than and equal to 2 inches water gage (both positive and negative pressures), and leakages classification 6 for pressure classifications greater than 2 inches water gage and less than and equal to 10 inches water gage.
  - 6. Remake leaking joints as required and apply sealants to achieve specified maximum allowable leakage.
  - 7. Record leakage testing results on forms from the SMACNA HVAC Air Duct Leakage Test Manual. Submit results within one week of testing.
  - 8. The maximum permissible percent of leakage shall be confined to 2% of the total CFM airflow of each respective fan/duct system.

### 3.6 DUCTWORK CLEANING

A. All ductwork shall be cleaned following fabrication using filtered compressed air and the ends shall be sealed at the shop. Upon delivery to the site, duct ends shall remain sealed until time of actual installation. Following installation, ductwork shall be wiped down and cleaned (swept/vacuumed) in place. Partially installed ductwork shall have unfinished areas resealed in place at the end of each working day.

# 3.7 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  - 1. Operate dampers to verify full range of movement.
  - 2. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat response device is installed.
  - 3. Inspect turning vanes for proper and secure installation.

#### 3.8 SYSTEM START UP

A. System start-up shall be provided by a factory-authorized representative of the LACS manufacturer. Start-up shall include calibrating the fume hood monitor and any combination sash sensing equipment, as required. Start-up shall also provide electronic verification of airflow (fume hood exhaust, supply, make-up, general exhaust or return), system programming and integration to BMS (when applicable).

B. The balancing contractor shall be responsible for final verification and reporting of all airflows.

# 3.9 CLOSEOUT ACTIVITIES

- A. Training
  - 1. The LACS supplier shall furnish a minimum of eight hours of owner training by factory trained and certified personnel. The training will provide an overview of the job specific airflow control components, verification of initial fume hood monitor calibration, general procedures for verifying airflows of air valves and general troubleshooting procedures.
  - 2. Operation and maintenance manuals, including as-built wiring diagrams and component lists, shall be provided for each training attendee.

## 3.10 DUCTWORK PAINTING

A. Apply paint to ductwork per paint manufacturer's written instructions and in accordance with all code requirements. Colors must be approved by Architect.

## 3.11 COMMISSIONING

A. Contractor shall provide copies of final reports to the Commissioning Agent (CxA) for review and inclusion with final Cx project documentation as applicable.

# **END OF SECTION**

## **SECTION 15990**

### TESTING, ADJUSTING AND BALANCING FOR HVAC

#### PART 1 GENERAL

### 1.1 **RELATED DOCUMENTS**

A. Drawing and general provisions of the Contract, including the General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section and the other Sections of Division 15.

#### 1.2 SUMMARY

- A. Coordinate work of this section with all trades.
- B. Work covered in this Section shall be performed after completion of work specified in all Divisions as they related to this work.
- C. Review of design drawings and specifications, and comment on potential problem areas.
- D. Site inspections of ongoing sheet metal installation with written report from each visit.
- E. Air leak testing of ductwork system. See Section 15800.
- F. Measurement and setting of all air, and hydronic (closed loop supply and return) water provided or specified in accordance with these contract documents, recording data, making tests, and preparing reports, all as hereinafter specified.
- G. Coordinate with all trades to provide all incidental items not indicated on drawings or in specifications that belong to work described or are required for complete systems balancing, at no additional cost to Owner.
- H. Refer to paragraph "Closeout Submittals" in Section 15010 "General Mechanical Provisions."

# 1.3 SUBMITTALS

- A. General: Submit each item in this Section according to the conditions of the Contract and Division 01 specification sections.
- B. Agency Data:
  - 1. Submit proof that proposed testing, adjusting, and balancing agency meets the qualifications specified within 30 days of award of contract.
- C. Engineer and Technicians Data:
  - 1. Submit proof that Test and Balance Engineer assigned to supervise procedures, and technicians proposed to perform procedures meet qualifications specified within 30 days of award of contract.
- D. Procedures and Agenda: Submit synopsis of testing, adjusting, and balancing procedures and

TESTING, ADJUSTING AND BALANCING FOR HVAC SECTION 15990 - 1 agenda proposed to be used for this project within 90 days of award of contract.

- E. Document Review:
  - 1. Submit certification in writing that all design drawings and specifications have been reviewed, and comment on potential problems within 90 days of award of contract.
- F. Maintenance Data: Submit maintenance and operating data that include how to test, adjust, and balance the building systems. Include this information in maintenance data specified in Division 01.
- G. Certified Reports: Submit testing, adjusting, and balancing reports bearing the seal and signature of Test and Balance Engineer. Reports shall be certified proof that systems have been tested, adjusted, and balanced in accordance with referenced standards; are an accurate representation of how systems have been installed; are true representation of how systems are operating at completion of testing, adjusting, and balancing procedures; and are accurate record of final quantities measured, to establish normal operating values of the systems. Follow procedures and format specified below:
  - 1. Report Format: Report forms shall be those standard forms prepared by referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders. Provide binding edge labels with project identification and a title descriptive of contents. Divide contents of binder into divisions listed below, separated by divider tabs:
    - a. General Information and Summary
    - b. Air Systems
    - c. Hydronic (Closed Loop Supply and Return) Systems
    - d. Automatic Temperature Controls
    - e. Special Systems
    - f. Sound and Vibration Systems
  - 2. Report Contents: Provide following minimum information, forms and data:
    - a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency, Contractor, Owner, Architect, Engineer, and Project. Include addresses, and contact names and telephone numbers. Include certification sheet containing seal and name address, telephone number, and signature of Certified Test and Balance Engineer. Include in this division listing of the instrumentations used for the procedures along with proof of calibration.
    - b. Remainder of the report shall contain appropriate forms containing as minimum, information indicated on standard report forms prepared by AABC and NEBB, for each respective item and system. Prepare schematic diagram for each item of equipment and system to accompany each respective report form.
- H. Final submittal shall include but not be limited to following:
  - 1. List of equipment used to perform test and procedures.
  - 2. Equipment performance data and equipment curves with actual points of performance indicated on curves as compiled during balancing.
  - 3. Air Devices including VAV Boxes (supply, return and exhaust) and all air outlets.
  - 4. Duct traverse readings during balancing.
  - 5. Room sound power levels where requested by Owner or Architect.
  - 6. Hydronic system components flow rates, pressures and temperatures.
  - 7. On balance report documents record date and time of reading.

#### 1.4 QUALITY ASSURANCE

- A. Agency Qualifications:
  - 1. Employ services of independent testing, adjusting, and balancing agency meeting qualifications specified below, to be single source of responsibility to test, adjust, and balance the building heating, ventilating and air conditioning systems to produce design objectives. Services shall include checking installations for conformity to design, measurement and establishment of fluid quantities of mechanical systems as required to meet design specifications, and recording and reporting results.
  - 2. Certified by National Environmental Balancing Bureau (NEBB) or by Associated Air Balance Council (AABC) in those testing and balancing disciplines required for this project, and having at least one Professional Engineer registered in State in which services are to be performed, certified by NEBB or AABC as Test and Balance Engineer.
- B. Work shall be accomplished in accordance with specifications. Procedures specified shall be followed and, if not specifically described herein, in general, shall be in accordance with Associated Air Balance Council's National Standards or National Environmental Balancing Bureau's Procedural Standards.
- C. Design Review
  - 1. Review all design drawings and specifications. Review shall include:
    - a. Duct pressure classification
    - b. Control device location and balancing devices location in duct systems and piping systems.
    - c. Indicate additional balancing devices required for proper balancing.
    - d. Specifications on all devices required for balancing.
    - e. Note any potential noise problems.
  - 2. Within 90 days of award of contract, meet with the Architect, Mechanical Contractor, and Building Automation System Contractor to review procedures and agenda and comments on design documents as to potential problem areas.
- D. Shop Drawing Review
  - 1. Review "Instrumentation and Control for HVAC" shop drawing submittals noting any potential balancing problems. Note comments on submittal, sign, stamp and return to General Contractor. All "Instrumentation and Control for HVAC" submittals must be reviewed by balancing agency prior to review by Architect.
- E. Pre-Balancing Conference: Prior to beginning of testing, adjusting, and balancing procedures, schedule and conduct conference with Architect and representatives of installers of mechanical systems. Objective of conference is final coordination and verification of system operation and readiness for testing, adjusting, and balancing.
- F. During construction, balancing agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of heating, ventilating, and air conditioning systems. Inspections shall be performed periodically as work progresses. Minimum of two inspections are required as follows: (1) when 60 percent of ductwork is installed; (2) when 90 percent of equipment is installed. Balancing agency shall submit brief written report of each inspection to Owner and Architect.
- G. Standards:

- 1. Associated Air Balance Council (AABC) Publication:
  - National Standards for Testing and Balancing Heating, Ventilating and Air a. Conditioning Systems, Latest Edition.
- 2. American Society of Heating, Refrigeration and air Conditioning Engineers (ASHRAE) Publications:
  - "ASHRAE Research Report No. 1162, "Air Flow Measurements at Intake a. and Discharge Openings and Grilles," ASHVE Transactions, Volume 46. b. ASHRAE Handbook of Fundamentals, Latest Edition.
  - American National Standards Institute (ANSI) Publications:
- 3. 4. National Environmental Balancing Bureau (NEBB)
  - Procedural Standards for Testing-Balancing- Adjusting of Environmental a. Systems, Latest Edition.
- Sheet Metal and Air Conditioning Contractors National Association Inc. 5. (SMACNA) - Air Duct Leakage Test Manual, Latest Edition.
- 6. Virginia Uniform Statewide Building Code (USBC).

#### 1.5 **OWNER'S INSTRUCTIONS**

A. Balancing contractor's technician along with his balancing engineer shall provide to Owner's engineers on balancing methods, procedures and equipment. Record instruction sessions. Provide the owner three copies of the recordings in digital versatile disk (DVD) format.

#### PART 2 **PRODUCTS (NOT USED)**

#### PART 3 **EXECUTION**

#### 3.1 SYSTEM BALANCE - GENERAL REQUIREMENTS

- Α. Balance heating, ventilating, and air conditioning to obtain air and water quantities indicated and required for proper operation of system.
- Β. Field work performed under this Section shall be provided under direct supervision of a **Registered Professional Engineer.**
- C. Furnish services for complete adjustment of water systems and air handling and exhaust systems, water, and air distribution and controls.
- D. During all tests, it shall be demonstrated that systems shall be free from leaks and all parts of system will operate correctly. If not, report deficiencies to Contractor and Owner. Balancing Firm shall make final adjustments to equipment as may be required for proper operation, maintaining correct temperatures in all parts of the building. Controls shall be adjusted by "Instrumentation and Control for HVAC" technicians in conjunction with Balancing Firm. Coordinate setpoints and adjustments with "Instrumentation and Control for HVAC."
- E. Preliminary Work:
  - 1. Inspect project site prior to starting adjustments to verify completion of trades, including general construction, piping system, ductwork system, building automation systems, and electrical systems, as they relate to balancing work. Verification shall include but not be limited to following:
    - Ductwork System: a.
      - Duct joints sealed. 1)
      - 2) Witness leakage tests required under sheet metal section.

12/23/2021

### TESTING, ADJUSTING AND BALANCING FOR HVAC **SECTION 15990 - 4**

- 3) Dampers and control devices installed.
- b. Piping System (hydronic):
  - 1) Already cleaned and flushed by mechanical contractor.
  - 2) Chemical treatment operating, or applicable to system.
  - 3) System filled and vented of air under Division 15.
  - 4) Proper isolation valves, temporary bypasses and other means and methods provided to allow the building to be balanced without affecting other buildings.
- c. Proper direction of rotation for motor-driven equipment and for proper speed on multi-speed motors.
- d. Balancing devices are installed and accessible.
- e. Control device connections.
- f. Note problems in general construction of the building that might effect systems performance such as sealing of windows, building joints, exhaust shafts, etc.
- g. Problems discovered during this inspection shall be reported to General Contractor and Owner.
- 2. Contractor shall certify in writing that each piping system has been prepared as per this Section, indicating dates procedures were done and which contractor did work. Submit in writing to Architect before beginning balancing work.
- F. Balancing of hydronic systems and parts installed under this Contract to obtain water quantities and temperature drops in all parts of system shown on plans, in specifications, on approved shop drawings or as required by Architect.
- G. Balancing of heating and air conditioning, exhaust and ventilating systems to achieve air quantities specified at each air inlet, outlet, or damper shown on plans at proper conditions of static pressure and temperature differential.
- H. Study and report on excessive noise conditions, which may develop during system balancing. Report shall be sent to Architect.

# 3.2 AIR SYSTEM BALANCE

- A. In conjunction with "Instrumentation and Control for HVAC", equipment shall be started per design sequence. Determine fan airflow at rated speed. If airflow is not within 10% of design capacity at rated speed, review system conditions, procedures, and recorded data. Check and record pressure drops across filters, compensate for clean versus dirty filters, coils, sound traps, airflow sensors, etc., to indicate excessive pressure loss or leakage. Resolve problems with appropriate contractor. If systems are properly operating, and airflow is still unacceptable, adjust fan drive in accordance with manufacturer's recommendations to obtain proper airflow and static pressure. Systems shall be balanced and operated at lowest feasible static pressure with allowance for filter loading. Record fan suction pressure, fan discharge pressure, amperage and airflow measurement. Correct fan curves to indicate new points of balance. Fan motor shall not be overloaded.
- B. With fan systems adjusted and dampers set to handle normal minimum outdoor air, perform following tests and compile following information:
  - 1. Air Handling Equipment
    - a. Design Conditions
      - 1) Supply, Return and Exhaust Airflow
      - 2) Static and Total Pressure
      - 3) Outdoor Airflow
      - 4) Motor rating
      - 5) Fan speed

- 6) Outlet Velocity
- b. Installed Equipment
  - 1) Manufacturer
  - 2) Motor serial number
  - 3) Motor type and efficiency, rating, voltage, phase, full-load amperes.
  - Field Test

c.

- 1) Fan speed
- 2) No-load operating amperes
- 3) Fan motor operating amperes
- 4) Calculated motor output
- d. Test for Total Air
  - 1) Sum of discharge, exhaust, return air and outside air ducts.
  - 2) Number and locations of velocity readings taken.
  - 3) Duct average velocity
  - 4) Total airflow
- e. After completion of tests, adjustments, and balancing under minimum outdoor air conditions, set system for 100% outdoor air. Repeat the total airflow tests to check field versus design conditions. Results under 100% outdoor air cycle shall agree with conditions found under "minimum fresh air operation" before system is considered to be in balance. Adjustments of proper dampers shall be made to achieve balance.
- C. With supply, return, and exhaust systems properly adjusted for airflow and static pressure, conduct following test, adjustments and compilation of data:
  - 1. Duct Mains and Branches:
    - a. Adjust, measure and record airflow, static pressure of duct mains and branch ducts to provide required pressure and airflow at terminal devices.
  - 2. Terminal Devices:
    - a. Manufacturer, Model No. and Size of airflow control terminal units (supply, return and exhaust).
    - b. Inlet velocity, static pressure, minimum and maximum airflow setpoints of valves.
    - c. Outlet airflow of valve.
    - d. Adjust minimum or maximum setting of valves as required to obtain required airflow of outlets in accordance with manufacturer's procedures and recommendations.
    - e. In conjunction with "Instrumentation and Control for HVAC", operate controls, i.e., thermostats, switches and pressure controls in accordance with design sequence to verify proper operation.
    - f. Report control problems in writing to the Contractor. Resolve sequence problems with Section "Instrumentation and Control for HVAC", the Contractor and Architect at no additional cost.
    - Air Outlets (supply, return and exhaust registers diffusers and grilles)
      - a. Manufacturer, model number, size of outlet and number of throw directions.
        - b. Design and actual airflow.
        - c. Adjust outlets to obtain design airflow within +5%.
        - d. Adjust direction of throw as required to match final installation location to prevent drafts.
        - e. With supply, return and exhaust balanced to design airflow, report room pressurization, (positive or negative). Report pressure readings relative to adjacent spaces only where requested by Owner or Architect.
- D. Sheaves And Belts:

3.

1. Should the air balance not meet acceptable industry standard tolerances as

referenced herein, change and replace sheaves and belts to provide a final acceptable air balance. Replacement of sheaves and belts shall be provided at no additional cost.

# 3.3 ACOUSTICS AND NOISE CRITERIA

A. Verify that mechanical systems comply with noise criteria as specified and indicated in Division 15. Where compliance is questionable or where requested by Owner, Architect or Contractor, take sound power level reading and record. Diagnose equipment causing deviations and report deviations to appropriate trade contractor and Contractor. Resolve noise problems with Contractor and appropriate Installer.

#### 3.4 CALIBRATION

A. During testing and balancing, inspect temperature sensors, pressure sensors, humidity gauges, digital indicators, and thermometers, provided under Division 15. Report discrepancies to the Contractor for replacement or recalibration.

#### 3.5 **RE-BALANCE**

A. After Architect's review of test and balance report submittal, make adjustment in any balancing point as required by Architect, to correct discrepancies between balance report and design, at no additional cost.

# 3.6 FINAL BALANCE

A. Visit site within one year after building occupancy if necessary to adjust and rebalance, any system required by Owner, to resolve any and all complaints. After final balance, revise previous submittal and resubmit to architect for record purpose. Rebalance and resubmittals shall be done at no additional cost to Owner.

### **END OF SECTION**