# PROJECT MANUAL

for construction of

# Stockton University Multicultural Center

101 Vera King Farris Drive Galloway, NJ 08205



Prepared by OCA Architects, Inc.

211 Warren Street Suite 218 Newark, NJ 07103 Telephone 973.732.0656 Fax 973.732.0657 www.oca-archplan.com

*Issued for Bid* 09.01.2021 Project Number P21–008

# PROJECT MANUAL

for construction of

# Stockton University Multicultural Center

101 Vera King Farris Drive Galloway, NJ 08205

Prepared by

## **OCA** Architects, Inc.

211 Warren Street Suite 218 Newark, NJ 07103 Telephone 973.732.0656 Fax 973.732.0657 www.oca-archplan.com

*Issued for Bid* 09.01.2021 Project Number P21–008

Date

September 1, 2021 Issued for Bid

#### TABLE OF CONTENTS

#### PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

#### **INTRODUCTORY INFORMATION**

Date	Section.No.	Title
09-01-21	00 01 10	Table of Contents

#### **PROCUREMENT & CONTRACTING REQUIREMENTS**

Section.No.Title00 60 01Submittal Transmittal00 60 04Data Transfer Agreement00 60 05Subcontractors and Major Material Suppliers List00 60 06Request for Interpretation00 60 07Substitution Request00 60 08Bulletin

#### SPECIFICATIONS GROUP

#### GENERAL REQUIREMENTS SUBGROUP

#### **DIVISION 01 - GENERAL REQUIREMENTS**

Section.No.	Title
01 10 00	Summary
01 23 00	Alternates
01 25 00	Substitution Procedures
01 26 00	Contract Modification Procedures
01 26 13	Requests for Interpretation (RFI)
01 29 00	Payment Procedures
01 31 00	Project Management and Coordination
01 32 00	Construction Progress Documentation
01 32 33	Photographic Documentation
01 33 00	Submittal Procedures
01 40 00	Quality Requirements
01 42 00	References
01 50 00	Temporary Facilities and Controls
01 60 00	Product Requirements
01 73 00	Execution
01 74 19	Construction Waste Management and Disposal
01 77 00	Closeout Procedures
01 78 23	Operation and Maintenance Data
01 78 39	Project Record Documents
01 79 00	Demonstration and Training
	$\begin{array}{c} \textit{Section.No.}\\ 01\ 10\ 00\\ 01\ 23\ 00\\ 01\ 25\ 00\\ 01\ 25\ 00\\ 01\ 26\ 00\\ 01\ 26\ 13\\ 01\ 29\ 00\\ 01\ 31\ 00\\ 01\ 32\ 00\\ 01\ 32\ 00\\ 01\ 32\ 00\\ 01\ 32\ 00\\ 01\ 40\ 00\\ 01\ 42\ 00\\ 01\ 40\ 00\\ 01\ 42\ 00\\ 01\ 50\ 00\\ 01\ 60\ 00\\ 01\ 73\ 00\\ 01\ 74\ 19\\ 01\ 77\ 00\\ 01\ 78\ 23\\ 01\ 78\ 39\\ 01\ 79\ 00\\ \end{array}$

#### FACILITY CONSTRUCTION SUBGROUP

#### **DIVISION 02 – EXISTING CONDITIONS**

Date	Section.No.	Title
09-01-21	02 41 19	Selective Demolition

#### DIVISION 03 - NOT USED

#### **DIVISION 04 – MASONRY**

Date	Section.No.	Title
09-01-21	04 22 00	Concrete Unit Masonry
09-01-21	04 72 00	Cast Stone Masonry

#### **DIVISION 05 – METALS**

Date	Section.No.	Title
09-01-21	05 40 00	Cold-Formed Metal Framing
09-01-21	05 50 00	Metal Fabrications

-----

#### **DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES**

Date	Section.No.	Title
09-01-21	06 10 00	Rough Carpentry
09-01-21	06 16 00	Sheathing
09-01-21	06 40 23	Interior Architectural Woodwork

#### **DIVISION 07 – THERMAL AND MOISTURE PROTECTION**

Date	Section.No.	Title
09-01-21	07 21 00	Thermal Insulation
09-01-21	07 27 13	Modified Bituminous Sheet Air Barriers
09-01-21	07 42 13	Metal Composite Material Wall Panels
09-01-21	07 62 00	Sheet Metal Flashing and Trim
09-01-21	07 84 13	Penetration Firestopping
09-01-21	07 92 00	Joint Sealants

#### **DIVISION 08 – OPENINGS**

Date	Section.No.	Title
09-01-21	08 11 13	Hollow Metal Doors and Frames
09-01-21	08 14 16	Flush Wood Doors
09-01-21	08 14 33	Stile and Rail Wood Doors
09-01-21	08 31 13	Access Doors and Frames
09-01-21	08 41 13	Aluminum-Framed Entrances
09-01-21	08 41 26	All-Glass Entrances
09-01-21	08 44 13	Glazed Aluminum Curtain Wall
09-01-21	08 71 00	Door Hardware
09-01-21	08 71 13	Automatic Door Operators
09-01-21	08 80 00	Glazing
		_

#### **DIVISION 09 – FINISHES**

Date	Section.No.	Title
09-01-21	09 22 16	Non-Structural Metal Framing
09-01-21	09 29 00	Gypsum Board
09-01-21	09 30 00	Tiling
09-01-21	09 51 13	Acoustical Panel Ceilings
09-01-21	09 54 26	Wood Panel Ceilings
09-01-21	09 65 13	Resilient Wall Base and Accessories
09-01-21	09 65 19	Resilient Tile Flooring
09-01-21	09 68 13	Tile Carpeting
09-01-21	09 91 00	Painting

#### **DIVISION 10 – SPECIALTIES**

Date	Section.No.	Title
09-01-21	10 11 00	Visual Display Surfaces
09-01-21	10 22 39	Sliding Glass Panel Partitions
09-01-21	10 31 00	Manufactured Gas Fireplaces
09-01-21	10 44 00	Fire Protection Specialties

#### **DIVISION 11 – EQUIPMENT**

Date	Section.No.	Title
09-01-21	11 31 00	Pantry Appliances

#### **DIVISION 12 – FURNISHINGS**

Date	Section.No.	Title
09-01-21	12 36 61	Simulated Stone Countertops

DIVISION 13 – NOT USED DIVISION 14 – NOT USED

#### FACILITY SERVICES SUBGROUP – Indexed Separately

#### **SITE AND INFRASTRUTURE SUBGROUP** – Indexed Separately

#### PROCESS EQUIPMENT SUBGROUP – NOT USED

#### END OF TABLE OF CONTENTS



### SUBMITTAL TRANSMITTAL

Project: <b>Stockt</b>	on University Multicultu	Date: A/E Project Numb	er: <b>P21-008</b>			
FRANSMITTAL	To (Contractor):	Date:	Submittal No.			
Α	From (Subcontractor):	Ву:	Resubmission			
Qty. Refere Numbe	nce / Title / Descrip er Manufacturer	tion /	Spec. Section Title and Paragraph Drawing Detail Reference			
Submitted for re Resubmitted for Complies with o Will be availab	eview and approval r review and approval contract requirements le to meet construction schedule	☐ Substitution inv ☐ If substitution i comparative da ☐ Items included	volved - Substitution request attached involved, submission includes point-by-point ta or preliminary details in submission will be ordered			
A/E review time Other remarks on a	bove submission:	immediately up	On receipt of approval			
RANSMITTAL	To (A/E):	Attn:	Date Rec'd by Contractor:			
B	From (Contractor):	By:	Date Trnsmt'd by Contractor:			
Approved Approved as no	ted	Revise / Result     Rejected / Res	bmit submit			
Other remarks on a	bove submission:		One copy retained by sende			
RANSMITTAL	To (Contractor):	Attn:	Date Rec'd by A/E:			
С	From (A/E):	Other By:	Date Trnsmt'd by A/E:			
Approved Approved as no	ted	<ul><li>Provide file co</li><li>Sepia copies o</li></ul>	opy with corrections identified nly returned			
No action requi	red nit	Point-by-point to complete ap	Point-by-point comparative data required to complete approval process			
Approved as no	ted / Resubmit	Submission In	Submission Incomplete / Resubmit			
Other remarks on a	bove submission:		One copy retained by sender			
RANSMITTAL	To (Subcontractor):	Attn:	Date Rec'd by Contractor:			
		By:	Date Trnsmt'd by Contractor:			
D	From (Contractor):	By:				

# **Data Transfer Agreement**

Entity Red (Transfer	questing Data ee)	Transferee Contact Name			
Project	Stockton University Multicultural Center	Project Number P21-008			
Client	Stockton University	Date			
		File			

Transferee has asked OCA Architects to provide electronic copies of, or access to, certain drawings, specifications, or other documents, CAD data files, and/or building information models (collectively, "Data") prepared by OCA Architects and/or its consultants (collectively "OCA") for the Project. OCA agrees to provide Transferee with the requested Data, under the terms of this Data Transfer Agreement ("Agreement").

- 1. The transfer of the Data is not and shall not be deemed a sale. The Data are instruments of service. OCA shall be deemed the Data's author and shall retain all proprietary rights, including any copyrights, embodied therein.
- 2. Transferee may transfer the Data to its contractors, subcontractors, suppliers, and consultants (collectively "Others"), provided Transferee requires the Others to be bound by this Agreement as if they were the Transferee in this Agreement. Transferee and Others shall use the Data only for purposes related to the Project.
- 3. Transferee acknowledges that anomalies and errors may occur when the Data is transferred electronically or used in an incompatible computer environment. Transferee solely accepts the risks associated with, and the responsibility for, any damages to hardware, software, computer systems, or networks related to the Data's transfer or use. OCA shall have no responsibility to provide software or training to allow Transferee to use the Data.
- 4. OCA shall have no duty to modify or update the Data. OCA may retain an archival copy of the Data, which shall be conclusive proof and govern in any dispute over the Data's form or content.
- 5. Transferee agrees to indemnify, defend and hold OCA, its officers, directors, shareholders, employees, agents, and consultants harm less from and against any and all claims, liabilities, suits, demands, losses, damages, costs, and expenses, including, but not limited to, reasonable attorneys' fees and all legal expenses and fees incurred through appeal, and all interest thereon, accruing to or resulting from any and all persons, firms or any other legal entities on account of any damages or losses to property or persons, including, but not limited to, injuries, death or economic losses, arising out of Transferee's or Others' use, reuse, transfer, or modification of the Data, except where a court or forum of competent jurisdiction determines that OCA is solely liable for such damages or losses.
- 6. If Transferee fails to perform or observe any of the terms of this Agreement, OCA may demand and Transferee immediately shall return the Data and any copies thereof.
- 7. To the extent the Data includes building information models ("Models"), the parties agree to the following additional terms: (i) The Models are intended for the purpose of communicating design intent. While the Models may be helpful to illustrate conflicts or inconsistencies in the design, the Models may not detect all conflicts or inconsistencies. (ii) Any use of the Models for the purpose of generating quantity take-offs or cost estimates, or for fabrication, shall be at the Transferee's sole risk. (iii) As with OCA's other services and deliverables, the Models will be prepared using that degree of skill and care exercised by licensed professionals practicing in the same community, under the same or similar circumstances. The Models may contain, or be based upon, data or information provided by others. OCA has relied upon such data or information as is consistent with the standard of care. (iv) Information contained in the Models shall not be construed to dictate construction means or methods, which shall remain the Contractor's responsibility. (v) To the extent of any conflict between information contained in, or generated by, the Models and OCA's drawings and specifications, the drawings and specifications shall prevail.
- 8. This Agreement shall be governed by the laws of the State of New Jersey.
- 9. In any legal proceeding to enforce this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs of defense.
- 10. Unless otherwise explicitly agreed to in writing by the parties, this Agreement shall govern any and all future data transfers to Transferee by OCA.

#### **OCA Authorization by**

Date Signed

Principal or Managing Principal's name and signature here

Transferee Authorization by

Date Signed

Authorized name and signature here

(%)	Advancerm of Construc Technology	ent ction					MAJOR	SUBCON	<b>TTRACTO</b> SUPPLIH	ORS AND ERS LIST
Project:	Stockton I	University Mult	icultural Cer	ıter		From (Contracto	r):			
To (A/E):	OCA Arch	itects				Date:	nber: P21-008			
List Subco	intractors and M	fajor Material Supplie	rs proposed for us	e on this Project	t as required by the C	Contract For:	nents. Attach supple	mental sheets if necessa	łry.	
Section Number	Sectio Title	u	Firm		Address			Phone Number (Fax Number)	Contact	
☐ Attachr	ments									
Signed by:								Date:		
Copies: [	Owner	Consultants								File
© Copyright 601 Madisor	it 1994, Constructi in Street, Alexandi	ion SpecificationsInstitut ria, VA 22314-1791	ຳ		Page	of				July 1994 CSI Form 1.5A

Project	Stockton University Multicultural Center	RFI Number	
То		Date	
Attentio	n	Project Number P21-008	·
From		File	
Issued E	Зу	Drawing Sheet / Location	
Subject		Detail	
Distribu	tion	Specifications Page Number	
		This is page 1 of	

### Problem, Cause and Proposed Solution (attach sketches as necessary)

Effect on Schedule

Effect on Cost

Reply

Reply Needed by

Signature

Date

# Substitution Request

Proj	ect	Stockton University Multicultural Ce	nter Date	
Proj	ect Location	101 Vera King Farris Drive Galloway, NJ 08205	Project Number	P21-008
Gene	eral Contractor		File	
Prep	ared by		This is page	1 of
We c	ertify that the fol	lowing product is equal or superior to the specified product is for your consideration as a substitute for the specified it	ct in appearance, durability, performance	ce, and in every other respect,
1.	Specified Item		Section	
2.	Proposed Subs	titution		
3.	Reason for Sub	ostitution		
4.	<b>Costs</b> (Provide a accepted. Includ	a complete breakdown of costs, including the cost amount for both materials and labor.)	to be DEDUCTED from the Contract Sun	n if the proposed substitution is
5.	Schedule (Desc	ribe substitution's affect on construction schedule)		
6. 7.	Supporting Dat Cutsh Instal propo Samp perfor List ways in wi	ta eets: Attach complete technical data, including labor lation: Include complete information on changes to I sed substitution will require for its proper installatio les: Submit with request all necessary samples and s mance to that which is specified. hich the substitution affects dimensions shown on Dr	atory tests, if applicable. Drawings and/or Specifications desc n. ubstantiating data clearly marked to awings	ribing the steps that the o prove equal quality and
8.	List affects of	proposed substitution on other trades		
9.	List ways in wl	nich proposed substitution will be affected by applica	ble code requirements and agency a	approval
10.	List differences	s between proposed substitution and specified item		
11. Expl	Manufacturer's ain:	warranties of the proposed and specified items are:	🗌 Same	Different
12.	List informatio	n on availability of maintenance service and source c	of replacement materials	
13.	Certification of	, and Assumption of Liability for, Equivalent Perform	ance	
The ι full c	undersigned certif compliance with th	ies that the function, appearance and quality of the propose contract Documents and applicable regulatory requirements	ed substitution is equivalent or superio	r to the specified item and is in
Supp	plier		Signature	
Tele	phone No.		Date	
Signa retra	ature must be by ction of approval.	person authorized to legally bind his/her firm to the at	pove terms. Failure to provide legally l	binding signature will result in
Cont	tractor		Signature	
Tele	phone No.		Date	

## **Bulletin Number**

Project	Stockton Uni	versity Mult	icultı	ural Center		Date	
Project Location	101 Vera King F Galloway, NJ 08	arris Drive 205				Architect's	s Project Number P21-008
Owner/Client						File	This is page 1 Of
То						Attention	
Address							
City						State	Zip Code
Delivered via:		Messenger		Hand carried		Facsimile	
		Express		Pick-up		E-mail Addre	SS
		Mail		UPS		Website Addı	ess
This Bulletin Con	veys to Contractor	(Check one of the f	ollowing	five choices.):			
Architect's A Architect recor	uthorization for Min nmends modifications larification / Supple	or Changes to the Work as des mental Instruction	scribed ons (Us	below. e this Bulletin form	in place of	Architect's Sup	plemental Instructions form.)
Contractor shall carry out the Work in accordance with the following supplemental instructions.							
Architect's Confirmation of a Field Order (Use this Bulletin form in place of a Field Order form.) This confirms Architect's verbal instructions to (individual's name) on (date), as described below.							
Note: The above three choices are each subject to the following terms: The change(s), clarification(s) and/or confirmation(s) described below is/are issued in accordance with the Contract Documents, without change in Contract Sum and/or Time.							
<ul> <li>Architect's Request for Contractor's Proposal (Use this Bulletin form in place of an <i>Estimate Request</i> form.)</li> <li>Please submit an itemized proposal for changes in the Contract Sum and/or Time for proposed modifications to the Contract Documents described herein. Submit proposal within days or notify the Architect in writing of the date on which you anticipate submitting your proposal. This is not a Change Order or a Construction Change Directive or a direction to proceed with the Work described in the proposed modifications.</li> <li>Other: As described below.</li> </ul>							
Attachments							
Requested by							
Architect	Owner	Contractor		Other (specify):			
Issued by OCA A	rchitects by					Date Sign	ed
Issued by Owner	r by					Date Sign	ed
Required; Ple	ase return signed cop	y to OCA		Not Required			
Accepted by Con	tractor by		Ξ.			Date Sign	ed
Distribution	ase return signed cop	y to OCA		Not Required			
Prepared by OCA	Architects by					Date Sign	ed
Instructions / Do	escription / Referen	ces / Dates					

**OCA** 

Begin text here...

#### SECTION 01 10 00 - SUMMARY

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Specifications format and drawing conventions.
  - 4. Codes and standards.

#### 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to the Work of all Sections in the Specifications. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.
- B. Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:
  - 1. Contract modifications (such as Change Orders and Bulletins) of later date take precedence over those of earlier date;
  - 2. the Agreement;
  - 3. Addenda of later date take precedence over those of earlier date;
  - 4. the Supplementary Conditions;
  - 5. The General Conditions;
  - 6. Drawings and Specifications; Drawings govern Specifications for quantity and location. Specifications govern Drawings for quality and performance. In the event of ambiguity or conflicts, the greater quantity and the better quality shall govern.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: The Project consists of exterior and interior improvements to create a new Multicultural Center for Stockton University.
- B. Architect Identification: The Contract Documents were prepared for this Project by OCA Architects, Inc.; 211 Warren Street, Suite 218, Newark, NJ 07103.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Project includes the following:

- 1. Civil work.
- 2. Landscape work.
- 3. Architectural work including interiors.
- 4. Miscellaneous structural work.
- 5. Mechanical work.
- 6. Electrical work.
- 7. Plumbing work.
- 8. Fire protection work.

#### 1.5 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period.
  - 1. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - 2. Driveways and Entrances: Keep driveways, parking areas, loading areas, and entrances serving premises clear and available to Owner, building occupants, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- B. Access: At all times, provide the Architect and its Consultants easy and safe access to the Work wherever it is in preparation and progress.

#### 1.6 WORK RESTRICTIONS

- A. General:
  - 1. Work Hours: Comply with Owner's requirements.
  - 2. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving occupied facilities unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Owner's written permission.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to building occupants with Owner.
  - 1. Notify Owner not less than 72 hours in advance of proposed disruptive operations.
  - 2. Obtain Owner's written permission before proceeding with disruptive operations.

#### 1.7 SPECIFICATIONS FORMAT AND DRAWING CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 50-division format of the Construction Specifications Institute's (CSI) "MasterFormat" numbering system.
  - 1. Division 01: Sections in Division 01 govern the execution of the Work of all Sections in the Specifications.
- B. Specification Content: The 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 inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be 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. 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.
  - 3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

#### 1.8 CODES AND STANDARDS

A. All references to codes, specifications and standards referred to in the Contract Documents shall mean, and are intended to be, the edition indicated in the corresponding construction subcode that governs the work or portion of the work indicated.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION (Not Applicable)

#### END OF SECTION 01 10 00

#### SECTION 01 25 00 - SUBSTITUTION PROCEDURES

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
  - 1. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
  - 2. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

#### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### 1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use form provided as Document 00 60 07 "Substitution Request."
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, necessary to accommodate proposed substitution.
- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. Certificates and qualification data, where applicable or requested.
- g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES or from a model code organization acceptable to authorities having jurisdiction.
- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
  - a. Forms of Acceptance: Change Order, Construction Change Directive, Bulletin or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### 1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

#### 1.6 PROCEDURES

A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

#### PART 2 - PRODUCTS

#### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 25 00

#### SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
  - 1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

#### 1.3 MINOR CHANGES IN THE WORK

A. Architect may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710 or "Bulletin" form included as Document 00 60 08.

#### 1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. AIA Document G709/Proposal Request or "Bulletin" form with "Architect's Request for Contractor's Proposal" indicated, issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 5 days after receipt of Proposal Request, unless otherwise specified in Bulletin, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.

- d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals (Change Order Request): If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
  - 1. Include a statement outlining 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 the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use form acceptable to Architect.

#### 1.5 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or other form acceptable to Owner.

#### 1.6 CONSTRUCTION CHANGE DIRECTIVE

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

#### PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 26 00

#### SECTION 01 26 13 - REQUESTS FOR INTERPRETATION (RFI)

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Requests for Interpretation.

#### 1.3 DEFINITIONS

A. Requests for Interpretation (RFI): Contractor initiated written instrument related to the execution of the Work that is addressed to the Architect. The RFI shall be used by the Contractor as the means to ask questions related to the Work; subject to the conditions contained within this Section.

#### 1.4 ACTION SUBMITTALS

- A. Requests for Interpretation: Include a detailed, legible description of an item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Reference to appropriate documents:
    - a. Specification Section number and title and related paragraphs.
    - b. Drawing number and detail references.
    - c. Schedule.
    - d. Bulletin number.
    - e. Other Contract Documents, if any.
  - 9. Field dimensions and conditions, as appropriate.
  - 10. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 11. Contractor's and RFI Manager's signature.

- 12. 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.
- B. RFI Forms: Use "Request for Interpretation" form provided as Document 00 60 06 in Project Manual.
  - 1. Attachments shall be electronic files in Adobe Acrobat PDF format.

#### 1.5 INFORMATIONAL SUBMITTALS

- A. RFI Log: Prepare, maintain, and submit a tabular log of RFI organized by the RFI number. Submit log weekly. Include the following:
  - 1. Project name.
  - 2. Name and address of Contractor.
  - 3. Name and address of Architect.
  - 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.

#### 1.6 QUALITY ASSURANCE

- A. Authorship: Prior to the commencement of the RFI process, designate a full time "RFI Manager" whose duties shall include the responsibility for enforcing the Request for Interpretation provisions of this Section, to maintain an up-to-date log of all RFI, advise the Architect, in writing, of the status and disposition of all RFI at the progress meetings, and be a member of the Contractor's staff. The RFI Manager shall be experienced in administration and supervision of the type of Work indicated on the Contract Documents.
  - 1. RFI Manager may be the Contractor's Job Superintendent.
  - 2. Each RFI shall originate solely from the RFI Manager. An RFI submitted to the Architect by an entity, or individual, other than the RFI Manager shall be returned to the Contractor.

#### 1.7 ADMINISTRATIVE REQUIREMENTS

- A. Processing Time: Allow five working days for Architect's response for each RFI. RFI received by Architect after 3:00 p.m. will be considered as received the following business day.
  - 1. Allow additional time if coordination with other work is required. Architect will advise Contractor when a RFI being processed must be delayed for coordination.
  - 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.

- B. Architect's action on RFI that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Proposal Request according to Section 01 26 00 "Contract Modification Procedures."
  - 1. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- C. Frivolous RFI:
  - 1. RFI shall not be used for the following:
    - a. Request for approval of submittals.
    - b. Request approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Request for adjustment in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Requests for coordination information already indicated in the Contract Documents, or to transfer coordination responsibility from the Contractor to the Owner or Architect.
    - g. Incomplete RFI or inaccurately prepared RFI.
  - 2. The Owner reserves the right to assess the Contractor for the cost (based on time and materials) of a RFI response performed by the Architect, and any of its consultants, which is deemed by the Owner and the Architect as being frivolous or unnecessary.
  - 3. Frivolous RFI shall be removed from the RFI log.

#### 1.8 COORDINATION

- A. Coordination: Coordinate preparation and processing of RFI with performance of construction activities.
  - 1. Submit RFI with such promptness as to cause no delays in the Work. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the Architect.

#### PART 2 - PRODUCTS (Not Applicable)

#### PART 3 - EXECUTION

#### 3.1 CONTRACTOR'S ACTION

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI in the form specified.
- B. Prior to submission of the RFI, coordinate the nature of the inquiry with the requirements of other Sections or trades as related thereto and responses to previous RFI.

- C. Complete each blank on the RFI form.
- D. In preparing each RFI, verify the applicable dimension(s), field conditions, Drawing requirements (small through large scale details), and/or Specification Section requirements pertaining thereto.
- E. Each RFI shall be reviewed, and signed by the RFI Manager prior to transmitting to the Architect.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

#### 3.2 ARCHITECT'S ACTION

- A. Architect's Action: Architect will review each RFI, determine action required, and respond.
  - 1. Frivolous RFI will be returned without action.
- B. RFI which fail to conform to requirements, (for example, is incomplete or contain numerous errors) shall be returned to the Contractor without a response. No adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to requirements.

END OF SECTION 01 26 13
### SECTION 01 29 00 - PAYMENT PROCEDURES

# PART 1 - GENERAL

# 1.1 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.

#### 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
  - 1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule.

#### 1.3 DEFINITIONS

- A. Site Visit: Architect's visits to the site at intervals necessary in the judgment of Architect to become generally familiar with the progress and quality of the Work completed and to determine in general if the Work completed is in accordance with the Contract Documents. Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work.
- B. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

#### 1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
  - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with Continuation Sheets.
    - b. Submittals Schedule.
    - c. Items required to be indicated as separate activities in Contractor's Construction Schedule.

- 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the Schedule of Values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Project Manager's name and address.
    - e. Contractor's name and address.
    - f. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703.
  - 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest onehundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum. Break down principal subcontract amounts into separate labor and materials items. Breakdown of subcontractor's schedule of values must be true and accurate.
  - 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
  - 6. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or bonded warehousing only if off-site storage is permitted by Owner.
  - 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

- 8. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 9. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 10. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
- 11. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

### 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date of each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Payment Application Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
  - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration, if any.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and off-site, only if off-site storage is permitted by Owner.

- 1. Provide description of item(s) being stored.
- 2. Location of the bonded warehouse(s) where materials or equipment is stored, only if offsite storage is permitted by Owner.
- 3. Bill of sale made to Owner stating there will be no additional cost for transportation and delivery of the stored item(s).
- 4. Statement certifying that item or any part thereof will not be installed in any construction other than Work under this Contract.
- 5. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
- 6. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
- 7. Provide summary documentation for stored materials indicating the following:
  - a. Materials previously stored and included in previous Applications for Payment.
  - b. Work completed for this Application utilizing previously stored materials.
  - c. Additional materials stored with this Application.
  - d. Total materials remaining stored, including materials with this application.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit notarized waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit final or full waivers.
  - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  - 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors, principal suppliers and fabricators.
  - 2. Schedule of Values.
  - 3. Contractor's Construction Schedule (preliminary if not final).
  - 4. Products list (preliminary if not final).
  - 5. Submittals Schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. List of Contractor's principal consultants.

- 8. Copies of building permits.
- 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
- 10. Initial progress report.
- 11. Report of preconstruction conference.
- 12. Certificates of insurance and insurance policies.
- 13. Performance and payment bonds, if provided under the Construction Contract.
- 14. Data needed to acquire Owner's insurance.
- 15. Initial settlement survey and damage report if required.
- 16. Construction waste management program.
- I. Application for Payment at Substantial Completion: After issuance of the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. Occupancy permits and similar approvals or certifications by governing authorities and franchised services, assuring Owner's full access and use of completed work.
  - 3. Submit executed warranty and maintenance agreements.
  - 4. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements, including, but not limited to:
    - a. Transmittal of required Project Record Documents to Owner.
    - b. Evidence of completion of demonstration and training.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
  - 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
  - 6. AIA Document G707, "Consent of Surety to Final Payment."
  - 7. Evidence that claims have been settled.
  - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 9. Final liquidated damages settlement statement.

# 1.6 REVIEW OF APPLICATION FOR PAYMENT

A. Draft Copy: Submit draft (pencil) copy of the Application for Payment ten days prior to due date for review by Architect.

- B. Draft Copy Review Meeting: The Owner, Architect and Contractor shall meet prior to payment application due date to review the draft (pencil) copy of the Application for Payment. Questions resulting from this review shall be answered by the Contractor and clarified prior to receipt of the official copy of the Application for Payment.
- C. Upon receipt of the official Application for Payment and other documentation as required by the Architect including the updated Schedule of Values and the updated Contractor's Construction Schedule if required, the Architect shall review the documents received to determine if they correspond to the agreements reached during the draft copy review meeting. If necessary, the Architect shall revise the Application for Payment to correspond to the agreements reached, execute the Certificate for Payment, and forward the executed copies to the Owner.
- D. The Architect will rely on the accuracy and completeness of the information furnished by the Contractor. Issuance of a Certificate of Payment will not be deemed to represent that the Architect has performed audits of the supporting data.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 00

# SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

# PART 1 - GENERAL

# 1.1 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.

### 1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Conservation.
  - 3. Coordination Drawings.
  - 4. Administrative and supervisory personnel.
  - 5. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
  - 2. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Section 01 77 00 "Closeout Procedures" for coordinating Contract closeout.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities or as specified in individual Sections.
  - 1. Indicate relationship of components shown on separate Shop Drawings.
  - 2. Indicate required installation sequences.
  - 3. Refer to Divisions in the Facility Services Subgroup for specific Coordination Drawing requirements for mechanical and electrical installations.
- B. 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. Use CSI Form 1.5A provided as Document 00 60 05. 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.
- C. Key Personnel Names: Within 15 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.

# 1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in various Sections of the 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.
  - 4. Arrange pipes, ducts, conduits, and other overhead systems in an orderly manner when indicated to remain exposed.
- B. If necessary, 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.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities 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 Contractor's Submittal Schedule.
  - 3. Preparation of the Schedule of Values.
  - 4. Installation and removal of temporary facilities and controls.
  - 5. Delivery and processing of submittals.
  - 6. Progress meetings.
  - 7. Preinstallation conferences.
  - 8. Startup and adjustment of systems.

- 9. Project closeout activities.
- D. 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.

# 1.5 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. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - c. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    - d. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    - e. Indicate required installation sequences.
    - f. 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 subframing 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, access doors, cleanouts and electrical distribution equipment.
  - c. Fire-rated enclosures around ductwork.
- 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 firealarm 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.

#### 1.6 PROJECT MEETINGS

- A. General: 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.
  - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
  - 4. Notification: Inform participants three days prior to meetings not regularly scheduled.
- A. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 10 days after execution of the Agreement. Conduct the meeting to review responsibilities and personnel assignments.
  - 1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; testing laboratory representatives; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

- 2. Agenda: Discuss items of significance that could affect progress, including the following:
  - a. Requirements in individual Specification Sections for preconstruction responsibilities.
  - b. Tentative construction schedule.
  - c. Project coordination
  - d. Phasing.
  - e. Critical work sequencing and long-lead items.
  - f. Designation of key personnel and their duties.
  - g. Lines of communication.
  - h. Procedures for processing Requests for Interpretation (RFIs.)
  - i. Procedures for processing Bulletins.
  - j. Procedures for processing submittals.
  - k. Procedures for processing substitution requests.
  - 1. Procedures for processing field decisions, proposal requests and Change Orders.
  - m. Procedures for testing and inspecting.
  - n. Procedures for processing Applications for Payment.
  - o. Distribution of the Contract Documents.
  - p. Preparation of Record Documents.
  - q. Use of the premises.
  - r. Work restrictions.
  - s. Working hours.
  - t. Owner's occupancy requirements.
  - u. Responsibility for temporary facilities and controls.
  - v. Procedures for moisture and mold control.
  - w. Procedures for disruptions and shutdowns.
  - x. Construction waste management and recycling.
  - y. Office, work, and storage areas.
  - z. Equipment deliveries and priorities.
  - aa. First aid.
  - bb. Security.
  - cc. Progress cleaning.
- 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned within three days of the meeting.
- B. Preinstallation Conferences: Conduct a preinstallation 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 and Owner's Commissioning Authority (when applicable) 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 RFI.
    - d. Related Change Orders.

- e. Purchases.
- f. Deliveries.
- g. Submittals.
- h. Review of mockups.
- i. Possible conflicts.
- j. Compatibility requirements.
- k. Time schedules.
- 1. Weather limitations.
- m. Manufacturer's written instructions.
- n. Warranty requirements.
- o. Compatibility of materials.
- 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.
- C. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 30 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 when applicable, 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 preparing operations and maintenance data.
    - e. Requirements for delivery of material samples, attic stock, and spare parts.
    - f. Requirements for demonstration and training.

- g. Preparation of Contractor's punch list.
- h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
- i. Submittal procedures for closeout documents.
- j. Coordination of separate contracts.
- k. Owner's partial occupancy requirements.
- 1. Installation of Owner's furniture, fixtures, and equipment.
- m. Responsibility for removing temporary facilities and controls.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
  - 1. Coordinate dates of meetings with preparation of payment requests.
  - 2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority when applicable, 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 conference 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) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Pending changes
      - 14) Status of Change Orders.
      - 15) Documentation of information for payment requests.
      - 16) Testing and inspection requirements.
      - 17) Status of Request for Information.
      - 18) Other business relating to the Work.

- 4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
  - 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.
- E. Coordination Meetings: Conduct Project coordination meetings at regular intervals corresponding to Work which needs to be coordinated. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
  - 1. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority when applicable, 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 conference shall be familiar with Project and 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) Status of submittals.
      - 4) Deliveries.
      - 5) Off-site fabrication.
      - 6) Access.
      - 7) Site utilization.
      - 8) Temporary facilities and controls.
      - 9) Work hours.
      - 10) Hazards and risks.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) 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.

# PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 31 00

# SECTION 01 32 00 - CONSTRUCTION PROGRESS DOCUMENTATION

### PART 1 - GENERAL

### 1.1 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.

### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's Construction Schedule.
  - 2. Daily construction reports.
  - 3. Site condition reports.
  - 4. Special reports.
- B. Related Sections include the following:
  - 1. Section 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
  - 2. Section 01 32 33 "Photographic Documentation" for submitting construction progress photographs.

### 1.3 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 activities are activities on the critical path. They must start and finish on the planned early start and finish times.
  - 2. Predecessor activity is an activity that must be completed before a given activity can be started.
  - 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 continuous chain of 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 following activity.
  - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- H. Major Area: A story of construction, a separate building, or a similar significant construction element.
- I. Milestone: A key or critical point in time for reference or measurement.
- J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format, unless indicated otherwise:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF electronic file.
  - 3. Two paper copies.
- B. 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.
- C. CPM Reports: Concurrent with CPM schedule, submit each of the following computergenerated reports. Format for each activity in reports shall contain activity number, activity description, 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.
- D. Construction Schedule Updating Reports: Submit with each Application for Payment.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.
- G. Special Reports: Submit at time of unusual event.

### 1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: Engage an experienced specialist or consultant to provide CPM scheduling, planning, evaluation and reporting, with capability of producing CPM reports and diagrams within 24 hours of request.
  - 1. In-House Option: Contractor may employ skilled personnel with experience in CPM scheduling and reporting techniques.
  - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact

### 1.6 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 parties involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### PART 2 - PRODUCTS

# 2.1 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 principal element of the Work. Comply with the following:
  - 1. Procurement Activities: Include procurement process activities for 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 Section 01 33 00 "Submittal Procedures" in schedule. Include selection process activities for finishes and products specified by allowances or specified to be selected during the sample review process. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
  - 3. Startup and Testing Time: Include not less than 15 days for startup and testing.
  - 4. 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.
  - 5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
  - 6. Demonstration and Training: Training of Owner's personnel as indicated in Section 01 79 00 "Demonstration and Training."
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule; show how the sequence of the Work is affected.
  - 1. Products Ordered in Advance: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
  - 2. Owner-Furnished Products: Include a separate activity for each product. Delivery dates indicated stipulate the earliest possible delivery date.
  - 3. 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.
  - 4. 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.
- 1. Startup and placement into final use and operation.
- 5. 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. Sitework completion.
  - b. Landscape completion.
  - c. Structural completion.
  - d. Temporary enclosure and space conditioning.
  - e. Building envelope or permanent enclosure.
  - f. Completion of HVAC installation.
  - g. Completion of plumbing installation.
  - h. Completion of fire protection installation.
  - i. Completion of electrical installation.
  - j. Completion of information technology installations.
  - k. Completion of communications installations.
  - 1. Completion of security installations.
  - m. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, commencement of Work, Substantial Completion, and final completion.
- E. 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 RFI.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and Contract Time.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules. Coordinate with Owner regarding which project management software will be used on the Project.
  - 1. Compatibility: All software shall comply with Owner's master scheduling software requirements.

# 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 10 days of date established for commencement of the Work. Outline significant construction activities for the first 60 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 30 days after date established for commencement of the Work.
    - 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 Owner and 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 preliminary 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 and commissioning when applicable.
    - j. Punch list and 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 or a computer-drawn, time-scaled 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.
- 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 list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
  - 1. Contractor or subcontractor and the Work or activity.
  - 2. Description of activity.
  - 3. Principal 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.

### 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. Approximate count of personnel at Project site.
- 3. Equipment at Project site.
- 4. Material deliveries.
- 5. High and low temperatures and general weather conditions, including rain or snow accumulation.
- 6. Accidents.
- 7. Meetings and significant decisions.
- 8. Unusual events (refer to special reports).
- 9. Stoppages, delays, shortages, and losses.
- 10. Meter readings and similar recordings.
- 11. Tests and inspections, including name(s) of testing and inspection agency(ies).
- 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.
- 20. Material stored following previous report and remaining in storage.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare a detailed report. Submit with a Request for Interpretation (RFI). 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 Owner within one day 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 Actual Completion percentage for each activity.
- 4. Notify Owner and Architect a minimum of one week prior to issuance of updated schedule of all anticipated significant revisions to the Construction Schedule.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Furnish Owner and Architect with an updated electronic version of the Construction Schedule each month.
  - 2. Post copies in Project meeting rooms and temporary field offices.
  - 3. 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 01 32 00

# SECTION 01 32 33 - PHOTOGRAPHIC DOCUMENTATION

# PART 1 - GENERAL

# 1.1 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.

### 1.2 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. Section 01 77 00 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building 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 image files within three days of taking photographs.
  - 1. Submit photos on CD-ROM, thumb-drive or by uploading to web-based project software site. Include copy of key plan indicating each photograph's location and direction.
  - 2. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Architect.
    - d. Name of Contractor.
    - e. Date photograph was taken.
    - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - g. Unique sequential identifier keyed to accompanying key plan.
- C. Printed Photographs: Submit one set of prints of each photographic view within seven days of taking photographs.

- 1. Format: 8-by-10-inch (203-by-254-mm) smooth-surface matte prints on single-weight, paper; enclosed back to back in clear plastic sleeves punched for three-ring binder. Include copy of key plan indicating each photograph's location and direction. Provide one binder for each set of prints.
- 2. Identification: On back of each print, label with the following information:
  - a. Name of Project.
  - b. Name and contact information for photographer.
  - c. Name of Architect.
  - d. Name of Contractor.
  - e. Date photograph was taken if not date stamped by camera.
  - f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
  - g. Unique sequential identifier keyed to accompanying key plan.

### 1.4 QUALITY ASSURANCE

A. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than 5 years.

### 1.5 USAGE RIGHTS

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

### 1.6 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. File Names: Name media files with date, Project area, and sequential numbering suffix.

# 1.7 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified photographer to take construction photographs.
- B. General: Take photographs with maximum depth of field and in focus.
  - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.

- C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
  - 1. Take representative color photographs to show existing conditions before commencement of Work.
- D. Periodic Construction Photographs: Take representative color photographs to show progress monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take representative color photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 32 33

### SECTION 01 33 00 - SUBMITTAL PROCEDURES

# PART 1 - GENERAL

# 1.1 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.

### 1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Sections include the following:
  - 1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
  - 2. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule.
  - 3. Section 01 40 00 "Quality Requirements" for submitting test and inspection reports and for erecting mockups.
  - 4. Section 01 77 00 "Closeout Procedures" for submitting warranties, operation and maintenance manuals, and closeout submittals.
  - 5. Section 01 78 23 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 6. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

# 1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's and Commissioning Agent's (when applicable) responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's and Commissioning Agent's (when applicable) responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

# 1.4 ACTION SUBMITTALS

- A. Contractor's Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate Submittal Schedule with list of subcontracts, the schedule of values, and Contractor's Construction Schedule.
  - 2. Initial Submittal: Submit within 30 days of commencement of Work. Include submittals required during the first 90 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
    - a. Submit revised Submittal Schedule to reflect changes in current status and timing for submittals.
  - 4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Submittal category: Action, informational.
    - d. Name of subcontractor.
    - e. Description of the Work covered.
    - f. Scheduled date for Architect's final release or approval.
    - g. Scheduled dates for purchasing, if necessary for critical path scheduling.
    - h. Scheduled dates for installation, if necessary for critical path scheduling.
    - i. Activity or event number.

# 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: At Contractor's written request, electronic copies of Drawings of the Contract Drawings and Project Manual will be provided by Architect for Contractor's use in preparing submittals and Project record documents.
  - 1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
  - 2. Execute and submit the Data Transfer Agreement form included as Document 00 60 04. Do not distribute digital data drawing files prior to transmitting to Architect copies of Data Transfer Agreement signed by each entity requesting the files.

- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all Action and Informational submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved Submittal Schedule.
    - a. Exception: Where samples for initial selection and samples for verification are both required, submit samples for verification after initial selection has been returned by Architect.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. Architect will document on submittal the date of receipt. Submittals received by Architect after 1:00 p.m. will be considered as received the following working day. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 10 working days for initial review of each submittal, unless otherwise agreed upon in the final Submittal Schedule. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.
  - 2. Sequential Review: Sequential review is a submittal that requires review by more than one design discipline. Where sequential review of submittals by Architect's consultants, Owner, or other parties is required, Submittal Schedule shall reflect sequential review and allow 15 days for initial review of each submittal, unless otherwise agreed upon in the final Submittal Schedule.
  - 3. Concurrent Consultant Review: Transmit submittals directly to Architect's consultants, provide duplicate copy of transmittal to Architect. Allow 15 days for initial review of each submittal, unless otherwise agreed upon in the final Submittal Schedule. Submittal will be returned to Architect before being returned to Contractor.
  - 4. Allow 15 days for review of each resubmittal, unless otherwise agreed upon in the final Submittal Schedule.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.

- 1. Indicate name of firm or entity that prepared each submittal on label or title block.
- 2. Provide a space approximately 4 by 8 inches (100 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
- 3. Include the following information for processing and recording action taken:
  - a. Project name.
  - b. Date.
  - c. Name of Architect.
  - d. Name of Contractor.
  - e. Name of subcontractor.
  - f. Name of supplier.
  - g. Name of manufacturer.
  - h. Unique identifier, including revision number. Submittals shall be numbered with a three-digit number, followed by a dash, followed by the Section number, followed by another dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.
    - 1) Section Number: Section number where submittal is specified.
    - 2) Three-Digit Number: Sequential number, beginning with "001," for each submittal transmitted to Architect for each Section.
    - 3) Submission Number: Use "0" for initial submittal, "1" for first resubmittal, "2" for second resubmittal, and so forth.



- i. Number and title of appropriate Specification Section.
- j. Drawing number and detail references, as appropriate.
- k. Location(s) where product is to be installed, as appropriate.
- 1. Other necessary identification.
- 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
  - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will discard submittals received from sources other than Contractor.
- 6. Transmittal Form: Use facsimile of sample form included as Document 00 60 01.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:

- 1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
- 2. Unique identifier, including revision number. Submittals shall be numbered with a threedigit number, followed by a dash, followed by the Section number, followed by another dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.
  - a. Section Number: Section number where submittal is specified.
  - b. Three-Digit Number: Sequential number, beginning with "001," for each submittal transmitted to Architect for each Section.
  - c. Submission Number: Use "0" for initial submittal, "1" for first resubmittal, "2" for second resubmittal, and so forth.



- 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
- 4. Scanned Copies: Legible scanned PDF files of paper originals are acceptable. Scanned submittals that are not legible will be rejected.
- 5. Sheet Orientation: Orient PDF sheets to a "Ready-to-Read" orientation with majority of text horizontal to the sheet with no additional adjustments or formatting required by the viewer.
- 6. File Security: Do not set any permissions on the file. Protected documents will not be accepted.
- 7. Transmittal Form for Electronic Submittals: Use PDF of completed Submittal Transmittal form included as Document 00 60 01.
- 8. Metadata: Include the following information in the electronic submittal file metadata:
  - a. Title: Project title
  - b. Author: Contractor's name.
  - c. Subject: Submittal type (product data, shop drawing, report, etc.).
  - d. Keywords: Number and title of appropriate Specification Section; manufacturer name; product name/model number.
- 9. File Size: Limit file size of each submittal as follows. Break larger PDF files into multiple packages where necessary to meet delivery restrictions. Identify split packages as "1 of #" and "2 of #" in the subject line.
  - a. Email Delivery: 10 Megabytes.
  - b. FTP Delivery: 100 Megabytes.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On an attached separate document, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those

requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are stamped with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
  - 4. Costs of compensation for Architect's additional services and expenses made necessary for review of submittals exceeding the limits set forth below shall be at the Contractor's expense.
    - a. Reviews of Each Submittal: Two, including initial review.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."
- K. The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been reviewed by Architect and returned to Contractor with Architect's action stamp marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS AS NOTED."

# PART 2 - PRODUCTS

# 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
  - 1. Submit electronic submittals via email as PDF electronic files. Do not post zipped files.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 2. Action Submittals: Submit three paper copies of each submittal, unless otherwise indicated. Architect will return two copies. Mark up and retain one returned copy as a Project Record Document.
  - 3. Informational Submittals: Submit two paper copies of each submittal, unless otherwise indicated. Architect will not return copies.
- 4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- 5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
  - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- 6. Systems Submittals: Identify submittals for systems such as fire alarms and fire protection systems, on the transmittal and act upon the system singularly as a combined submittal. If resubmission is required, resubmit entire system submittal.

# 2.2 ACTION SUBMITTALS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's written recommendations.
    - c. Manufacturer's product specifications.
    - d. Standard color charts.
    - e. Mill reports.
    - f. Standard product operating and maintenance manuals.
    - g. Compliance with recognized trade association standards.
    - h. Compliance with recognized testing agency standards.
    - i. Application of testing agency labels and seals.
    - j. Notation of coordination requirements.
    - k. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before or concurrent with Samples.
- B. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not reproduce, digitally or otherwise, the Contract Documents and submit as Shop

Drawings. Do not use, copy or reproduce title blocks, dimensions, notes, keynotes, symbols schedules or details from Contract Drawings, digital or otherwise. Use of the Contract Drawings shall be limited to reproduction, digitally or otherwise, of the exterior wall layout, interior partition layout, grid lines, doors, and windows. Do not base Shop Drawings on standard printed data.

- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
  - a. Dimensions and layout information.
  - b. Identification of products.
  - c. Fabrication and installation drawings.
  - d. Roughing-in and setting diagrams.
  - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
  - f. Shopwork manufacturing instructions.
  - g. Templates and patterns.
  - h. Schedules.
  - i. Design calculations.
  - j. Compliance with specified standards.
  - k. Notation of coordination requirements.
  - 1. Notation of dimensions established by field measurement.
  - m. Relationship and attachment to adjoining construction clearly indicated.
  - n. Seal and signature of professional engineer for delegated design responsibility.
- 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than size of Contract Drawings.
- C. Samples: Submit physical units of materials or products for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
  - 3. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
    - e. Specification paragraph number and generic name of each item.
  - 4. Submit corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.

- 5. Disposition: Maintain sets of approved Samples at Project site, available for qualitycontrol comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
  - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
  - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
  - b. Architect will return submittal with options selected.
- 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples:
    - 1) Submit three sets of Samples.
    - 2) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 3) Submit at least three sets of paired units that show approximate limits of variations if variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample.
  - b. Architect will retain one Sample set; remainder will be returned. Mark up and retain one returned Sample set as a Project record sample.
- 8. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Architect's sample where so indicated. Attach label on unexposed side that includes the following:
  - a. Generic description of Sample.
  - b. Product name or name of manufacturer.
  - c. Sample source.
- 9. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.

- a. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
- b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

## 2.3 INFORMATIONAL SUBMITTALS

- A. Product Schedule or List: Prepare and submit a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  - 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  - 2. Manufacturer and product name, and model number if applicable.
  - 3. Number and name of room or space.
  - 4. Location within room or space.
- B. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
- C. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."
- D. Subcontract List: Prepare and submit 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. Submit on the form included as Document 00 60 05, "Subcontractors and Major Material Suppliers List."
- E. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation" for action required.
- F. Construction Photographs: Comply with requirements in Section 01 32 33 "Photographic Documentation."
- G. Daily Construction Reports: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- I. Certified Surveys: Comply with requirements specified in Section 01 73 00 "Execution."
- J. Closeout Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- K. Operation and Maintenance Data: Submit written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."

- L. Qualification Data: Submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- M. Welding Certificates: Prepare and submit written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- N. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, where required, is authorized by manufacturer for this specific Project.
- O. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements.
- R. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- S. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.
- U. Preconstruction Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- V. Compatibility Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests

performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- W. Field Test Reports: Prepare and submit reports, written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- X. Manufacturer's Field Reports: Prepare and submit written information documenting factoryauthorized service representative's tests and inspections. Include the following, as applicable:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement whether conditions, products, and installation will affect warranty.
  - 7. Other required items indicated in individual Specification Sections.
- Y. Manufacturer's Instructions: Submit written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- Z. Insurance Certificates and Bonds: Prepare and submit written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- AA. Material Maintenance Submittals: Comply with requirements specified in individual Sections for quantity and disposition of delivery of extra stock.
- BB. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## PART 3 - EXECUTION

## 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, coordinated, checked, and approved for compliance with the Contract Documents.

#### 3.2 ARCHITECT'S ACTION

- A. General: Architect will not review submittals that have not been properly transmitted, reviewed by Contractor, or do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review submittal, make marks to indicate corrections or revisions required, and return it to Contractor. Architect will stamp each submittal with an action stamp as illustrated at the end of this Section, and will mark stamp appropriately to indicate action, as follows:
  - 1. "NO EXCEPTIONS TAKEN": No further review of Submittal required.
  - 2. "MAKE CORRECTIONS AS NOTED": Resubmittal not required unless Contractor cannot comply with corrections noted. Incorporate corrections in Work. If Contractor cannot comply with corrections as noted, revise to respond to exceptions and resubmit.
  - 3. "REVISE AS NOTED AND RESUBMIT": Revise as noted and resubmit for further review.
  - 4. "RESUBMIT PROPERLY": Submittal not reviewed for reasons noted.

- 5. "NOT REVIEWED": Submittal not required by Contract Documents. Remove from submittal log.
- 6. "RECEIVED FOR CLIENT'S RECORD ONLY": Submittal not reviewed.
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Submittals not required by the Contract Documents will not be reviewed and may be discarded or returned marked "NOT REVIEWED."
- G. Substitution items received as product data, shop drawing, or sample submittals required by individual Sections will be returned to Contractor without review. Comply with requirements in Section 01 25 00 "Substitution Procedures" for submission of substitution request.

END OF SECTION 01 33 00

# SECTION 01 40 00 - QUALITY REQUIREMENTS

# PART 1 - GENERAL

# 1.1 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.

## 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, Commissioning Authority when applicable, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
  - 1. Section 01 73 00 "Execution" for cutting and patching procedures to repair and restore construction disturbed by testing and inspecting activities.
  - 2. Divisions 02 through 49 Sections for specific test and inspection requirements.

# 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site, unless indicated otherwise. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review

coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

- 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
- 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- 3. Benchmark Samples: A type of mockup used to illustrate the application and aesthetic effect of finishes and coatings. Benchmark Samples establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity independent of the Owner's and Contractor's operations, engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- K. Professional Engineer: Engineer currently licensed to practice in the State of New Jersey.

# 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If 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 conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. 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 requirements. Refer uncertainties to Architect for a decision before proceeding.

## 1.5 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

# 1.6 INFORMATIONAL SUBMITTALS

- A. General: Format and assemble miscellaneous record submittals to comply with requirements specified in Section 01 78 39 "Project Record Documents."
  - 1. Distribution: Comply with the following as applicable:
    - a. Owner: One copy.
    - b. Contractor: Three copies.
    - c. Architect: One copy.
    - d. Consulting Engineer: One copy.
    - e. Authority having jurisdiction: One copy or as otherwise requested by the Authority.
- B. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- C. Qualification Data: For Contractor's quality-control personnel.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- E. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- F. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Description of test and inspection.
  - 3. Identification of applicable standards.
  - 4. Identification of test and inspection methods.
  - 5. Number of tests and inspections required.
  - 6. Time schedule or time span for tests and inspections.
  - 7. Entity responsible for performing tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- G. Testing Agency and Inspection Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Ambient conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and reinspecting.
- H. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, and telephone number of technical representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Statement that products at Project site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement whether conditions, products, and installation will affect warranty.
  - 7. Other required items indicated in individual Specification Sections.

- I. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement that equipment complies with requirements.
  - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 4. Statement whether conditions, products, and installation will affect warranty.
  - 5. Other required items indicated in individual Specification Sections.
- J. Permits, Licenses, and Certificates: For 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.

# 1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
  - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
  - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
  - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
  - 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority when applicable.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into

compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

# 1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Fabricator Qualifications: A firm experienced and expert in producing products similar to those indicated for this Project and with a three-year record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a three-year record of successful in-service performance.
- E. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a five-year record of successful in-service performance.
- F. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- H. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.

- I. Testing Agency Qualifications: An NRTL, an NVLAP-accredited, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens and assemblies representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Fabricate and install test assemblies and mockups using installers who will perform the same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority when applicable, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish specified in individual Sections, to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
  - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.

- 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 7. Demolish and remove mockups when directed, unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to design components indicated at location indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.
- M. Room Mockups: Construct room mockups incorporating required materials and assemblies, finished according to requirements. Provide required lighting and additional lighting where required to enable Architect to evaluate quality of the Work. Construct room mockups according to design indicated on Drawings.

# 1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
  - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
  - 2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
  - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
  - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  - 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
  - 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  - 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

- 7. Provide quality assurance and control services required due to changes in the Work proposed by or made by the Contractor.
- 8. Provide quality control services for Work done contrary to the Contract Documents, without prior notice, when so specified, or without proper supervision.
- 9. Overtime expenses and schedule delays accruing as a result of executing quality control services shall be the Contactor's responsibility and shall not be charged to the Owner.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents. Architect retains the right to require the use of a different testing agency for retesting ad reinspecting.
- F. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority when applicable and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  - 1. Notify Architect, Commissioning Authority when applicable, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  - 5. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
  - 6. Do not perform any duties of Contractor.
  - 7. Attend Project progress meetings as requested by Owner.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - 1. Access to the Work.
  - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
  - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
  - 4. Facilities for storage and field-curing of test samples.

- 5. Delivery of samples to testing agencies or arranging for pick-up of test samples after normal business hours.
- 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
- 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar qualitycontrol services required by the Contract Documents as a component of Contractor's qualitycontrol plan. Coordinate and submit schedule concurrently with Contractor's Construction Schedule as specified in Section 01 32 00 "Construction Progress Documentation."
  - 1. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority when applicable, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

# 1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
  - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  - 2. Notifying Architect, Commissioning Authority when applicable, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
  - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority when applicable, with copy to Contractor and to authorities having jurisdiction.
  - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
  - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  - 6. Retesting and reinspecting corrected work.

# PART 2 - PRODUCTS (Not Applicable)

# PART 3 - EXECUTION

## 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Architect.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Commissioning Authority's (when applicable), reference during normal working hours.

# 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with cutting and patching requirements specified in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

# SECTION 01 42 00 - REFERENCES

## PART 1 - GENERAL

# 1.1 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.

## 1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "As Required": As required by regulatory bodies, by referenced standards, by existing conditions, by generally accepted construction practice or by the Contract Documents. In the event of ambiguity or conflicts, the most stringent requirements shall apply.
- J. "By Others" refers to work that is not a part of the Contract.
- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

- L. "N.I.C.": "Not in Contract" means the work or the item indicated is not a part of the Contract and will be provided by the Owner.
- M. "Day": Unless stated otherwise, "day" means a calendar day.

# 1.3 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 editions of standards referenced in the corresponding construction subcode for the work or portion of the work indicated.
- C. Copies of Standards: Each entity engaged in construction on 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, obtain copies directly from publication source and make them available on request.

## 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-todate as of the date of the Contract Documents.
  - 1. AA; Aluminum Association (The); www.aluminum.org.
  - 2. AAADM; American Association of Automatic Door Manufacturers; www.aaadm.com.
  - 3. AABC; Associated Air Balance Council; www.aabc.com.
  - 4. AAMA; American Architectural Manufacturers Association; www.aamanet.org.
  - 5. AAPFCO; Association of American Plant Food Control Officials; www.aapfco.org.
  - 6. AASHTO; American Association of State Highway and Transportation Officials; www.transportation.org.
  - 7. AATCC; American Association of Textile Chemists and Colorists; www.aatcc.org.
  - 8. ABAA; Air Barrier Association of America; www.airbarrier.org.
  - 9. ABMA; American Bearing Manufacturers Association; www.americanbearings.org.
  - 10. ACI; American Concrete Institute; (Formerly: ACI International); www.concrete.org.
  - 11. ACPA; American Concrete Pipe Association; www.concrete-pipe.org.
  - 12. ADC; Air Diffusion Council; www.flexibleduct.org.
  - 13. AEIC; Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
  - 14. AF&PA; American Forest & Paper Association; www.afandpa.org.
  - 15. AGA; American Gas Association; www.aga.org.
  - 16. AGC; Associated General Contractors of America (The); www.agc.org.
  - 17. AHA; American Hardboard Association; http://domensino.com/AHA.
  - 18. AHAM; Association of Home Appliance Manufacturers; www.aham.org.
  - 19. AHRI; Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.

- 20. AI; Asphalt Institute; www.asphaltinstitute.org.
- 21. AIA; American Institute of Architects (The); www.aia.org.
- 22. AISC; American Institute of Steel Construction; www.aisc.org.
- 23. AISI; American Iron and Steel Institute; www.steel.org.
- 24. AITC; American Institute of Timber Construction; www.aitc-glulam.org.
- 25. ALSC; American Lumber Standard Committee, Incorporated; www.alsc.org.
- 26. AMCA; Air Movement and Control Association International, Inc.; www.amca.org.
- 27. ANLA; American Nursery & Landscape Association; www.anla.org.
- 28. ANSI; American National Standards Institute; www.ansi.org.
- 29. AOSA; Association of Official Seed Analysts, Inc.; www.aosaseed.com.
- 30. APA; APA; The Engineered Wood Association; www.apawood.org.
- 31. APA; Architectural Precast Association; www.archprecast.org.
- 32. API; American Petroleum Institute; www.api.org.
- 33. APWA; American Public Works Association; www.apwa.net.
- 34. ARI; Air-Conditioning & Refrigeration Institute; (See AHRI).
- 35. ARI; American Refrigeration Institute; (See AHRI).
- 36. ARMA; Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
- 37. ASA; Acoustical Society of America; www.acousticalsociety.org.
- 38. ASC; Adhesive and Sealant Council (The); www.ascouncil.org.
- 39. ASCA; Architectural Spray Coaters Association.
- 40. ASCE; American Society of Civil Engineers; www.asce.org.
- 41. ASCE/SEI; American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
- 42. ASHRAE; American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
- 43. ASME; ASME International; (American Society of Mechanical Engineers); www.asme.org.
- 44. ASPE; American Society of Plumbing Engineers; www.aspe.org.
- 45. ASSE; American Society of Safety Engineers (The); www.asse.org.
- 46. ASSE; American Society of Sanitary Engineering; www.asse-plumbing.org.
- 47. ASTM; ASTM International; (American Society for Testing and Materials International); www.astm.org.
- 48. ATIS; Alliance for Telecommunications Industry Solutions; www.atis.org.
- 49. ASCI; Association of the Wall and Ceiling Industry; www.awci.org.
- 50. AWEA; American Wind Energy Association; www.awea.org.
- 51. AWI; Architectural Woodwork Institute; www.awinet.org.
- 52. AWMAC; Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
- 53. AWPA; American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
- 54. AWS; American Welding Society; www.aws.org.
- 55. AWWA; American Water Works Association; www.awwa.org.
- 56. BHMA; Builders Hardware Manufacturers Association; www.buildershardware.com.
- 57. BIA; Brick Industry Association (The); www.gobrick.com.
- 58. BICSI; BICSI, Inc.; www.bicsi.org.
- 59. BIFMA; BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
- 60. BISSC; Baking Industry Sanitation Standards Committee; www.bissc.org.
- 61. BWF; Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.

- 62. CCC; Carpet Cushion Council; www.carpetcushion.org.
- 63. CCFSS; Center for Cold-formed Steel Structures; www.ccfssonline.org.
- 64. CDA; Copper Development Association; www.copper.org.
- 65. CEA; Canadian Electricity Association; www.electricity.ca.
- 66. CEA; Consumer Electronics Association; www.ce.org.
- 67. CFFA; Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
- 68. CFI; International Certified Floorcovering Installers Association; www.cfi-installers.org.
- 69. CFSEI; Cold-Formed Steel Engineers Institute; www.cfsei.org.
- 70. CGA; Compressed Gas Association; www.cganet.com.
- 71. CIMA; Cellulose Insulation Manufacturers Association; www.cellulose.org.
- 72. CISCA; Ceilings & Interior Systems Construction Association; www.cisca.org.
- 73. CISPI; Cast Iron Soil Pipe Institute; www.cispi.org.
- 74. CLFMI; Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
- 75. CPA; Composite Panel Association; www.pbmdf.com.
- 76. CPPA; Corrugated Polyethylene Pipe Association; www.plasticpipe.org/drainage/index.html.
- 77. CRI; Carpet and Rug Institute (The); www.carpet-rug.org.
- 78. CRRC; Cool Roof Rating Council; www.coolroofs.org.
- 79. CRSI; Concrete Reinforcing Steel Institute; www.crsi.org.
- 80. CSA; Canadian Standards Association; www.csa.ca.
- 81. CSA; CSA International; (Formerly: IAS; International Approval Services); www.csa-international.org.
- 82. CSI; Construction Specifications Institute (The); www.csinet.org.
- 83. CSSB; Cedar Shake & Shingle Bureau; www.cedarbureau.org.
- 84. CTI; Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
- 85. CWC; Composite Wood Council; (See CPA).
- 86. DASMA; Door and Access Systems Manufacturers Association; www.dasma.com.
- 87. DHI; Door and Hardware Institute; www.dhi.org.
- 88. ECA; Electronic Components Association; (See ECIA).
- 89. ECAMA; Electronic Components Assemblies & Materials Association; (See ECIA).
- 90. ECIA; Electronic Components Industry Association; www.eciaonline.org
- 91. EIA; Electronic Industries Alliance; (See TIA).
- 92. EIMA; EIFS Industry Members Association; www.eima.com.
- 93. EJMA; Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
- 94. ESD; ESD Association; (Electrostatic Discharge Association); www.esda.org.
- 95. ESTA; Entertainment Services and Technology Association; (See PLASA).
- 96. EVO; Efficiency Valuation Organization; www.evo-world.org.
- 97. FIBA; Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
- 98. FIVB; Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
- 99. FM Approvals; FM Approvals LLC; www.fmglobal.com.
- 100. FM Global; FM Global; (Formerly: FMG; FM Global); www.fmglobal.com.
- 101. FRSA; Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
- 102. FSA; Fluid Sealing Association; www.fluidsealing.com.
- 103. FSC; Forest Stewardship Council U.S.; www.fscus.org.
- 104. GA; Gypsum Association; www.gypsum.org.
- 105. GANA; Glass Association of North America; www.glasswebsite.com.
- 106. GBCI; Green Building Certification Institute; www.gbci.org.

- 107. GS; Green Seal; www.greenseal.org.
- 108. GSI; Geosynthetic Institute; www.geosynthetic-institute.org.
- 109. GTA; Glass Tempering Division of Glass Association of North America; (see GANA).
- 110. HI; Hydraulic Institute; www.pumps.org.
- 111. HI/GAMA; Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
- 112. HMMA; Hollow Metal Manufacturers Association; (See NAAMM).
- 113. HPVA; Hardwood Plywood & Veneer Association; www.hpva.org.
- 114. HPW; H. P. White Laboratory, Inc.; www.hpwhite.com.
- 115. IAPSC; International Association of Professional Security Consultants; www.iapsc.org.
- 116. IAS; International Accreditation Service; www.iasonline.org.
- 117. IAS; International Approval Services; (See CSA).
- 118. ICBO; International Conference of Building Officials; (See ICC).
- 119. ICC; International Code Council; www.iccsafe.org.
- 120. ICEA; Insulated Cable Engineers Association, Inc.; www.icea.net.
- 121. ICPA; International Cast Polymer Alliance; www.icpa-hq.org.
- 122. ICRI; International Concrete Repair Institute, Inc.; www.icri.org.
- 123. IEC; International Electrotechnical Commission; www.iec.ch.
- 124. IEEE; Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
- 125. IES; Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
- 126. IESNA; Illuminating Engineering Society of North America; (See IES).
- 127. IEST; Institute of Environmental Sciences and Technology; www.iest.org.
- 128. IGCC; Insulating Glass Certification Council; www.igcc.org.
- 129. IGMA; Insulating Glass Manufacturers Alliance; www.igmaonline.org.
- 130. IGSHPA; International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
- 131. ILI; Indiana Limestone Institute of America, Inc.; www.iliai.com.
- 132. Intertek; Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
- 133. ISA; International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
- 134. ISAS; Instrumentation, Systems, and Automation Society (The); (See ISA).
- 135. ISFA; International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
- 136. ISO; International Organization for Standardization; www.iso.org.
- 137. ISSFA; International Solid Surface Fabricators Association; (See ISFA).
- 138. ITU; International Telecommunication Union; www.itu.int/home.
- 139. KCMA; Kitchen Cabinet Manufacturers Association; www.kcma.org.
- 140. LMA; Laminating Materials Association; (See CPA).
- 141. LPI; Lightning Protection Institute; www.lightning.org.
- 142. MBMA; Metal Building Manufacturers Association; www.mbma.com.
- 143. MCA; Metal Construction Association; www.metalconstruction.org.
- 144. MFMA; Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
- 145. MFMA; Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
- 146. MHIA; Material Handling Industry of America; www.mhia.org.
- 147. MIA; Marble Institute of America; www.marble-institute.com.
- 148. MIA; Masonry Institute of America; www.masonryinstitute.org.
- 149. MMPA; Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.
- 150. MPI; Master Painters Institute; www.paintinfo.com.

- 151. MSS; Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
- 152. NAAMM; National Association of Architectural Metal Manufacturers; www.naamm.org.
- 153. NACE; NACE International; (National Association of Corrosion Engineers International); www.nace.org.
- 154. NADCA; National Air Duct Cleaners Association; www.nadca.com.
- 155. NAIMA; North American Insulation Manufacturers Association; www.naima.org.
- 156. NBGQA; National Building Granite Quarries Association, Inc.; www.nbgqa.com.
- 157. NCAA; National Collegiate Athletic Association (The); www.ncaa.org.
- 158. NCMA; National Concrete Masonry Association; www.ncma.org.
- 159. NCPI; National Clay Pipe Institute; www.ncpi.org.
- 160. NCTA; National Cable & Telecommunications Association; www.ncta.com.
- 161. NEBB; National Environmental Balancing Bureau; www.nebb.org.
- 162. NECA; National Electrical Contractors Association; www.necanet.org.
- 163. NeLMA; Northeastern Lumber Manufacturers Association; www.nelma.org.
- 164. NEMA; National Electrical Manufacturers Association; www.nema.org.
- 165. NETA; InterNational Electrical Testing Association; www.netaworld.org.
- 166. NFHS; National Federation of State High School Associations; www.nfhs.org.
- 167. NFPA; NFPA; (National Fire Protection Association); www.nfpa.org.
- 168. NFPA; NFPA International; (See NFPA).
- 169. NFRC; National Fenestration Rating Council; www.nfrc.org.
- 170. NGA; National Glass Association; www.glass.org.
- 171. NHLA; National Hardwood Lumber Association; www.nhla.com.
- 172. NLGA; National Lumber Grades Authority; www.nlga.org.
- 173. NOFMA; National Oak Flooring Manufacturers Association; (See NWFA).
- 174. NOMMA; National Ornamental & Miscellaneous Metals Association; www.nomma.org.
- 175. NRCA; National Roofing Contractors Association; www.nrca.net.
- 176. NRMCA; National Ready Mixed Concrete Association; www.nrmca.org.
- 177. NSF; NSF International; (National Sanitation Foundation International); www.nsf.org.
- 178. NSPE; National Society of Professional Engineers; www.nspe.org.
- 179. NSSGA; National Stone, Sand & Gravel Association; www.nssga.org.
- 180. NTMA; National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
- 181. NWFA; National Wood Flooring Association; www.nwfa.org.
- 182. PCA; Portland Cement Association; www.cement.org.
- 183. PDCA; Painting and Decorating Contractors of America; www.pdca.com.
- 184. PCI; Precast/Prestressed Concrete Institute; www.pci.org.
- 185. PDI; Plumbing & Drainage Institute; www.pdionline.org.
- 186. PGI; PVC Geomembrane Institute; http://pgi-tp.ce.uiuc.edu.
- 187. PLANET; Professional Landscape Network; www.landcarenetwork.org.
- 188. PLASA; PLASA; (Formerly: ESTA; Entertainment Services and Technology Association); www.plasa.org.
- 189. PTI; Post-Tensioning Institute; www.post-tensioning.org.
- 190. RCSC; Research Council on Structural Connections; www.boltcouncil.org.
- 191. RFCI; Resilient Floor Covering Institute; www.rfci.com.
- 192. RIS; Redwood Inspection Service; www.redwoodinspection.com.
- 193. RMA; Rubber Manufacturers Association; www.rma.org.
- 194. SAE; SAE International; (Society of Automotive Engineers); www.sae.org.
- 195. SCTE; Society of Cable Telecommunications Engineers; www.scte.org.
- 196. SDI; Steel Deck Institute; www.sdi.org.
- 197. SDI; Steel Door Institute; www.steeldoor.org.

- 198. SEFA; Scientific Equipment and Furniture Association; www.sefalabs.com.
- 199. SEI/ASCE; Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
- 200. SGCC; Safety Glazing Certification Council; www.sgcc.org.
- 201. SIA; Security Industry Association; www.siaonline.org.
- 202. SJI; Steel Joist Institute; www.steeljoist.org.
- 203. SMA; Screen Manufacturers Association; www.smainfo.org.
- 204. SMACNA; Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
- 205. SMPTE; Society of Motion Picture and Television Engineers; www.smpte.org.
- 206. SPFA; Spray Polyurethane Foam Alliance; www.sprayfoam.org.
- 207. SPIB; Southern Pine Inspection Bureau; www.spib.org.
- 208. SPRI; Single Ply Roofing Industry; www.spri.org.
- 209. SRCC; Solar Rating and Certification Corporation; www.solar-rating.org.
- 210. SSINA; Specialty Steel Industry of North America; www.ssina.com.
- 211. SSMA; Steel Stud Manufacturers Association; www.ssma.com.
- 212. SSPC: SSPC: The Society for Protective Coatings; www.sspc.org.
- 213. STI; Steel Tank Institute; www.steeltank.com.
- 214. SWI; Steel Window Institute; www.steelwindows.com.
- 215. SWPA; Submersible Wastewater Pump Association; www.swpa.org.
- 216. SWRI; Sealant, Waterproofing, and Restoration Institute; www.swrionline.org.
- 217. TCA; Tilt-Up Concrete Association; www.tilt-up.org.
- 218. TCNA; Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
- 219. TEMA; Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
- 220. TIA; Telecommunications Industry Association; (Formerly: TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
- 221. TIA/EIA; Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
- 222. TMS; The Masonry Society; www.masonrysociety.org.
- 223. TPI; Truss Plate Institute; www.tpinst.org.
- 224. TPI; Turfgrass Producers International; www.turfgrasssod.org.
- 225. TRI; Tile Roofing Institute; (Formerly: National Tile Roofing Manufacturing Association); www.tileroofing.org.
- 226. UBC; Uniform Building Code; (See ICC).
- 227. UFAC; Upholstered Furniture Action Council; www.ufac.org.
- 228. UL; Underwriters Laboratories Inc.; www.ul.com.
- 229. UNI; Uni-Bell PVC Pipe Association; www.uni-bell.org.
- 230. USAV; USA Volleyball; www.usavolleyball.org.
- 231. USGBC; U.S. Green Building Council; www.usgbc.org.
- 232. USITT; United States Institute for Theatre Technology, Inc.; www.usitt.org.
- 233. WASTEC; Waste Equipment Technology Association; www.wastec.org.
- 234. WCLIB; West Coast Lumber Inspection Bureau; www.wclib.org.
- 235. WCMA; Window Covering Manufacturers Association; www.wcmanet.org.
- 236. WDMA; Window & Door Manufacturers Association; www.wdma.com.
- 237. WI; Woodwork Institute; (Formerly: WIC; Woodwork Institute of California); www.wicnet.org.
- 238. WMMPA; Wood Moulding & Millwork Producers Association; (See MMPA).
- 239. WSRCA; Western States Roofing Contractors Association; www.wsrca.com.

- 240. WPA; Western Wood Products Association; www.wwpa.org.
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
  - 1. DIN; Deutsches Institut für Normung e.V.; www.din.de.
  - 2. IAPMO; International Association of Plumbing and Mechanical Officials; www.iapmo.org.
  - 3. ICC; International Code Council; www.iccsafe.org.
  - 4. ICC-ES; ICC Evaluation Service, LLC; www.icc-es.org.
- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
  - 1. COE; Army Corps of Engineers; www.usace.army.mil.
  - 2. CPSC; Consumer Product Safety Commission; www.cpsc.gov.
  - 3. DOC; Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
  - 4. DOD; Department of Defense; http://dodssp.daps.dla.mil.
  - 5. DOE; Department of Energy; www.energy.gov.
  - 6. EPA; Environmental Protection Agency; www.epa.gov.
  - 7. FAA; Federal Aviation Administration; www.faa.gov.
  - 8. FG; Federal Government Publications; www.gpo.gov.
  - 9. GSA; General Services Administration; www.gsa.gov.
  - 10. HUD; Department of Housing and Urban Development; www.hud.gov.
  - 11. LBL; Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
  - 12. OSHA; Occupational Safety & Health Administration; www.osha.gov.
  - 13. SD; Department of State; www.state.gov.
  - 14. TRB; Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
  - 15. USDA; Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
  - 16. USDA; Department of Agriculture; Rural Utilities Service; www.usda.gov.
  - 17. USDJ; Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
  - 18. USP; U.S. Pharmacopeia; www.usp.org.
  - 19. USPS; United States Postal Service; www.usps.com.
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.
  - 1. ADAAG; Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; www.access-board.gov.

- 2. CFR; Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
- 3. DOD; Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
- 4. DSCC; Defense Supply Center Columbus; (See FS).
- 5. FED-STD; Federal Standard; (See FS).
- 6. FS; Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
  - a. Available from Defense Standardization Program; www.dsp.dla.mil.
  - b. Available from General Services Administration; www.gsa.gov.
  - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
- 7. MILSPEC; Military Specification and Standards; (See DOD).
- 8. USAB; United States Access Board; www.access-board.gov.
- 9. USATBCB; U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names and Web site addresses are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

NJUCC	New Jersey Uniform Construction Code	
DCA	Department of Community Affairs	(609) 984-7609
	Division of Codes and Standards	
	www.nj.gov/dca/codes/	

## PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 42 00

# SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

## 1.1 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.

#### 1.2 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
  - 2. Division 1 Section "Execution" for progress cleaning requirements.
  - 3. Division 1 Section "Construction Waste Management and Disposal."
  - 4. Divisions 3 through 28 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

#### 1.3 DEFINITIONS

A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

#### 1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities are not chargeable to Owner or Architect and shall be included in the Contract Sum, unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
  - 1. Occupants of Project.
  - 2. Architect.
  - 3. Testing agencies.
  - 4. Personnel of authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer service use charges for sewer usage by all parties and entities engaged in construction operations at the Project Site.

- 1. Existing sewer system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Water Service: Owner will pay water service use charges, whether metered or otherwise, for water used by all parties and entities engaged in construction operations at the Project Site.
  - 1. Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- D. Electric Power Service: Owner will pay electric power service use charges, whether metered or otherwise, for electricity used by parties and entities engaged in construction operations at the Project Site.
  - 1. Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
  - 1. Locations of dust-control partitions at each phase of work.
  - 2. HVAC system isolation schematic drawing.
  - 3. Location of proposed air-filtration system discharge.
  - 4. Waste handling procedures.
  - 5. Other dust-control measures.
- F. Temporary Utility Reports: Submit reports of tests, inspections, and similar procedures performed on temporary utilities.

# 1.6 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
  - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

#### 1.7 PROJECT CONDITIONS

- A. Temporary Use of Existing Utilities and Facilities: The Contractor is responsible for operation, maintenance, and protection of each existing, temporary, and permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
  - 1. Keep temporary services and facilities clean and neat.
  - 2. Relocate temporary services and facilities as required by progress of the Work.

# PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General: Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
- C. Gypsum Board: Minimum 1/2 inch thick by 48 inches wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- E. Paint: Comply with requirements in Division 09 Section "Painting."
- F. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mil minimum thickness, with flamespread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- G. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- H. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- I. Water: Potable.

#### 2.2 TEMPORARY FACILITIES

- A. General: Provide temporary facilities and equipment suitable for use intended.
- B. Field Offices: Prefabricated or mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
- C. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, Engineer, and construction personnel office activities and to accommodate meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot-square tack board and marker boards.
  - 3. Drinking water and private toilet.
  - 4. Coffee machine and supplies.
  - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 degrees F.
  - 6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1. Comply with NFPA 241.
  - 2. Store combustible materials apart from building.

## 2.3 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- D. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

- E. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
- F. HVAC Equipment: Permanent HVAC system may be used subject to coordination and approval by the Owner. Permanent systems that are used for temporary facilities including ductwork shall be cleaned at Project Closeout; replace all filters.
  - 1. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
    - a. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  - 2. For temporary use of permanent HVAC system during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction.

# PART 3 - EXECUTION

# 3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

## 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Owner will engage or obtain Owner's approval to contact appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
  - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.

- 2. Connect temporary sewers to permanent systems as directed by authorities having jurisdiction.
- 3. Maintain sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
  - 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
  - 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.
    - a. Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
  - 3. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select and ensure that equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select and ensure that equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
  - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- G. Electric Power Service: Provide grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period.
  - 1. Install power distribution wiring overhead and rise vertically where least exposed to damage.
  - 2. Connect temporary service to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
- 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- I. Telephone Service: Access to Owner's telephone lines and network shall not be permitted. Provide temporary telephone service and wireless cellular telephone service throughout construction period in field office used and common-use facilities used by all personnel engaged in construction activities.
  - 1. Provide telephone service for each field office and first-aid station.
  - 2. Provide additional telephone lines for the following:
    - a. Provide a dedicated telephone line for each modem or router connection serving facsimile machines and computer equipment in each field office.
  - 3. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Consulting Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.
  - 4. Provide an answering machine, voice-mail service, or messaging service on superintendent's telephone.
  - 5. Provide a portable cellular telephone or two-way radio for superintendent's use in making and receiving telephone calls when away from field office.
- J. Internet Service: Provide computer with broadband modem, router and ISP, equipped with hardware firewall in field office for superintendent's use in sending and receiving e-mail.
- K. Electronic Communication Service: Provide a desktop computer in field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications.

#### 3.3 SUPPORT FACILITIES INSTALLATION

- A. Traffic Controls: Comply with requirements of authorities having jurisdiction.
- B. Vehicular Parking, Including Deliveries: Comply with Owner's requirements.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section "Execution" for progress cleaning requirements. Comply with additional requirements specified in Division 1 Section "Construction Waste Management and Disposal."

- D. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- E. Existing Elevator Use: Comply with Owner's requirements.
  - 1. Do not load elevators beyond their rated weight capacity.
  - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame.
- F. Existing Stair Use: Comply with Owner's requirements.
  - 1. Cover finished, permanent stairs with protective covering of plywood or similar material to prevent damage to finishes.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Division 01 Section "Summary."
  - 2. Avoid using tools and equipment that produce harmful noise.
  - 3. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- C. Security Enclosure and Lockup: Comply with Owner's requirements for lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for openings in building exterior.
- F. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate occupied areas from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side of framing.

- 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
- 3. Insulate partitions to provide noise protection to occupied areas.
- 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
- 5. Protect air-handling equipment.
- G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas.
  - 2. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
    - a. Field Offices: Class A stored-pressure water-type extinguishers.
    - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
    - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
  - 3. Store combustible materials in containers in fire-safe locations.
  - 4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fireprotection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
  - 5. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 6. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
  - 7. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

#### 3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage or mold.
  - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 2. Indicate methods to be used to avoid trapping water in finished work.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.

- 3. Keep porous and organic materials from coming into prolonged contact with concrete.
- 4. Remove standing water from decks.
- 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.
  - 6. Discard and replace stored or installed material that begins to grow mold.
  - 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
  - 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
  - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

#### 3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor.
  - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

#### END OF SECTION 015000

#### SECTION 01 60 00 - PRODUCT REQUIREMENTS

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. Section includes the following administrative and procedural requirements:
  - 1. Selection of products for use in Project.
  - 2. Product delivery, storage, and handling.
  - 3. Product warranties.
  - 4. Comparable products.
- B. Related Sections:
  - 1. Section 01 25 00 "Substitution Procedures" for requests for substitutions.
  - 2. Section 01 77 00 "Closeout Procedures" for submitting warranties for contract closeout.
  - 3. Divisions 03 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

#### 1.3 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. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and 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, in-service

performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

- C. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- D. Special 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.

# 1.4 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.
  - 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 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 01 33 00 "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 Section 01 33 00 "Submittal Procedures." Show compliance with requirements.

#### 1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

#### 1.6 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.
  - 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 ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- 5. Store products to allow for inspection and measurement of quantity or counting of units.
- 6. Store materials in a manner that will not endanger Project structure.
- 7. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 9. Protect stored products from damage and liquids from freezing.
- 10. Provide a secure location and enclosure at Project site for storage of materials and equipment.

### 1.7 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. Submit a draft for approval before final execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: Forms are included with the Specifications. Prepare a written document using appropriate form properly executed.
  - 3. Refer to Divisions 03 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements Section 01 77 00 "Closeout Procedures."

#### PART 2 - PRODUCTS

#### 2.1 PRODUCTS, GENERAL

A. Components, materials, or parts required to be supplied in quantity within a Section shall be of the same manufacture, shall be interchangeable, and shall be the same with regard to function, texture, pattern, and color.

B. Except for building equipment in service areas, no manufacturers' labels or name plates shall be visible on any component, unless required by local authorities having jurisdiction.

#### 2.2 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged, and unless otherwise indicated, that 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: Unless custom products or nonstandard options are specified, provide products of both quality and type that have been used successfully in similar situations on equal quality projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
  - 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures: Procedures for product selection include the following:
  - 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 not be considered.
  - 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 not be considered.
  - 3. Products, 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 not be considered unless otherwise indicated.
  - 4. Manufacturers, 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 not be considered unless otherwise indicated.
  - 5. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Products" are included and also introduce or refer to a list of manufacturers' names, provide either the specified 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 provisions in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
  - 6. Visual Matching Specification: Where Specifications require matching an established Sample, provide a product (and manufacturer) that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches satisfactorily.

- a. If no product available within specified category matches satisfactorily and complies with other specified requirements, comply with requirements in Section 01 25 00 "Substitution Procedures" for proposal of product.
- 7. Visual Selection Specification:
  - a. Standard Range: Where Specifications include the phrase "as selected by Architect from manufacturer's standard range" or similar phrase, Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that does not include premium items.
  - b. Full Range: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

### 2.3 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 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.
  - 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.

#### PART 3 - EXECUTION (Not Applicable)

#### END OF SECTION 01 60 00

# SECTION 01 73 00 – EXECUTION

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Installation of the Work.
  - 3. Cutting and patching.
  - 4. Coordination of Owner-installed products.
  - 5. Progress cleaning.
  - 6. Starting and adjusting.
  - 7. Protection of installed construction.
  - 8. Repair of the Work.
- B. Related Sections include the following:
  - 1. Divisions 3 through 28 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
  - 2. Requirements in this Section apply to mechanical and electrical installations. Refer to Divisions 21 through 28 for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

#### 1.3 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.

#### 1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

- 1. Structural Elements: 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 results in increased maintenance or decreased operational life or safety.
- 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 results 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 wall elements.
  - 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.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

# PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. New Patching Materials: Comply with requirements specified in Division 3 through 28 Sections of these Specifications.
- C. In-Place or Existing 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

#### 3.1 EXAMINATION

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

#### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner for issue 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. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

- 1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
- 2. Do not proceed with utility interruptions without Owner's written permission.
- C. 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.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. 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 interpretation to Architect according to Section 01 26 13 "Request for Interpretation." Include a detailed description of problem encountered, together with recommendations for necessary modifications that may be required.

#### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to existing benchmarks, control and reference points. If discrepancies are discovered, notify Architect promptly.
- B. General: Lay out the Work using accepted practices.
  - 1. Establish benchmarks and control points to set lines and levels as needed to locate each element of the Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the Work progresses.
  - 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, architectural elements, 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.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Make the log available for reference by Architect.

#### 3.4 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 clearances indicated.
- 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 produces 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.
- K. Protect adjacent property and adjoining work, including sealant bond surfaces, from spillage or blow-over of coatings, paints, sprayed fire-resistive material, and other spray-applied products. Cover adjoining and nearby surfaces, including live plants and grass, if there is possibility of spray-applied products being deposited on surfaces.

#### 3.5 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. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- D. Temporary Support: Provide temporary support of work to be cut.
- E. 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.
- F. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching operations with Owner.
- G. 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.
  - 1. All temporary bypass utilities must be reviewed and approved, in writing, by Owner prior to placing in service.
- H. 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. Avoid cutting steel reinforcement.

- a. Locate steel reinforcement using Ground Penetrating Radar or Ferroscan prior to cutting or drilling reinforced concrete and masonry. If existing steel reinforcement is in proposed cut or hole location, contact Architect before proceeding with the Work.
- 4. Excavating and Backfilling: Comply with requirements indicated.
- 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.
- I. 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. Ceramic Tile: Provide ceramic tile and grout to match existing. Remove and replace tile damaged as a result of Work of this Contract. Comply with TCNA's "Handbook for Ceramic Tile Installation" for installation method to match existing. Lay tile in grid pattern to match existing. Make joints between existing and new tile same width so patches are not apparent in finished work.
  - 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- J. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

#### 3.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
  - 1. 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.
  - 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

#### 3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. 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 materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- 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: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

- 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.

#### 3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 40 00 "Quality Requirements" and additional requirements specified in Division 3 thru Division 49 Specification Sections.

# 3.9 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.

#### 3.10 REPAIR OF THE WORK

- A. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
  - 1. Where damaged or worn items cannot be repaired or restored, provide replacements.
  - 2. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
  - 3. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 4. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

- 5. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
  - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
- 6. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
- 7. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 73 00

### SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

#### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for waste reduction, including salvaging, recycling, and disposing of nonhazardous waste.
  - 1. Reduce waste by minimizing factors that contribute to waste.
  - 2. Use reasonable and legal means to divert construction and demolition debris from landfills and incinerators by facilitating their recycling or reuse through a Contractor developed, and Owner reviewed, construction waste management program.
  - 3. Alternative daily cover, (ADC) does not qualify as material diverted from disposal.
  - 4. Land clearing debris is not considered construction or demolition waste.

#### 1.2 DEFINITIONS

- A. Construction Waste: Building improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Commingled Waste: Single waste material stream recycling where recyclable or diverted material waste is separated at the receiving facility rather than on-site.
- C. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- D. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- E. Hazardous Materials: Construction and demolition debris that are regulated for disposal by local, city, county, state, or Federal authorities.
- F. Reclamation Materials: Construction and demolition debris that meets the requirements of a product manufacturer's reclamation program where the debris is removed and prepared for shipping to a manufacturer's facility for reuse in producing new products.
- G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- H. Recyclable Materials: Construction and demolition debris that can be recovered and processed into new products or materials. Recyclable materials include, but are not limited to, the following:

- 1. Metals: Ferrous (iron, steel, stainless steel, galvanized steel) and non-ferrous (copper, brass, bronze, aluminum) types and containers made from metals such as pails, buckets and beverage cans. Paint cans shall be cleaned to qualify.
- 2. Concrete.
- 3. Brick.
- 4. Gypsum wallboard.
- 5. Paper products such as generated from field office activities and clean corrugated packaging cardboard.
- 6. Wood products, including untreated dimensional lumber, plywood, oriented strand board, hardboard, particleboard and crates and pallets made from wood products.
- 7. Carpet and padding.
- 8. Plastics and containers made from plastics such as pails, buckets, and beverage bottles.
- 9. Glass: Glass beverage containers, window and mirror glass.
- 10. Asphaltic concrete paving.
- 11. Clean and uncontaminated, excavated soils not intended for other on-site use.
- 12. Stumps and trees removed as a part of land clearing operations.
- I. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- J. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- K. Waste Material Stream: Designated flows of materials coming from the project site into markets for building materials or for landfill.
- L. Waste Reduction: Construction practices that achieve the most efficient use of resources and materials; uses water efficiently; avoids practices such as over-packaging, improper storage, ordering errors, poor planning, breakage, mishandling and contamination.

#### 1.3 PERFORMANCE REQUIREMENTS

A. Practice efficient waste management in the use of materials in the course of the Work. Reduce waste by minimizing factors that contribute to waste and achieve the most efficient use of resources and materials; uses water efficiently; avoids practices such as over-packaging, improper storage, ordering errors, poor planning, breakage, mishandling and contamination

#### 1.4 SUBMITTALS

- A. Construction and Demolition Waste Management Plan: Within 30 days of award for the Hauler/Recycling contract, submit to the Owner a Construction and Demolition Waste Management Plan.
- B. Waste Management Progress Reports: With each Application for Payment submit a Waste Management Report in a form acceptable to the Architect and Owner. Attach manifests, weight tickets, receipts and invoices. Organize and maintain records to document the following:
  - 1. For each waste stream identified in the Construction and Demolition Waste Management Plan, provide in tons or cubic yards:

- a. Total quantity of waste generated
- b. Quantity and percentage of waste diverted through, reused or salvaging, sale or donation, or recycling
- c. Quantity and percentage of waste disposed by landfill or incineration.
- d. Quantity and percentage of waste dedicated to Alternative Daily Cover.
- 2. Name and location of each firm accepting the debris, including:
  - a. Types of debris accepted.
  - b. Net weights of each type.
  - c. Date of acceptance.

### 1.5 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct preconstruction conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review and finalize procedures for identifying and returning reusable packaging materials.
  - 5. Review and finalize procedures for identifying waste that be directly reused without going through a recycling center; for example by the original vendor or a related supplier.
  - 6. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 7. Review waste management requirements for each trade.
  - 8. Review procedures for minimizing packaging delivered to the site.
  - 9. Review procedures for returning packaging for reuse by the supplier or manufacturer.

#### 1.6 WASTE MANAGEMENT PLAN

General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification and waste reduction work plan. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan. The construction waste management plan shall include the following:

- 1. Identification of Contractor's staff responsible for enforcing construction waste management.
- 2. Description of the specific methods to be used in recycling/reuse of the various construction and demolition debris generated, including the areas and equipment, to be used for processing, sorting, and temporary storage of debris.
- 3. Characterization, including estimated types and quantities of the construction and demolition debris to be generated. Include percentages of recyclable and non-recyclable debris.
- 4. Identify specific construction and demolition debris materials that will be salvaged for resale, salvaged and reused, or recycled.
- 5. Name(s) of landfill and incinerator to be used and the estimated costs for use, for construction and demolition debris that is unable to be recycled or reused.
- 6. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used and excess construction materials such as materials exchange networks and Habitat for Humanity.
- 7. Identification of local recycling facilities that will accept construction and demolition debris.
- 8. Describe the condition of the construction and demolition debris required by the waste material processors, the method proposed to provide the construction and demolition debris in suitable condition and in a quantity acceptable to the disposal sites and waste material processors whom will receive them, and the impact on the project schedule.
- 9. Identification of construction and demolition debris that cannot be recycled/reused with an explanation or justification.
- 10. Handling and Transportation Procedures: Specify whether materials will be separated or commingled and describe method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed
- 11. The Contractor shall be responsible for implementation of any special programs involving rebates or similar incentives related to the recycling of waste.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Reclamation Programs: Research and prepare a plan to work with manufacturers who have programs to receive used materials. Known reclamation programs are available from, but not limited to, the following manufacturers:
  - 1. Carpet:
    - a. ReEntryProgram by Interface.
    - b. ReCover by Mohawk
    - c. Antron, Invista.
    - d. CON-tinuum by Constantine & Covanta.
    - e. Local carpet and carpet cushion reclamation centers may be found on http://www.carpetrecovery.org/
    - f. Fulfill Program by Bentley
  - 2. Ceiling Panels: Armstrong World Industries, Inc.

- 3. Resilient Flooring: ReUse Program by Tarkett.
- 4. Rubber Base: ReStart Program

### PART 3 - EXECUTION

#### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract. During the prosecution of the Work encourage the practice of efficient waste reduction when sizing, cutting, and installing products and materials.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Waste management coordinator may have other duties on site.
- C. Transportation: Arrange for the regular collection, transport from the site, and delivery of the construction wastes and debris to the designated recyclers, and waste material processors and disposal sites.
- D. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
  - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

#### 3.2 RECYCLING WASTE AND RECLAMATION

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from nonrecyclable waste materials, trash, and debris.
  - 1. Designate separate on-site areas for recyclable waste and nonrecyclable materials, trash and debris. Locate each area in order that non-recyclable debris will not contaminate materials to be reused or recycled. Provide appropriately marked containers or bins for controlling waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
- 2. Maintain the facilities in an orderly condition.
- 3. Cut all items to lengths and sizes to fit within the containers or bins provided.
- 4. Where there is sufficient quantity of a specific recyclable debris item (for example; salvaged metal doors and frames or duct work), make arrangements for items to be bundled, banded or tied, and stack in a designated location for a special pick-up.
- 5. Separate construction and demolition debris at the project site by on e of the following methods:
  - a. Source Separated Method: Construction and demolition debris, that is reusable and recyclable, are separated from non-recyclable debris and sorted into appropriately marked separated containers or bins and then transported to the designated recycling facility for further processing. Non-recyclable debris is transported to a landfill or incinerator
  - b. Co-Mingled Method: Place all recyclable construction and demolition debris into containers or bins and transport to a recycling facility where recyclable and salvageable materials are removed, sorted, and processed.
- E. Reclamation: Provide on-site operations to remove reclamation materials and package or palletize in accordance with manufacturer's reclamation program requirements.

#### 3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Do not dispose waste materials in building trash dumpster.

END OF SECTION 01 74 19

#### SECTION 01 77 00 - CLOSEOUT PROCEDURES

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Substantial Completion procedures.
  - 2. Final completion procedures.
  - 3. Warranties.
  - 4. Final cleaning.
  - 5. Repair procedures.
- B. Related Requirements:
  - 1. Section 01 32 33 "Photographic Documentation" for submitting final completion construction photographic documentation.
  - 2. Section 01 78 23 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
  - 3. Section 01 78 39 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 4. Section 01 79 00 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

#### 1.3 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Final Construction Photographs.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

### 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.
  - 5. Submit testing, adjusting, and balancing records.
  - 6. Submit sustainable design submittals not previously submitted.
  - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Owner of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Comply with requirements specified in Section 01 79 00 "Demonstration and Training."
  - 6. Advise Owner of changeover in utility services.
  - 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 9. Complete final cleaning requirements.

- 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- 11. Complete repair and restoration operations.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  - 2. Results of completed inspection will form the basis of requirements for final completion.
- E. Certificate Form: AIA Document G704, Certificate of Substantial Completion.

# 1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
  - 1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 3. Submit final completion photographic documentation.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.

- 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
- 3. Include the following information at the top of each page:
  - a. Project name.
  - b. Date.
  - c. Name of Architect.
  - d. Name of Contractor.
  - e. Page number.
- 1. Submit list of incomplete items in one of the following electronic formats:
  - a. MS Excel electronic file. Architect will return annotated file.
  - b. PDF electronic file. Architect will return annotated file.
- 2. Additional copies: In addition to submission of electronic files, submit three paper copies.

### 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

#### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with applicable State VOC restrictions.

### PART 3 - EXECUTION

#### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - 1. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

- p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
- q. Leave Project clean and ready for occupancy.

#### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair, or remove and replace, defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

#### SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

#### PART 1 - GENERAL

#### 1.1 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.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### 1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Manuals: Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:

- 1. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves.
- C. Initial Manual Submittal: Submit draft copy of each manual to Owner at least 30 days before commencing demonstration and training. Owner will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form to Owner prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Owner will return copy with comments.
  - 1. Correct or revise each manual to comply with Owner's comments. Submit copies of each corrected manual at least 5 days prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

# 1.5 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Operation and Maintenance Documentation Directory: Prepare a comprehensive directory that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

#### 1.6 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with

clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
- b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
- 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
- 3. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
- 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

#### 1.7 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- B. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Architect.
  - 7. Name and contact information for Commissioning Authority, if applicable.
  - 8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  - 9. Cross-reference to related systems in other operation and maintenance manuals.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of maintenance manuals.

### 1.8 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
- 2. Shutdown instructions for each type of emergency.
- 3. Operating instructions for conditions outside normal operating limits.
- 4. Required sequences for electric or electronic systems.
- 5. Special operating instructions and procedures.

# 1.9 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor has delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.

- 4. Regulation and control procedures.
- 5. Instructions on stopping.
- 6. Normal shutdown instructions.
- 7. Seasonal and weekend operating instructions.
- 8. Required sequences for electric or electronic systems.
- 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

#### 1.10 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

- 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
- 3. Identification and nomenclature of parts and components.
- 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

### 1.11 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- D. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
  - 1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

# SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

### 1.1 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.

#### 1.2 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. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
  - 2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### 1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Submit one set of marked-up record prints plus scanned PDF electronic file(s) of marked-up record drawings.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications plus scanned PDF electronic file(s) of marked-up record specifications.
- C. Record Product Data: Submit one paper copy of each Product Data submittal plus scanned PDF electronic file(s) of marked-up paper copy of Product Data.
  - 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.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous recordkeeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal plus scanned PDF electronic file(s) of each miscellaneous submittals.

### 1.4 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 marked-up 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 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.
    - 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.
    - 1. 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. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
  - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

- 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Architect.
    - e. Name of Contractor.

# 1.5 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
  - 5. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Maintain format of original Project Manual organized sequentially by Specification Section number and title.

# 1.6 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, record Specifications, and record Drawings where applicable.

B. Format: Include record Product Data directory organized sequentially by Specification Section number and title.

#### 1.7 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. Miscellaneous record submittals include, but are not limited to, the following:
  - 1. Certificates.
  - 2. Reports.
  - 3. Inspection data.
  - 4. Test results.
  - 5. Design data.
  - 6. Engineering analysis.
  - 7. Informational submittals.
- B. Format: Include miscellaneous record submittals directory organized sequentially by Specification Section number and title.

#### 1.8 RECORDING AND MAINTENANCE OF RECORD DOCUMENTS

- A. Recording: Maintain one copy of each record document 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: Store record documents 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.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 78 39

### SECTION 01 79 00 - DEMONSTRATION AND TRAINING

#### PART 1 - GENERAL

### 1.1 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.

#### 1.2 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.

#### 1.3 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.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Training Manuals: At completion of training, submit 3 complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals.
  - 1. Electronic Copy: Provide copy of training materials in PDF electronic file format on compact disc.

#### 1.5 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 Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "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.

### 1.6 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.

### 1.7 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.
  - 1. Required sequences for electric or electronic systems.
  - 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.

#### 1.8 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 Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### 1.9 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. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires 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. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 79 00

### SECTION 02 41 19 - SELECTIVE DEMOLITION

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Demolition and removal of selected portions of building or structure.
  - 2. Demolition and removal of selected site elements.
  - 3. Salvage of existing items to be reused or recycled.
  - 4. Repair procedures for selective demolition operations.
- B. Related Requirements:
  - 1. Division 1 Section "Execution" for cutting and patching procedures.
  - 2. Division 1 Section "Construction Waste Management and Disposal" for handling demolished materials.

#### 1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Carefully detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

#### 1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be salvaged, reinstalled, or otherwise reused or indicated to remain Owner's property, demolished waste becomes property of the Contractor and shall be removed from Project site.
- B. Materials to be reused remain the property of the Owner.

### 1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project

names and addresses, names and addresses of architects and owners, and other information specified.

- B. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
  - 4. Use of elevator, stairs, entrances, and loading facilities.
  - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Proposed Protection Measures: Indicate measures proposed for protecting individuals and property, for dust control and for noise control. Indicate proposed locations and construction of barriers. Include Drawings for the following temporary facilities in connection with selective demolition operations:
  - 1. Locations of proposed dust- and noise-control temporary partitions and barriers.
  - 2. Locations of temporary facilities for construction barriers including fire barriers.
  - 3. Locations of temporary facilities for means of egress.
- D. Predemolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.
- E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, if necessary, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

# 1.5 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

### 1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- D. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

- E. Predemolition Conference: Conduct conference at Project site prior to commencement of demolition operations. Review methods and procedures related to selective demolition including, but not limited to, the following:
  - 1. Inspect and discuss condition of construction to be selectively demolished.
  - 2. Review structural load limitations of existing structure.
  - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  - 5. Review areas where existing construction is to remain and requires protection.
  - 6. Record significant conference discussions, agreements, and actions moving forward.
    - a. Reporting: Distribute minutes of the meeting to each party present, to parties who should have been present, and other interested parties.

# 1.7 FIELD CONDITIONS

- A. Maintain access to adjacent occupied or used facilities.
  - 1. Do not close or obstruct existing walkways, corridors or egress facilities that must remain in use without written permission from authorities having jurisdiction.
- B. Owner assumes no responsibility for condition of areas to be selectively demolished.
  - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
- G. Maintain fire-protection facilities and life safety systems in service during selective demolition operations.

# 1.8 COORDINATION

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

### PART 2 - PRODUCTS

#### 2.1 REPAIR MATERIALS

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

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- 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 intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Perform survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
  - 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed or Relocated: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

- 2. If services/systems are required to be removed or relocated, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - a. All temporary bypass utilities must be reviewed and approved, in writing, by Owner prior to placing in service.
- 3. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.
  - a. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.
- 4. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- C. Ballasts: If ballast is not labeled "No PCBs," or if the label is illegible, contact a ballast recycler for disposal.
- D. Mercury-Containing Devices: Mercury-containing devices include thermostats, silent switches, mechanical switches and relays or contacts. Dispose of these devices with an appropriate recycler.
- E. Nickel-Cadmium and Lead-Acid Batteries: Exit signs, emergency lighting units, alarm systems, smoke detectors and carbon-monoxide detectors may contain nickel-cadmium or lead-acid. Arrange with an appropriate recycler for disposal.
- F. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.
- G. Refer to Mechanical and Electrical Drawings and Specifications for additional requirements for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed.

# 3.3 PREPARATION

- A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with selective demolition operations.
  - 1. Pest Control: Employ a certified, licensed exterminator to treat building and to control rodents and vermin before and during selective demolition operations.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

- 1. Do not close or obstruct streets, walks, walkways, 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.
- 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
- 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."
- D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
  - 1. Erect temporary fire barriers as required to maintain the continuity of existing fire enclosures and to prevent the possibility of fire spread at areas affected by selective demolition.
- F. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
  - 1. Strengthen or add new supports when required during progress of selective demolition.

#### 3.4 POLLUTION CONTROLS

- A. Dust Control: Use suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
  - 1. Do not use water (mist) when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

- B. Disposal: 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 in a controlled descent.

# 3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  - 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. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. 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.
    - a. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations.
    - b. Maintain fire watch and 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.
  - 8. Locate selective demolition equipment 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. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."
  - 10. Return elements of construction and surfaces that are to remain to condition existing before selective demolition operations began.
  - 11. Cutting and patching procedures: Comply with requirements specified in Division 1 Section "Execution."
- B. Existing Facilities: Comply with Owner's requirements for using and protecting, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- C. Removed and Salvaged Items: Comply with the following:
  - 1. Clean salvaged items.

- 2. Pack or crate items after cleaning. Identify contents of containers.
- 3. Store items in a secure area until delivery to Owner.
- 4. Transport items to Owner's storage area on-site designated by Owner.
- 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items: Comply with the following:
  - 1. Clean and repair items to functional condition adequate for intended reuse.
  - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  - 3. Protect items from damage during transport and storage.
  - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

# 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."
  - 1. Remove residual adhesive and prepare substrate for new floor coverings by one of the methods recommended by RFCI.
- E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
- F. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

# 3.7 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with requirements specified in Division 1 Section "Execution."

- C. Repairs: 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 that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Floors and Walls: Where walls or partitions that are demolished 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 existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
  - 2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
  - 3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
- F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

### 3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly remove and dispose of demolition waste materials. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

### 3.9 CLEANING

A. General: Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

### END OF SECTION 02 41 19

### SECTION 05 40 00 - COLD-FORMED METAL FRAMING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section includes exterior non-load-bearing wall and soffit framing.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cold-formed steel framing product and accessory.
- B. Shop Drawings: Indicate layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
  - 1. For cold-formed metal framing indicated to comply with design loads, submit shop drawings including structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

### 1.3 QUALITY ASSURANCE

- A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code Steel."
  - 2. AWS D1.3, "Structural Welding Code Sheet Steel."
- D. AISI Specifications and Standards: Comply with applicable requirements of the following:
  - 1. AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members."
  - 2. AISI S200, "North American Standard for Cold-Formed Steel Framing General Provisions."
  - 3. AISI S211, "North American Standard for Cold-Formed Steel Framing Wall Stud Design."
  - 4. AISI S212, "North American Standard for Cold-Formed Steel Framing Header Design."

# 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling.
- B. Store cold-formed steel framing, protect with a waterproof covering, and ventilate to avoid condensation.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. ClarkDietrich Building Systems.
  - 2. Marino/WARE.
  - 3. Super Stud Building Products Inc.

#### 2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
  - 1. Design Loads: As follows.
    - a. Dead Loads: Weights of component materials for exterior assemblies and construction indicated.
    - b. Wind Loads: Determine loads in accordance with the Building Subcode based upon design wind speed, exposure and risk category indicated.
      - 1) Design wind speed: 115 miles per hour.
      - 2) Exposure category: B.
      - 3) Risk category: II.
  - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
    - a. Vertical assemblies (walls): Horizontal deflection of 1/480 of the wall height.
    - b. Horizontal assemblies (soffits): Vertical deflection of 1/480 of the horizontal span.
  - 3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 degrees F.
  - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

- a. Upward and downward movement of 1/360 of span or 1/2 inch, whichever is greater.
- 5. Design framing system to accommodate horizontal deflection without regard for contribution of sheathing materials.

# 2.3 COLD-FORMED STEEL FRAMING, GENERAL

- A. Recycled Content of Steel Products: Provide products with postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: **ST50H** or as otherwise required by structural performance.
  - 2. Coating: G90 (galvanized). No equivalent coatings (EQ) will be allowed.

# 2.4 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: As required by structural performance but not less than 0.0428 inch.
  - 2. Flange Width: 1-5/8 inches, unless otherwise indicated on Drawings.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: As required by structural performance but not less than 0.0538 inch.
  - 2. Flange Width: 1-1/4 inches.
- C. Vertical Deflection Clips: Manufacturer's standard bypass or head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
  - 1. Minimum Base-Metal Thickness: As required by structural performance but not less than 0.0538 inch.
  - 2. Flange Width: 1 inch plus the design gap for 1-story structures.
- E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

#### 2.5 SOFFIT FRAMING

- A. Framing Members: Manufacturer's standard C-shaped steel sections, of web depths indicated, with stiffened flanges, and as follows:
  - 1. Minimum Base-Metal Thickness: As required by structural performance but not less than 0.0428 inch.
  - 1. Flange Width: 1-5/8 inches, unless otherwise indicated on Drawings.

#### 2.6 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
  - 1. Supplementary framing.
  - 2. Bracing, bridging, and solid blocking.
  - 3. Web stiffeners.
  - 4. Anchor clips.
  - 5. End clips.
  - 6. Foundation clips.
  - 7. Gusset plates.
  - 8. Stud kickers, knee braces, and girts.
  - 9. Hole reinforcing plates.
  - 10. Backer plates.

# 2.7 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A 36, zinc coated by hot-dip process according to ASTM A 123.
- B. Anchor Bolts: ASTM F 1554, Grade 36 or Grade 55, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153, Class C.
- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated in accordance with ICC-ES AC70, greater than 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.
- E. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

- 1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
- F. Welding Electrodes: Comply with AWS standards.

# 2.8 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A 780.
- B. Shims: Load bearing, high-density multimonomer plastic, nonleaching.
- C. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

#### 2.9 FABRICATION

- A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
  - 1. Fabricate framing assemblies using jigs or templates.
  - 2. Cut framing members by sawing or shearing; do not torch cut.
  - 3. Except as otherwise indicated, fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.
  - 4. Fasten other materials to cold-formed steel framing by welding, bolting, or screw fastening, according to Shop Drawings.
- B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.
- C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 12 feet and as follows:
  - 1. Spacing: Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
  - 2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Install shims between the underside of wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete construction.
- B. Install sealer gaskets at the underside of wall bottom track or rim track and the top of foundation wall or slab at stud locations.

#### 3.3 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed metal framing in accordance with approved shop drawings and referenced AISI quality and installation standards following manufacturer's written instructions, unless more stringent requirements are indicated.
- C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.
  - 1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch.
- D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
  - 1. Cut framing members by sawing or shearing; do not torch cut.
  - 2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    - a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    - b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.
- E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

- F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- G. Do not bridge building expansion and control joints with cold-formed steel framing. Independently frame both sides of joints.
- H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.
- I. Erection Tolerances: Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 12 feet and as follows:
  - 1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

#### 3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
  - 1. Stud Spacing: 16 inches, except as otherwise indicated.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
  - 1. Install single deep-leg deflection tracks and anchor to building structure.
  - 2. Connect vertical deflection clips to studs and anchor to building structure.
  - 3. Connect drift clips to cold formed metal framing and anchor to building structure.
- E. Install bridging and bracing in accordance with approved Shop Drawings. Fasten at each stud intersection.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, girts, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

# 3.5 SOFFIT FRAMING INSTALLATION

A. Install perimeter tracks sized to match framing members. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.

- B. Secure framing members to supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten framing members to both flanges of tracks.
  - 1. Reinforce ends and bearing points with web stiffeners, end clips, hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- C. Space framing members not more than 16 inches on center, unless otherwise indicated.
- D. Frame openings with built-up headers, unless otherwise indicated.
- E. Install reinforcement and bridging as indicated on Shop Drawings.
- F. Install miscellaneous framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable framing assembly.

### 3.6 FIELD QUALITY CONTROL

- A. Testing: Owner reserves the right to engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

### 3.7 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 40 00

### SECTION 05 50 00 - METAL FABRICATIONS

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel framing and supports for secondary framing members to support items indicated.
  - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- B. Related Sections:
  - 1. Section 099100 "Painting."

### 1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design metal fabrications indicated to comply with design loads, including comprehensive engineering analysis, by a qualified professional engineer using performance requirements and design criteria indicated.
- B. Structural Performance:
  - 1. Countertop and Vanity Framing: Provide countertop and vanity framing capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections, or of exhibiting excessive deflections in any of the components making up the countertops and vanities:
    - a. All deadloads.
    - b. 500 pound live load placed on the countertop and vanity.
    - c. Deflection at Midspan: L/1000 times span or 1/8-inch, whichever is less.
  - 2. Tube Framing for Partial Height Walls: Provide tube framing for partial height walls capable of withstanding a deflection not to exceed 2L/1440 of the wall height when subjected to a positive and negative pressure of 5 psf.

### 1.3 ACTION SUBMITTALS

- A. Product Data: Submit for the following:
  - 1. Paint products.
  - 2. Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.

- 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
- 2. For installed products indicated to comply with performance requirements and design criteria, submit shop drawings including structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

# 1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code Steel."
  - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

# 1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for metal fabrications. 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.

#### PART 2 - PRODUCTS

#### 2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

#### 2.2 FERROUS METALS

- A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Steel Plates, Shapes, and Bars: ASTM A 36.

- C. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53, standard weight (Schedule 40) unless otherwise indicated or required by structural loads.
- E. Slotted Channel Framing: Cold-formed metal channels with continuous slot and with flanged edges returned toward web complying with MFMA-3 and fabricated from steel complying with ASTM A 1008. Width, depth, and metal thickness as required to suit performance requirements.
- F. Cast Iron: Either gray or malleable iron, unless otherwise indicated.
  - 1. Malleable Iron: ASTM A 47.
  - 2. Grey Iron: ASTM A 48.

#### 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1 or Group 2.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: ASME B18.6.3.
- G. Lag Screws: ASME B18.2.1.
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, ASME B18.22.1.
- J. Lock Washers: Helical, spring type, ASME B18.21.1.
- K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

- L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- M. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
  - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 or Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- N. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches on center. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

### 2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
  - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.) or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

### 2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
  - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches on center unless otherwise indicated.

## 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
  - 1. Fabricate units from slotted channel framing where indicated.
  - 2. Furnish inserts for units installed after concrete is placed.
- C. Exterior Assemblies: Galvanize all miscellaneous framing and supports.

- D. Interior Assemblies: Shop-prime miscellaneous framing and supports.
  - 1. Prime miscellaneous framing and supports with zinc-rich primer where indicated.
  - 2. Galvanize miscellaneous framing and supports that are to be embedded in concrete.

# 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

# 2.8 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
  - 1. ASTM A 123, for galvanizing steel and iron products.
  - 2. ASTM A 153, for galvanizing steel and iron hardware.
  - 3. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 3. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

### PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
  - 1. Cast Aluminum: Heavy coat of bituminous paint.
  - 2. Extruded Aluminum: Two coats of clear lacquer.

## 3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

### 3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

- 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00

### SECTION 061000 - ROUGH CARPENTRY

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Miscellaneous rough carpentry for blocking, nailers and support of other work.
  - 2. Wood structural panels (plywood) for miscellaneous applications.

### 1.2 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
  - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
  - 2. NLGA: National Lumber Grades Authority.
  - 3. SPIB: The Southern Pine Inspection Bureau.
  - 4. WCLIB: West Coast Lumber Inspection Bureau.

#### 1.3 SUBMITTALS

- A. Product Data: Submit for panel products.
- B. Wood Treatment Data:
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
  - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
  - 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.
- C. Evaluation Reports: For the following, from ICC-ES showing compliance with building code:
  - 1. Wood-preservative-treated wood.

2. Fire-retardant-treated wood.

### 1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber and plywood panels flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

### PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated, certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. 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.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Wood Structural Panels:
  - 1. Plywood: Comply with requirements of DOC PS 1 and APA The Engineered Wood Association.
  - 2. General: Comply with applicable recommendations in APA Form No. E30V, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
  - 3. Thickness: As needed to comply with requirements specified but not less than thickness indicated.
  - 4. Factory mark panels to indicate compliance with applicable standard.

## 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1.
  - 1. Uses:
    - a. Use Category UC2 for interior construction not in contact with the ground.
    - b. Use Category UC3b for exterior construction not in contact with the ground.
    - c. Use Category UC4a for items in contact with the ground.
  - 2. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, 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, stripping, and similar concealed members in contact with masonry or concrete.
- 3. Wood members in exterior assemblies.
- 4. Wood members less than 18 inches above grade.

## 2.3 FIRE-RETARDANT-TREATED MATERIALS

- 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 fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, 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. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity.
  - 3. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.
- E. Application: Treat items indicated on Drawings, and the following:
  - 1. Concealed blocking.
  - 2. Plywood backing panels.
  - 3. All wood members not indicated to receive preservative treatment.

# 2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
  - 1. Blocking.
  - 2. Nailers.
- B. For items of dimension lumber size, provide Construction, No. 2, or Stud grade lumber with 19 percent maximum moisture content and any of the following species:
  - 1. Hem-fir (north); NLGA.

- 2. Mixed southern pine; SPIB.
- 3. Spruce-pine-fir; NLGA.
- 4. Spruce-pine-fir (south); NeLMA or WCLIB.
- 5. Northern species; NLGA.
- 6. Eastern softwoods; NeLMA.
- C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

### 2.5 WOOD STRUCTURAL PANELS

- A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, manufactured with no added urea-formaldehyde, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.
- B. Miscellaneous Backing Panels: APA Rated Sheathing, Group 1, Exposure 1, fire-retardant treated, manufactured with no added urea-formaldehyde, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

### 2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Provide fasteners with hot-dip zinc coating complying with ASTM A 153 or Type 304 stainless steel.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

# 2.7 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. VOC Content Limits: Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### PART 3 - EXECUTION

#### 3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Do not splice structural members between supports, unless otherwise indicated.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
  - 2. NES NER-272 for power-driven fasteners.
- H. 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; do not countersink nail heads, unless otherwise indicated.

# 3.2 WOOD BLOCKING AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

# 3.3 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30V, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Do not use materials with defects that impair quality of panels or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- D. Do not bridge building expansion or other movement joints; cut and space edges of panels to match spacing of structural support elements.
- E. Space panels 1/8 inch apart at edges and ends.
- F. Fasten panels to substrates indicated.
- G. Fastening Methods: Fasten panels to supports with screws.

### 3.4 **PROTECTION**

A. Protect rough carpentry from weather.

### END OF SECTION 061000

## SECTION 06 16 00 - SHEATHING

PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Glass-mat gypsum wall sheathing.
  - 2. Sheathing joint and penetration treatment.
- B. Related Requirements:
  - 1. Section 05 40 00 "Cold-Formed Metal Framing."
  - 2. Section 06 10 00 "Rough Carpentry" for plywood sheathing used for backing panels.

### 1.2 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.

#### 1.3 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 WALL SHEATHING

- A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177; consisting of a water resistant silicone treated gypsum core, surfaced with inorganic glass mats on face and back; partially or completely embedded in the core, top coated with an alkali resistant coating, unsurfaced square edges; resistant to wicking, moisture penetration, and delamination caused by surface water exposure and resistant to warping, rippling, buckling, and sagging.
  - 1. Basis of Design: "DensGlass" Sheathing by Georgia-Pacific Corporation.
  - 2. Type and Thickness: Regular, 1/2 inch thick, except as otherwise indicated.
  - 3. Size: 48 by 96 inches.

## 2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Type recommended by sheathing manufacturer for thickness of sheathing to be attached.
  - 1. Acceptable materials:
    - a. Type 304 stainless steel.
    - b. Carbon steel drill screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
  - 2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.
- C. Nails, Brads, and Staples: ASTM F 1667.
- D. Power-Driven Fasteners: NES NER-272 or fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

## 2.3 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium- or low-modulus, neutralcuring silicone joint sealant compatible with sheathing tape and joint substrates formed by gypsum sheathing and other materials; recommended by sheathing and sheathing tape manufacturers for applications indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."
  - 1. VOC Content Limits: Provide architectural sealants and sealant primers that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Sheathing Tape for Glass-Mat Gypsum Sheathing: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

## 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.
- C. Securely attach to substrate by fastening as indicated, complying with the following:

- 1. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code.
- 2. NES NER-272 or ICC-ES evaluation report for power-driven fasteners.
- D. 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 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 for prolonged periods or at end of the workday when rain is forecast.

## 3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
  - 1. Fasten gypsum sheathing to cold-formed metal framing with screws.
  - 2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
  - 3. Install boards with a 1/4-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. 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 on center and set back a minimum of 3/8 inch from edges and ends of boards.
- D. Seal sheathing joints according to sheathing manufacturer's written instructions.
  - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient quantity 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 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 06 16 00

## SECTION 07 21 00 - THERMAL INSULATION

## PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Mineral-wool blanket insulation.
- B. Related Requirements:
  - 1. Section 09 29 00 "Gypsum Board" for sound attenuation blankets used as acoustic insulation for gypsum board assemblies.

# 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

## 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-testresponse characteristics indicated, as determined by testing identical products per test method indicated below by UL or a qualified testing and inspecting agency acceptable to authorities having jurisdiction. Identify products and materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Surface-Burning Characteristics: ASTM E 84.
  - 2. Combustion Characteristics: ASTM E 136.

## 1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Johns Manville; a Berkshire Hathaway company.

2. Knauf Insulation.

# 2.2 MINERAL-WOOL BLANKET INSULATION

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- B. Mineral-Wool Blanket, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
  - 1. Thickness: As indicated on Drawings.
  - 2. Application: Exterior wall assemblies indicated.
- C. Mineral-Wool Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less per ASTM E 84); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
  - 1. Thickness: As indicated on Drawings.
  - 2. Application: Exterior wall assemblies indicated.

### 2.3 MISCELLANEOUS MATERIALS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
  - 1. Products: Provide one of the following:
    - a. AGM Industries, Inc.; Series T TACTOO Insul-Hangers.
    - b. Gemco; Spindle Type.
  - 2. Plate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - 3. Spindle: Copper-coated, low-carbon steel; fully annealed; 0.105 inch in diameter; length to suit depth of insulation indicated.
- B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch 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 square or in diameter.
  - 1. Products: Provide one of the following:
    - a. AGM Industries, Inc.; RC150 or SC150.
    - b. Gemco; Dome-Cap, R-150 or S-150.
  - 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

- C. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch between face of insulation and substrate to which anchor is attached.
  - 1. Products: Gemco; Clutch Clip.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
  - 1. Products: Provide one of the following:
    - a. AGM Industries, Inc.; TACTOO Adhesive.
    - b. Gemco; Tuff Bond Hanger Adhesive.
  - 2. VOC Content Limits for Adhesives: Provide adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Adhesives: 65 g/L or less.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation facings or that interfere with insulation attachment.

### 3.3 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsolled and that has not been left exposed to ice, rain, or snow at any time.
- C. 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.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

# 3.4 INSTALLATION OF CONCEALED BUILDING INSULATION

- A. Blanket Insulation: Install in cavities formed by framing members according to ASTM C 1320 and the following requirements:
  - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain required clearances of insulation around recessed lighting fixtures and electrical devices not rated for or protected from contact with insulation.
  - 4. For wood-framed construction where wall cavity heights exceed 96 inches:
    - a. Unfaced blankets: Provide supplemental spindle-type insulation anchors to support insulation mechanically in addition to friction fitting.
    - b. Faced blankets having stapling flanges:
      - 1) Lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
      - 2) Tape joints and ruptures in insulation facings, and seal each continuous area of insulation to ensure airtight installation.
      - 3) Set units with facing placed toward interior of construction.

## 3.5 **PROTECTION**

A. Protect installed insulation 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 07 21 00

## SECTION 07 27 13 - MODIFIED BITUMINOUS SHEET AIR BARRIERS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes self-adhering, vapor-retarding, modified bituminous sheet air barriers.
- B. Related Requirements:
  - 1. Section 061600 "Sheathing" for wall sheathing including wall sheathing joint-andpenetration treatments.

## 1.2 DEFINITIONS

A. Air Barrier Assembly: The collection of air barrier membrane materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement, moisture and water vapor transmission through the wall.

## 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: Show locations and extent of air barriers. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.

## 1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: From air barrier manufacturer, certifying compatibility of air barrier materials with Project materials that connect to or that come in contact with air barrier.

## 1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm with a minimum of 10 years experience in applying air barrier materials similar in material, design, and extent to those indicated for this Project, and whose work has resulted in applications with a record of successful in-service performance.
- B. Single-Source Responsibility: Obtain air barrier materials, including primer, flashing, and auxiliary materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Regulatory Requirements: Comply with all federal, state, and local regulations controlling use of volatile organic compounds (VOCs).

September 1, 2021 Issued for Bid

- D. Preinstallation Conference: Conduct conference at Project site.
  - 1. Include installers of substrates and adjacent or subsequent construction.
  - 2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, sequence of installation, inspection procedures, and protection and repairs.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Store rolls according to manufacturer's written instructions.
- D. Protect stored materials from direct sunlight.

## 1.7 PRROJECT CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer.
  - 1. Protect substrates from environmental conditions that affect performance of air barrier.
  - 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion, isolation and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration, air leakage and barrier performance exceeding specified limits.

# 2.2 SELF-ADHERING SHEET AIR BARRIER

- A. Modified Bituminous Sheet: 40-mil thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil thick, cross-laminated polyethylene film with release liner on adhesive side and formulated for application with primer that complies with specified VOC limits.
  - 1. Products: Subject to compliance with requirements, provide one of the following:

- a. Carlisle Coatings & Waterproofing Inc.; CCW-705.
- b. GCP Applied Technologies; Perm-A-Barrier Wall Membrane.
- c. Henry Company; Blueskin SA.
- d. Meadows, W. R., Inc.; SealTight Air-Shield.
- 2. Provide low temperature membrane formulation for cold weather applications.
- 3. Physical and Performance Properties:
  - a. Water Vapor Transmission (Vapor Permeance): Maximum 0.05 perms; ASTM E 96/E 96M, Water Method.
  - b. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
  - c. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 degrees F; ASTM D 570.
  - d. Tensile Strength: Minimum 250 psi; ASTM D 412, Die C.
  - e. Puncture Resistance: Minimum 40 lbf; ASTM E 154.
  - f. Ultimate Elongation: Minimum 200 percent; ASTM D 412, Die C.
  - g. Low-Temperature Flexibility: Pass at minus 20 degrees F; ASTM D 1970.
  - h. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C 836.

## 2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid primer recommended for substrate by air barrier manufacturer.
  - 1. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Counterflashing Strip: Modified bituminous 40-mil thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil thick, cross-laminated polyethylene film with release liner backing.
- D. Modified Bituminous Strip and Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil thick, cross-laminated polyethylene film with release liner backing.
- E. Termination Mastic: Manufacturer's cold fluid-applied elastomeric liquid; trowel grade.
- F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- G. Adhesive and Tape: Manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- H. Joint Sealants and Backers: Single-component, low-modulus neutral-curing silicone; provide products specified in Section 079200 "Joint Sealants."

### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
  - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
  - 2. Verify that concrete has cured and aged for minimum time period recommended by air barrier manufacturer.
  - 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 4. Verify that masonry joints are flush and completely filled with mortar.
  - 5. Verify that sheathing substrates comply with manufacturer's requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from substrates.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
  - 1. Install modified bituminous strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.
- G. Bridge and cover isolation joints and discontinuous wall-to-wall and deck-to-wall joints with overlapping modified bituminous strips.
- H. At changes in substrate plane, apply termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

### 3.3 INSTALLATION

- A. General: Install modified bituminous sheets and auxiliary materials according to air barrier manufacturer's written instructions and according to recommendations in ASTM D 6135.
  - 1. When ambient and substrate temperatures range between 25 and 40 degrees F, install self-adhering, modified bituminous air barrier sheets produced for low-temperature application. Do not install low-temperature sheets if ambient or substrate temperature is higher than 60 degrees F.
- B. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
  - 1. Install modified bituminous strips centered over vertical inside corners. Install 3/4-inch fillets of termination mastic on horizontal inside corners.
- C. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.
- D. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet on same day. Reprime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- E. Apply and firmly adhere modified bituminous sheets horizontally over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to prevent breaches, seam failures, and to ensure airtight installation.
  - 1. Apply sheets in a shingled manner to shed water without interception by any exposed sheet edges.
  - 2. Roll sheets firmly to enhance adhesion to substrate.
- F. Apply continuous modified bituminous sheets over modified bituminous strips bridging substrate cracks, construction, and contraction joints.
- G. Seal top of through-wall flashings to air barrier sheet with an additional 6-inch wide, modified bituminous counterflashing strip.
- H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Install air barrier sheet and auxiliary materials to form a seal with adjacent construction and to maintain a continuous weather barrier.
  - 1. Coordinate air barrier installation with construction of exterior wall openings and installation of wall flashings to ensure continuity of weather barrier.
  - 2. Install modified bituminous counterflashings over air and other base or wall flashings so that a minimum of 3 inches of coverage is achieved over each substrate.
- J. At end of each working day, seal top edge of air barrier to substrate with termination mastic.

- K. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- L. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air barrier sheet extending 6 inches beyond repaired areas in all directions.
- M. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

## 3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Inspect vapor barrier installation prior to subsequent construction for the following:
  - 1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
  - 2. Continuous structural support of air barrier system has been provided.
  - 3. Site conditions for application temperature and dryness of substrates have been maintained.
  - 4. Maximum exposure time of materials to UV deterioration has not been exceeded.
  - 5. Surfaces have been primed.
  - 6. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
  - 7. Termination mastic has been applied on cut edges.
  - 8. Air barrier has been firmly adhered to substrate.
  - 9. Compatible materials have been used.
  - 10. Transitions at changes in direction and structural support at gaps have been provided.
  - 11. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
  - 12. All penetrations have been sealed.
- B. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier materials.

## 3.5 CLEANING AND PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
  - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than 30 days, remove and replace air barrier according to manufacturer's written instructions.
  - 2. Protect air barrier from contact with contaminants and incompatible materials not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 27 13

## SECTION 07 42 13 – METAL COMPOSITE MATERIAL WALL PANELS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes metal composite material wall panel assemblies for exterior cladding.
- B. Related Sections:
  - 1. Division 07 Section "Sheet Metal Flashing and Trim" for metal flashing materials and installation.
  - 2. Division 07 Section "Joint Sealants" for joint-sealant materials and installation.

#### 1.2 DEFINITION

- A. Metal Composite Material Wall Panel Assembly: Metal composite material wall panels, attachment system components, miscellaneous metal framing, and accessories necessary for a complete and weathertight wall system.
- B. Sheet Metal Thickness: Minimum thickness of base metal without metallic coatings or painted finishes.

### 1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Metal composite material wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Delegated Design: Design metal composite material wall panel assemblies, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- C. Structural Performance: Provide panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:
  - 1. Wind Loads: Determine loads in accordance with the Building Subcode based upon design wind speed, exposure category and risk category indicated.
    - a. Design wind speed: 115 miles per hour.
    - b. Exposure category: B.
    - c. Risk category: II.
  - 2. Deflection Limits: Engineer panel assemblies to withstand test pressures with deflection no greater than 1/480 of the span and no evidence of material failure, structural distress, or permanent deformation exceeding 0.2 percent of the clear span.

- a. Test Pressures: 150 percent of inward and outward wind-load design pressures.
- D. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- E. Water Penetration: No water penetration or evidence of water leakage when tested according to AAMA 501.1 or ASTM E 331 at a minimum differential pressure equal to 20 percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. and not more than 12 lbf/sq. ft.
  - 1. Water Leakage: Uncontrolled water infiltrating the panel system or appearing on panel system's normally exposed interior surfaces from sources other than condensation. Water controlled by flashing and gutters that is drained back to the exterior and cannot damage adjacent materials or finishes is not water leakage.
- F. Thermal Movements: Provide panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.

## 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings: Include fabrication and installation layouts of panel assemblies; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
  - 1. Distinguish between factory- or shop-assembled and field-assembled work.
  - 2. Include details of components at a scale of not less than 3 inches per 12 inches.
  - 3. For installed products indicated to comply with design loads, submit shop drawings including structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Composite Material Panels: Minimum 12 x 12 inches incorporating typical edge profiles.

### 1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: For each product, tests performed by a qualified testing agency.
- B. Warranties: Sample of special warranties specified in this Section.

## 1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal composite material panels to include in maintenance manuals.

### 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of panels; certified by panel manufacturer to fabricate and install manufacturer's panel system; and an employer of workers trained and approved by panel manufacturer. A firm which is specialized in the installation of panel assemblies, who has successfully installed work similar in design and extent to that required for the project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years.
  - 1. Installer's responsibilities include fabricating and installing panel assemblies and providing professional engineering services required to demonstrate compliance with performance requirements indicated.
  - 2. Engineering Responsibility: Preparation of engineering data for panel assemblies, including Shop Drawings and structural calculations, based on testing and comprehensive engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Drawings indicate size, profiles, and dimensional requirements of panel assemblies and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."
  - 2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- C. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, panel Installer, panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects panel assemblies including installers of exterior wall components, flashings and joint treatment materials.

- 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
- 3. Review methods and procedures related to panel installation, including manufacturer's written instructions.
- 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
- 5. Review flashings, special details, wall penetrations, openings, and condition of other construction that affect panel installation and performance.
- 6. Review temporary protection requirements for panel assemblies during and after installation.
- 7. Review procedures for repair of panels damaged after installation.
- 8. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's instructions for delivery, storage and handling of panels, components, and other manufactured items to prevent damage or deformation. Package panels for protection during transportation and handling.
- B. Unload, store, and erect panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack panels on platforms or pallets, covered with suitable weathertight and ventilated covering. Store panels to ensure dryness, with positive slope for drainage of water. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on panels during installation.

## 1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of panels to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before panel fabrication and indicate measurements on Shop Drawings.
  - 1. Coordinate wall construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions. Field trimming of panels will not be permitted.

## 1.10 COORDINATION

A. Coordinate panel installation with rain drainage work, flashing, trim, construction of adjacent exterior assemblies, glazing assemblies, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

### 1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of panel assemblies that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including rupturing, cracking, or puncturing.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard warranty form in which manufacturer agrees to repair finish or replace panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading in excess of 5 delta E units (Hunter) as calculated in accordance with ASTM D2244 on exposed surfaces cleaned with clean water and a soft cloth.
    - b. Degree of chalking in excess of rating No. 8 when measured in accordance with ASTM D659 on exposed unwashed surfaces.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
  - 1. Basis-of-Design Products: Project design is based upon the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. 3A Composites USA, Inc.
  - 2. Alcoa Inc.
  - 3. CENTRIA Architectural Systems.
  - 4. Protean Construction Products, Inc.

### 2.2 METAL COMPOSITE MATERIAL WALL PANELS

- A. Metal Composite Material Wall Panels: Provide factory-formed and -assembled, metal composite material wall panels fabricated from two metal facings that are bonded to a solid, extruded thermoplastic core; formed into profiles for installation method indicated. Include attachment system components and accessories required for a complete and weathertight system.
  - 1. Basis of Design: Provide products indicated on Drawings.
  - 2. Facing Sheets: Fabricate panels with exterior and interior facings formed from minimum 0.020-inch thick, aluminum sheet facings; ASTM B 209, alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required.
  - 3. Panel Thickness: As required to comply with structural performance requirements but not less than nominal 4 mm thickness.
  - 4. Core: Fire retardant.
  - 5. Fire Performance Requirements:
    - a. Comply with NFPA 285.
    - b. Surface-Burning Characteristics: As determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
      - 1) Flame-Spread Index: 25 or less.
      - 2) Smoke-Developed Index: 450 or less.
  - 6. Exterior Finish: Coil-coated, fluoropolymer finish.
  - 7. Interior Finish: Manufacturer's standard.
  - 8. Panel Sizes and Profiles: As indicated on Drawings.
- B. Attachment System Components: Extruded aluminum.
  - 1. Provide attachment system that allows individual panels to be installed and removed without disturbing adjacent panels.
  - 2. Include manufacturer's standard perimeter extrusions and tracks with integral weatherstripping or drainage channels, panel stiffeners, panel clips and anchor channels.
  - 3. Alignment Pins: Stainless steel.

## 2.3 MISCELLANEOUS METAL FRAMING

- A. Steel Sheet: ASTM A 1003, Structural Grade, Type H, metallic coated (galvanized), of grade and coating weight as follows:
  - 1. Grade: **ST50H** or as otherwise required by structural performance.
  - 2. Coating: G90 or equivalent.
- B. Subgirts: C- or Z-shaped sections, minimum 0.064-inch base metal thickness.
- C. Base or Sill Angles, Channels, and Zee-Clips: Minimum 0.079-inch base metal thickness.

- D. Hat-Shaped, Rigid Furring Channels: ASTM C 645, minimum 0.0428-inch base metal thickness.
- E. Cold-Rolled Furring Channels: Minimum 0.0538-inch base metal thickness, with minimum 1/2-inch- wide flange.
- F. Fasteners for Metal Framing, General: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members and to secure to substrates.
  - 1. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
  - 2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

## 2.4 MISCELLANEOUS MATERIALS

- A. Panel Accessories: Provide components required for a complete and weathertight panel assembly including trim, copings, fasciae, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, setting button, shims, and similar items. Match material and finish of panels unless otherwise indicated.
- B. Exposed Flashing and Trim: Extruded or brake-formed aluminum components to match profiles indicated; finish to match adjacent panels.
- C. Concealed Flashing: Fabricate from stainless steel sheet complying with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."
- D. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of panels by means of plastic caps or factory-applied coating.
  - 1. Do not use exposed fasteners, except where approved specifically in advance by Architect.
  - 2. Fasteners for Panels: Stainless steel with EPDM or neoprene sealing washers.
  - 3. Fasteners for Flashing and Trim: Blind fasteners or stainless steel self-drilling screws with hex washer head.
  - 4. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- E. Panel Gaskets and Sealants:
  - 1. Panel Gaskets: Manufacturer's standard extruded units.
  - 2. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
  - 3. Joint Sealant: ASTM C 920; elastomeric silicone sealant; of type, grade, class, and use classifications required to seal panel joints and remain weathertight; and as recommended in writing by panel manufacturer.
  - 4. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

### 2.5 FABRICATION

- A. General: Fabricate and finish panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
  - 1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
  - 2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
  - 3. Fabricate panels with panel stiffeners as required to maintain fabrication tolerances and to withstand design loads within deflection limits.
  - 4. Fabricate panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.
- B. Factory form panels in a continuous process with no glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.
- C. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- D. Fabricate panels to the following dimensional tolerances:
  - 1. Length and Width: Plus or minus 0.032 inch up to 48 inches; 0.064 inch more than 48 inches.
  - 2. Thickness: Plus or minus 0.008 inch.
  - 3. Squareness: 0.1875-inch difference between diagonal measurements.
  - 4. Diagonal: Plus or minus 0.1875 inch.
  - 5. Panel Bow: Not more than 0.2 percent of panel width or length up to 0.1875 inch maximum.
- E. Sheet Metal Accessories: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
  - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
  - 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
  - 3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flatlock seams. Tin edges to be seamed, form seams, and solder.
  - 4. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
  - 5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
  - 6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by panel manufacturer.

a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or panel manufacturer for application but not less than thickness of metal being secured.

### 2.6 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Aluminum Panels and Accessories:
  - 1. Exposed Coil-Coated Finish: High-performance organic finish; prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
    - a. Basis of Design: "Duranar XL Plus"; PPG Industries, Inc.
    - b. Fluoropolymer 3-Coat System: Manufacturer's three-coat, polyvinylidene fluoride finish consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent of "ATO Atochem Kynar 500" or "Ausimont Hylar 5000" fluorocarbon resin specially formulated for spray application. Remove die markings, scratches, abrasions, dents and other blemishes before applying finish. Coating films shall be uniform and visibly free from flow lines, streaks, blisters, sags or other surface imperfections in the dry-film state on all surfaces. Comply with physical properties and coating performance requirements of AAMA 620.
    - c. Color and gloss: Match Architect's control Sample.
  - 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or lightcolored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, panel supports, and other conditions affecting performance of the Work.

- 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by panel manufacturer.
- 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by panel manufacturer.
  - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and assemblies penetrating panels to verify actual locations of penetrations relative to seam locations of panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Install flashings and other sheet metal to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."
- B. Miscellaneous Framing: Install subgirts, subframing, base angles, sill, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and panel manufacturer's written recommendations.

#### 3.3 PANEL INSTALLATION, GENERAL

- A. General: Install panels according to approved shop drawings and manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - 1. Field cutting of panels is not permitted.
  - 2. Shim or otherwise plumb substrates receiving panels.
  - 3. Flash and seal panels with weather closures at perimeter, penetrations and all openings. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by panels are installed.
  - 4. Install screw fasteners in predrilled holes.
  - 5. Locate and space fastenings in uniform vertical and horizontal alignment.
  - 6. Install flashing and trim as panel work proceeds.
  - 7. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
  - 8. Align bottoms of panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
  - 9. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners: Use stainless-steel fasteners for surfaces exposed to the exterior; use stainless steel, aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by permanent separation as recommended in writing by panel manufacturer.
- D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by panel manufacturer.
  - 1. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

# 3.4 METAL COMPOSITE MATERIAL PANEL INSTALLATION

- A. General: Install attachment system required to support panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
  - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
  - 2. Attach panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
- B. Clip Installation: Attach panel clips to supports at panel joint locations, spacings, and with fasteners recommended by manufacturer. Attach routed-and-returned flanges of wall panels to panel clips with manufacturer's standard fasteners.
  - 1. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
  - 2. Apply gaskets and sealants to joints unless otherwise indicated.
- C. Track-Support Installation: Install support assembly at locations, spacings, and with fasteners recommended by manufacturer. Use manufacturer's standard horizontal tracks and vertical tracks that provide support and secondary drainage assembly, draining to the exterior. Attach routed-and-returned flanges of wall panels to perimeter extrusions with manufacturer's standard fasteners.
  - 1. Install wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.
  - 2. Apply gaskets and sealants to joints unless otherwise indicated.
- D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  - 1. Install components required for a complete panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners

where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight and weather-resistant.

- 1. Install exposed flashing and trim that is without oil canning, buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
- 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.

# 3.5 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align panel units within installed tolerance of 3/16 inch in 20 feet, non-accumulative, on level, plumb, and location lines as indicated, and within 3/32-inch offset of adjoining faces and of alignment of matching profiles.

# 3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.
- B. After panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 42 13

# SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Wall flashing and counterflashing.
  - 2. Manufactured reglets.
- B. Related Requirements:
  - 1. Section 079200 "Joint Sealants" for field-applied sealants not otherwise specified in this Section.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Include plans, elevations, sections, and attachment details. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work. Include the following:
  - 1. Identification of material, thickness, weight, and finish for each item and location in Project.
  - 2. Details for forming, including profiles, shapes, seams, and dimensions.
  - 3. Details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  - 4. Details of termination points and assemblies.
  - 5. Details of special conditions.
  - 6. Include details of connections to adjoining work.
  - 7. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.

# 1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" and applicable requirements of NRCA's "The NRCA Roofing Manual" for dimensions and profiles shown, unless more stringent requirements are indicated.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- D. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

### 1.5 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall assemblies, materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

# PART 2 - PRODUCTS

# 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.
- C. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

#### 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 316, dead soft, fully annealed.
  - 1. Finish: 2D (dull, cold rolled).
  - 2. Surface: Smooth, flat.

# 2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Slip Sheet: Rosin-sized building paper, <u>3 lb/100 sq. ft.</u> minimum.

# 2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item, unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
  - 2. Fasteners for Stainless-Steel Sheet: Type 316 stainless steel.
- C. Solder For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant Materials: Silicone sealant; provide products specified in Section 079200.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

## 2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated; provide with factory-mitered and -welded corners and junctions.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cheney Flashing Company.
    - b. Fry Reglet Corporation.
    - c. Keystone Flashing Company, Inc.
    - d. OMG Roofing Products/Hickman Engineered Systems.
  - 2. Fabricate components from stainless steel sheet; 0.019 inch minimum thickness.
  - 3. 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.

### 2.6 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" and NRCA's "The NRCA Roofing Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
  - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 2. Obtain field measurements for accurate fit before shop fabrication.
  - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
  - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to SMACNA recommendations.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

- 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.
- F. Do not use graphite pencils to mark metal surfaces.

# 2.7 SHEET METAL FLASHINGS

- A. Flashing Materials:
  - 1. Concealed and Thru-Wall Flashings: Fabricate from minimum 0.019 inch stainless steel sheet.
  - 2. Equipment Support Flashing: Fabricate from minimum 0.019 inch stainless steel sheet.
- B. Wall Flashing and Counterflashing:
  - 1. Fabricate continuous flashings in minimum 96-inch long, but not exceeding 12-foot long, sections, for exposed applications, through-wall flashings, flashings under copings, at shelf angles, and where indicated.
  - 2. Fabricate discontinuous lintel, sill, and similar flashings to extend 8 inches beyond each side of wall openings. Form with minimum 2-inch high, end dams where flashing is discontinuous.
  - 3. Fabricate through-wall metal flashing embedded in masonry with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
  - 4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
  - 5. Fabricate flashings with drip edges, unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  - 6. Fabricate flashings with sealant stop where indicated. Fabricate by bending metal back on itself (hem) 1 inch or at least depth of sealant joint at exterior face of wall to form a stop for retaining sealant and backer rod.
  - 7. Metal drip edges: Extend at least 3 inches into wall or veneer and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
  - 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
  - 5. Install sealant tape where indicated.
  - 6. Torch cutting of sheet metal flashing and trim is not permitted.
  - 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
  - 1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate substrates not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
  - 1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 degrees F, set joint members for 50 percent movement each way. Adjust setting proportionately for

installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 degrees F.

- 2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.
  - 1. Do not use torches for soldering.
  - 2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
  - 3. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

# 3.3 FLASHING INSTALLATION

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Reglets: Install in accordance with manufacturer's written installation instructions.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 6 inches over base flashing. Lap counterflashing joints a minimum of 6 inches and bed with sealant. Secure in a waterproof manner.
- D. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Seal flashing with elastomeric sealant to equipment support member.

# 3.4 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

### SECTION 07 84 13 - PENETRATION FIRESTOPPING

### PART 1 - GENERAL

### 1.1 SUMMARY

A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated assemblies and construction.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. General: For penetrations through fire-resistance-rated constructions and through floor construction without a fire-resistance rating, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. Exception: Slab on grade floors.
- B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per ASTM E 814 or UL 1479:
  - 1. F-Rated Systems: Provide through-penetration firestop systems with minimum 1-Hour F-ratings but not less than the fire-resistance rating of the assembly penetrated.
  - 2. T-Rated Systems: Provide through-penetration firestop systems with minimum 1-Hour T-ratings as well as minimum 1-Hour F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas but not less than the fire-resistance rating of the assembly penetrated.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

### 1.3 ACTION SUBMITTALS

A. Product Data: Submit product data for each type of through penetration firestop system product indicated.

# 1.4 INFORMATIONAL SUBMITTALS

- A. Through-Penetration Firestopping Schedule: Submit, for information only, a Through-Penetration Firestopping Schedule indicating the type of through-penetration firestop system to be installed for each penetration. Indicate each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of testing and inspection agency acceptable to the authorities having jurisdiction that evidences compliance with requirements for each condition indicated, and listed in the "Through Penetration Firestopping Schedule" at the end of Part 3 of this Section.
  - 1. Submit documentation, including illustrations applicable to each through-penetration firestop.
  - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
  - 3. At Project Closeout, submit a Record Schedule, signed by the Installer, of systems installed, the UL design designations, and the location of each system.

# 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm or individual certified or licensed, by firestop system manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
  - 1. Firestop tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems identical to those tested per ASTM E 814 or UL 1479. Provide rated systems complying with the following requirements.
    - a. Through-penetration firestop systems corresponding to those indicated by reference to through-penetration firestop system designations listed by the following:
      - 1) UL in "Fire Resistance Directory."
      - 2) ITS in "Directory of Listed Products."

# 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and

inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

### 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

#### 1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing and provide through-penetration firestop systems to accommodate sizes of sleeves, openings, core-drilled holes, or cut openings.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide through-penetration firestop systems that are produced by one of the following manufacturers:
  - 1. Hilti Inc.
  - 2. Nelson Firestop Products.
  - 3. Specified Technologies Inc.
  - 4. 3M; Fire Protection Products Division.
  - 5. USG Corporation.
- B. Basis of Design: Subject to compliance with requirements, provide through-penetration firestop systems that are UL listed for the penetrations listed in UL-Classified Through Penetration Fire Stopping Assemblies in the *Through-Penetration Firestop System Schedule* at the end of Part 3 of this Section.

# 2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. VOC Content: Provide penetration firestopping that complies with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
  - 4. Plastic Foam Adhesives: 50 g/L.
  - 5. Adhesives for Porous Materials (Except Wood): 50 g/L.
  - 6. Fiberglass Adhesives: 80g/L.
  - 7. Primers, Sealers and Undercoaters: 200 g/L.
- C. Accessories: Provide components for each through-penetration firestop system needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
  - 1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.
- D. Gypsum Products: The use of gypsum products for through-penetration firestopping is strictly prohibited.

# 2.3 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the *Through-Penetration Firestop System Schedule* at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

- B. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.
- C. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12 inches of unreinforced annular space.
- D. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- E. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.
- F. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- G. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- H. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- I. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- J. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- K. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- L. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- M. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- N. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- O. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a

nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.

# 2.4 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without damaging substrate or disturbing firestop system's seal with substrates.

### 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
  - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

# 3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
  - 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
  - 4. Date of installation.

- 5. Through-penetration firestop system manufacturer's name.
- 6. Installer's name.
- B. Identify fire-resistance-rated construction (including walls, shaft enclosures, partitions, and smoke barriers) with signs or stenciling permanently installed above suspended ceilings or in other concealed spaces. The lettering shall be 3 inches (75 mm) in height and spaced 12 feet (3658 mm) on center:
  - 1. The words "\_\_\_\_-HOUR FIRE AND SMOKE WALL PROTECT ALL PENETRATIONS."
    - a. Replace blank with actual fire-resistance rating.

### 3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

# 3.7 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Select UL-classified systems from the attached schedule and submit "Through-Penetration Firestopping Schedule" as specified in Article 1.3, Submittals.

PENETRATION FIRESTOPPING SCHEDULE FIRESTOPPING SYSTEMS ARE LISTED USING THE ALPHA-ALPHA-NUMERIC IDENTIFICATION SYSTEM PUBLISHED IN UL'S FIRE RESISTANCE DIRECTORY, VOLS. 2A - 2B								
	CONSTRUCTION							
TYPE OF PENETRANT	FLOOR PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR F)				WALL PENETRATION SYSTEMS (FIRST ALPHA COMPONENT = C OR W)			
	CONCRETE FLOORS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 5 INCHES (127 MM)	CONCRETE FLOORS WITH A MINIMUM THICKNESS OF MORE THAN 5 INCHES (127 MM)	FRAMED FLOORS	FLOOR-CEILING ASSEMBLIES CONSISTING OF CONCRETE WITH MEMBRANE PROTECTION	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS LESS THAN OR EQUAL TO 8 INCHES (203 MM)	CONCRETE OR MASONRY WALLS WITH A MINIMUM THICKNESS OF MORE THAN 8 INCHES (203 MM)	FRAMED WALLS	COMPOSITE PANEL WALLS
NO PENETRATING ITEMS	C-AJ-0001- 0999 or F-A-0001-0999	C-BJ-0001- 0999 or F-B-0001-0999	F-C-1001- 1999		C-AJ-0001- 0999, C-BJ-0001- 0999, or W-J-0001-0999		W-L-000-1- 0999	
METALLIC PIPE, CONDUIT, OR TUBING	C-AJ-1001- 1999 or F-A-1001-1999	C-BJ-1001- 1999, C-BK-1001- 1999, or F-B-1001-1999	F-C-1001- 1999	F-E-1001-1999	C-AJ-1001- 1999, C-BJ-1001- 1999, or W-J-1001-1999	C-BK-1001- 1999 or W-K-1001-1999	W-L-1001- 1999	W-N-1001-1999
NONMETALLIC PIPE, CONDUIT, OR TUBING	C-AJ-2001- 2999 or F-A-2001-2999	C-BJ-2001- 2999, C-BK-2001- 2999, or F-B-2001-2999	F-C-2001- 2999	F-E-2001-2999	C-AJ-2001- 2999, C-BJ-2001- 2999, or W-J-2001-2999	C-BK-2001- 2999 or W-K-2001-2999	W-L-2001- 2999	W-N-2001-2999
ELECTRICAL CABLES	C-AJ-3001- 3999 or F-A-3001-3999	C-BJ-3001- 3999, C-BK-3001- 3999, or F-B-3001-3999	F-C-3001- 3999	F-E-3001-3999	C-AJ-3001- 3999, C-BJ-3001- 3999, or W-J-3001-3999	C-BK-3001- 3999 or WK-3001-3999	W-L-3001- 3999	
CABLE TRAYS WITH ELECTRICAL CABLES	C-AJ-4001- 4999 or F-A-4001-4999	C-BJ-4001- 4999 or F-B-4001-4999			C-AJ-4001- 4999, C-BJ-4001- 4999, or W-J-4001-4999	W-K-4001-4999	W-L-4001- 4999	
INSULATED PIPES	C-AJ-5001- 5999 or F-A-5001-5999	C-BJ-5001- 5999, C-BK-5001- 5999, or F-B-5001-5999	F-C-5001- 5999	F-E-5001-5999	C-AJ-5001- 5999, C-BJ-5001- 5999, or W-J-5001-5999	C-BK-5001- 5999	W-L-5001- 5999	W-N-5001-5999
MISCELLANEOUS ELECTRICAL PENETRANTS	C-AJ-6001- 6999 or F-A-6001-6999	C-BJ-6001- 6999			C-AJ-6001- 6999, C-BJ-6001- 6999, or W-BJ-6001- 6999		W-L-6001- 6999	
MISCELLANEOUS MECHANICAL PENETRANTS	C-AJ-7001- 7999 or F-A-7001-7999	C-BJ-7001- 7999 or F-B-7001-7999	F-C-7001- 7999	F-E-7001-7999	C-AJ-7001- 7999, C-BJ-7001- 7999, or W-J-7001-7999		W-L-7001- 7999	W-N-7001-7999
GROUPINGS OF PENETRATIONS	C-AJ-8001- 8999 or F-A-8001-8999	C-BJ-8001- 8999 or F-B-8001-8999	F-C-8001- 8999	F-E-8001-8999	C-AJ-8001- 8999, C-BJ-8001- 8999, or W-J-8001-8999		W-L-8001- 8999	
Remarks: For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed penetration firestonoing system selected from								

Remarks: For each location where a fire-resistance-rated floor or wall assembly is penetrated, provide a UL-listed penetration firestopping system selected from the applicable UL number range listed above that complies with Section 078413 "Penetration Firestopping" and that is suitable for the penetration conditions indicated for the Project.

# END OF SECTION 07 84 13

# SECTION 07 92 00 – JOINT SEALANTS

# PART 1 - GENERAL

# 1.1 SUMMARY

A. This Section includes joint sealants for the applications indicated.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
  - 1. Joint-sealant application, joint location, and designation.
  - 2. Joint-sealant manufacturer and product name.
  - 3. Joint-sealant formulation.
  - 4. Joint-sealant color.

# 1.3 INFORMATIONAL SUBMITTALS

- A. Field-Adhesion-Test Reports: For each sealant application tested.
- B. Warranties.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Exposed sealant work shall be performed by a single firm specializing in the installation of sealants who has successfully produced work comparable to this project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years. Concealed sealant work shall be the responsibility of the subcontractor whose work requires concealed or internal sealant applications.
- B. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.
- B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

# 1.6 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 degrees F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

### 1.7 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty excludes deterioration or failure of joint sealants from the following:
    - a. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
    - b. Disintegration of joint substrates from causes exceeding design specifications.
    - c. Mechanical damage caused by individuals, tools, or other outside agents.
    - d. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.
  - 2. Warranty Period: 5 years from date of Substantial Completion.
- B. Manufacturer's Warranty for Silicone Sealants: Manufacturer agrees to furnish silicone sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. Warranty Period: 20 years from date of Substantial Completion.

# PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and waterresistant continuous joint seals without staining or deteriorating joint substrates.

#### 2.2 MATERIALS, GENERAL

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- B. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as stated by sealant manufacturer's published data, and as substantiated by the manufacturer for each application, based on testing and field experience.
- C. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

# 2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Provide elastomeric sealants that are nonstaining to porous substrates as demonstrated by testing according to ASTM C 1248.
- C. Single-Component Neutral-Curing Silicone Sealant:
  - 1. Products: Provide one of the following:
    - a. Dow Corning Corporation; 795.
    - b. GE Advanced Materials; SilPruf LM SCS2700.
    - c. Pecora Corporation; 864 or 890.
    - d. Tremco; Spectrem 3 or Spectrem 1.

- 2. Type and Grade: S (single component) and NS (nonsag).
- 3. Class: 50.
- 4. Use Related to Exposure: NT (nontraffic).
- 5. Uses Related to Joint Substrates: M, G, A, and, O.
- 6. Application: Joints in exterior wall assemblies and concealed metal flashing joints (moving joints).
- D. Single-Component Neutral-Curing Silicone Sealant:
  - 1. Products: Provide one of the following:
    - a. Dow Corning Corporation; 790.
    - b. Pecora Corporation; 301 NS or 311 NS.
    - c. Tremco Incorporated; Spectrem 800.
  - 2. Type and Grade: S (single component) and NS (nonsag).
  - 3. Class: 50.
  - 4. Use Related to Exposure: T (traffic).
  - 5. Uses Related to Joint Substrates: M, G, A, and, O.
  - 6. Application: Joints in exterior paving or pavements (moving joints).
- E. Single-Component Mildew-Resistant Silicone Sealant:
  - 1. Products: Provide one of the following:
    - a. Dow Corning Corporation; 786 Mildew Resistant.
    - b. GE Advanced Materials; Sanitary SCS1700.
    - c. Pecora Corporation; 898.
    - d. Tremco; Tremsil 200 Sanitary.
  - 2. Type and Grade: S (single component) and NS (nonsag).
  - 3. Use Related to Exposure: NT (nontraffic).
  - 4. Uses Related to Joint Substrates: M, G, A, and, O.
  - 5. Provide products containing a fungicide for mildew resistance.
  - 6. Application: Joints in interior wet areas.
- F. Single-Component Pourable Urethane Sealant:
  - 1. Products: Provide one of the following:
    - a. Pecora Corporation; Urexpan NR-201.
    - b. Sika Corporation, Inc.; Sikaflex 1CSL.
    - c. Tremco; Tremflex S/L or Vulkem 45.
  - 2. Type and Grade: S (single component) and P (pourable).
  - 3. Uses Related to Exposure: T (traffic) and NT (nontraffic).
  - 4. Uses Related to Joint Substrates: M, G, A, and, O.
  - 5. Application: Interior floor joints.

# 2.4 BUTYL JOINT SEALANTS

- A. Butyl-Rubber-Based Joint Sealant: ASTM C 1311.
  - 1. Products: Provide one of the following:
    - a. Bostik, Inc; Chem-Calk 300.
    - b. Pecora Corporation; BC-158.

# 2.5 LATEX JOINT SEALANTS

- A. Acrylic Latex Sealant or Siliconized Acrylic Latex Sealant: ASTM C 834, Type OP, Grade NF.
  - 1. Products: Provide one of the following:
    - a. Pecora Corporation; AC-20+Silicone.
    - b. Tremco; Tremflex 834.
  - 2. Application: Interior wall joints and perimeter of frames.

# 2.6 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: Preformed, compressible, resilient, nonstaining, nonwaxing, nonextruding backings of flexible plastic foam complying with ASTM C 1330 for type indicated. Select size, shape and density of cylindrical sealant backings in consultation with the manufacturer to control sealant depth and produce optimum sealant performance for specific project conditions of use.
  - 1. Type C: Closed-cell polyethylene foam material with a surface skin, which is nonabsorbent to liquid water and gas, non-outgassing in unruptured state. Provide one of the following:
    - a. HBR Closed Cell Backer Rod; Nomaco, Inc.
    - b. Sonneborn Sonolastic Closed-Cell Backer-Rod; Building Systems Division/BASF.
    - c. MasterSeal 920; BASF Master Builders.
  - 2. Type B: Bi-cellular reticulated, polymeric foam material with a surface skin, nonoutgassing, with a density of between 24-48 kg/cubic meter per ASTM D1622 and minimum tensile strength of greater than 200 kPa per ASTM D1623, and with water absorption less than 0.10 gm/cc per ASTM C1016. Provide one of the following:
    - a. SofRod; Nomaco, Inc.
    - b. Sonolastic Soft Backer-Rod; Building Systems Division/BASF.
    - c. MasterSeal 921; BASF Master Builders.

C. Bond-Breaker Tape: Polyethylene, TFE fluorocarbon, or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

# 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and which will not stain nor mar the finish of surfaces adjacent to joints.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.

- 3. Remove laitance and form-release agents from concrete.
- 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
  - a. Metal.
  - b. Glass.
  - c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

# 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form

smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

- 1. Remove excess sealant from surfaces adjacent to joints.
- 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

#### 3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates for joint sealants in exterior wall assemblies as follows:
  - 1. Extent of Testing: Test completed and cured sealant joints as follows:
    - a. Perform test at each building façade for each kind of sealant and joint substrate.
  - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
    - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  - 3. Inspect tested joints and report on the following:
    - a. Whether sealants filled joint cavities and are free of voids.
    - b. Whether sealant dimensions and configurations comply with specified requirements.
    - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
  - 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
  - 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

# 3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

# 3.6 **PROTECTION**

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

# END OF SECTION 079200

# SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes hollow metal doors and frames.
  - 1. The integration of a security system into the hollow metal door and frame work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.
- B. Related Requirements:
  - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors and frames.
  - 2. Section 099100 "Painting" for field painting hollow metal doors and frames.

#### 1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: Submit product data for each product indicated. Include material descriptions, core descriptions, label compliance, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- B. Shop Drawings: Submit door and frame schedule using same reference designations indicated on Drawings. Include opening size(s), handing of doors, frame throat dimensions, details of each frame type, elevations of door design types, details of construction, location and installation requirements of door hardware and reinforcements, hardware group numbers, details of joints and connections, fire label requirements including fire rating time duration, maximum temperature rise requirements, and smoke label requirements.
  - 1. Indicate routing of electrical conduit and dimensions and locations of cutouts in doors and frames to accept electric hardware devices.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

# 1.4 INFORMATIONAL SUBMITTALS

A. Certificate of Compliance for Fire Rated Doors: Provide copies of Certificate of Compliance for all fire rated door assemblies, all smoke and draft control door assemblies, and all temperature rise rated door assemblies.

# 1.5 QUALITY ASSURANCE

- A. Hollow Metal Door and Frame Standard: Comply with the applicable provisions and recommendations of the following publications by Hollow Metal Manufacturers Association (HMMA) Div. of National Association of Architectural Metal Manufacturers (NAAMM), unless more stringent requirements are indicated in the Contract Documents:
  - 1. HMMA "Hollow Metal Manual."
  - 2. HMMA 861 "Guide Specifications for Commercial Hollow Metal Doors and Frames."
- B. Manufacturer Qualifications: A firm experienced in manufacturing hollow metal doors and frames similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
  - 1. Provide metal labels permanently fastened on each door which is within the size limitations established by the labeling authority having jurisdiction.
  - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 degrees F (250 degrees C) maximum in 30 minutes of fire exposure.
  - 3. Positive Pressure Rated Door Assemblies: Where indicated provide positive pressure rated fire rated door assemblies. Sizes and configurations as shown on the Drawings. Installed door assemblies shall be in accordance with door manufacturer's certified assemblies.
    - a. Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inches (1000 mm) or less above the sill.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage.
- B. Inspect doors and frames, on delivery, for damage. Tool marks, rust, blemishes, and other damage on exposed surfaces will not be acceptable. Remove and replace damaged items as directed by Architect. Store doors and frames at building site in a dry location, off the ground, and in such a manner as to prevent deterioration.

#### 1.7 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

# PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide doors and frames by one of the following:
  - 1. Ceco Door Products; an Assa Abloy Group Company.
  - 2. Curries Company; an Assa Abloy Group Company.
  - 3. Steelcraft; an Allegion PLC Company.

# 2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 1011/A 1011M, CS (commercial steel), Type B, free from scale, pitting, coil breaks, surface blemishes, buckles, waves, or other defects, exposed (matte) dull finish, suitable for exposed applications.
- B. Cold-Rolled Steel Sheets: ASTM A 1008/A 1008M, CS (commercial steel), Type B; free of scale, pitting, or surface defects; pickled and oiled. Not less than 16 gauge, (0.053 inch) (1.3 mm) thick where frames are indicated to be built into exterior walls, hot dip galvanize after fabrication in compliance with ASTM A153/A153M, Class B.
- C. Metallic-Coated Steel Sheets: ASTM ASTM A 653/A 653M, CS (commercial steel), Type B; with G60 (Z180) zinc (galvanized) or A60 (ZF180) zinc-iron-alloy (galvannealed) coating, mill phosphatized.
- D. Inserts, Bolts, and Fasteners: Galvanized or cadmium plated steel.
  - 1. Expansion Bolts and Shields: FS FF-S-325, Group III, Type 1 or 2.
  - 2. Machine Screws: FS FF-S-92, carbon steel, Type III cross recessed, design I or II recess, style 2C flat head.
- E. Filler: Sound deadening and heat retarding mineral fiber insulating material.
- F. Glass and Glazing: Refer to Section 08 80 00 "Glazing."

# 2.3 DOORS

A. General: Provide flush-design doors, 1-3/4 inches (44 mm) thick, of seamless hollow construction, unless otherwise indicated. Construct doors with sheets joined at their vertical edges by continuous welding the full height of the door, or joined at vertical edges by 1 inch

(25.4 mm) spot welds 6 inches (150 mm) on center, or intermittently welded seams. Voids between spot and intermediate welds shall be epoxy edge filled Grind and finish all welds and edge fills flush to result in invisible seams on the door faces or vertical door edges.

- 1. For single-acting swing doors, bevel both vertical edges 1/8 inch in 2 inches (3 mm in 50 mm).
- 2. For double-acting swing doors, round vertical edges with 2-1/8-inch (54-mm) radius.
- B. Core Construction: Doors shall be stiffened by continuous vertically formed steel sections which, upon assembly, shall span the full thickness of the interior space between door faces. These stiffeners shall be 0.026-inch (0.6-mm) minimum thickness, spaced so that the vertical interior webs shall be not more than 6 inches (150 mm) apart and spot welded to face sheets a maximum of 5 inches (127 mm) on center. Place filler between stiffeners for full height of door.
- C. Exterior Door Core Construction: Polystyrene core adhered to face sheets with waterproof adhesive.
- D. Fire Door Cores: A continuous mineral fiberboard core permanently bonded to the inside face of the outer face sheet unless otherwise required to provide fire-protection and temperature-rise ratings indicated.
- E. Top and Bottom Channels: Spot weld metal channel not less than thickness of face sheet to face sheets not more than 6 inches (150 mm) on center.
  - 1. Reinforce tops and bottoms of doors with inverted horizontal channels of same material as face sheet so flanges of channels are even with bottom and top edges of face sheets.
  - 2. For exterior doors, close top edge with metallic-coated steel closing channel of same material, so webs of channels are flush with top door edges. Weld inverted steel channels to both face sheets or form integrally with edge construction of door.
- F. Hardware Reinforcement: Fabricate reinforcing from the same material as door to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with door surfaces.
  - 1. Hinges and Pivots: 7 gauge (0.167 inch) (4.2 mm) thick by 1-1/2 inches (38 mm) wide by 9 inches (229 mm).
  - 2. Lock Front, Strike, and Flushbolt Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick by size as required by hardware manufacturer.
  - 3. Lock Reinforcement Units: 14 gauge (0.067 inch) (1.7 mm) thick by size as required by hardware manufacturer.
  - 4. Closer Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick one-piece channel by size as required by hardware manufacturer.
  - 5. Other Hardware Reinforcements: As required for adequate strength and anchorage.
  - 6. In lieu of reinforcement specified, hardware manufacturer's recommended reinforcing units may be used.
  - Exit Device Reinforcements: 0.250 inch (6.35 mm) thick by 10 inches (245 mm) high by
    4 inches (101 mm) wide centered on exit device case body, unless otherwise recommended by exit device manufacturer.

- G. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.
  - 1. Provide all cutouts and reinforcements required for hollow metal doors to accept security system components.
  - 2. Doors with Electric Hinges and Pivots: Provide with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.
    - a. Hinge Location: Center for doors less than 90 inches (2286 mm) tall or second hinge from door bottom for doors greater than 90 inches (2286 mm); top or bottom electric hinge locations shall not be permitted.
- H. Interior Hollow Metal Doors:
  - 1. Typical Interior Doors: Flush design with 18 gauge (0.042-inch-) (1.06-mm-) thick cold-rolled stretcher-leveled steel face sheets and other metal components from hot- or cold-rolled steel sheets.
  - 2. Extra Heavy Use Doors: Flush design with 14 gauge (0.067-inch-) (1.7-mm-) thick cold-rolled, stretcher-leveled steel face sheets and other metal components from hot- or cold-rolled steel sheets. Provide only where indicated.
- I. Exterior Hollow Metal Doors: Flush design with 16 gauge (0.053-inch-) (1.3-mm-) thick metallic-coated stretcher leveled steel face sheets and other metal components from metallic coated steel sheets. Provide weep-hole openings in bottom of doors to permit entrapped moisture to escape.
- 2.4 PANELS
  - A. Provide panels of same materials, construction, and finish as specified for doors.

# 2.5 FRAMES

- A. Fabricate hollow metal frames, formed to profiles indicated, with full 5/8 inch (16 mm) stops, and of the following minimum thicknesses.
  - 1. For exterior use, form frames from 14 gauge (0.067-inch-) (1.7-mm-) thick, metallic-coated steel sheets.
  - 2. For interior use, form frames from cold- rolled steel sheet of the following thicknesses:
    - a. Openings up to and Including 48 Inches (1200 mm) Wide: 16 gauge (0.053 inch) (1.3 mm).
    - b. Openings More Than 48 Inches (1200 mm) Wide: 14 gauge (0.067 inch) (1.7 mm).
  - 3. Frame heads at all masonry openings shall be formed to extend to the lowest CMU horizontal mortar joint.

- B. Provide frames either saw mitered and full (continuously) profile welded, or machine mitered and full profile welded, on back side at frame corners and stops with edges straight and true. Grind welds smooth and flush on exposed surfaces.
- C. Hardware Reinforcement: Fabricate reinforcements from same material as frame to comply with the following. Offset reinforcement so that faces of mortised hardware items are flush with surface of the frame.
  - 1. Hinges and Pivots: 7 gauge (0.167 inch) (4.2 mm) thick by 1-1/4 inches (32 mm) wide by 10 inches (254 mm).
  - 2. Strike, Surface Mounted Hold Open Arms, and Flushbolt Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick by size as required by hardware manufacturer.
  - 3. Closer Reinforcements: 12 gauge (0.093 inch) (2.3 mm) thick one piece channel by size as required by hardware manufacturer.
  - 4. Other Hardware Reinforcements: As required for adequate strength and anchorage.
- D. Electrical Requirements: Make provisions for installation of electrical items specified elsewhere; arrange so wiring can be readily removed and replaced.
  - 1. Provide all cutouts and reinforcements required for steel frames to accept security system components.
  - 2. Frames with Electric Hinges and Pivots: Provide welded on UL listed back boxes with metal conduit or raceway to permit wiring from electric hinge or pivot to other electric door hardware.
    - a. Hinge Location: Center for doors less than 90 inches (2286 mm) tall or second hinge from door bottom for doors greater than 90 inches (2286 mm); top or bottom electric hinge locations shall not be permitted.
- E. Jamb Anchors: Locate jamb anchors above hinges and directly opposite on strike jamb as required to secure frames to adjacent construction. At metal stud partitions locate the additional jamb anchor below the top hinge.
  - 1. Masonry Construction: Adjustable, corrugated or perforated, anchors to suit frame size; formed of same material and gauge thickness as frame; at non-rated frames use friction fit T-shaped anchors, at rated frames use anchors consisting of spot welded strap and adjustable anchor; with leg not less than 2 inches (50 mm) wide by 10 inches (250 mm) long. Furnish at least the number of anchors per jamb according to the following frame heights:
    - a. Two anchors per jamb up to 60 inches (1500 mm) in height.
    - b. Three anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
    - c. Four anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
    - d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.
  - 2. Metal-Stud Partitions: Metal channel stud zee anchor sized to match stud width, welded to back of frames, formed of same material and gauge thickness as frame. Provide at least the number of anchors for each jamb according to the following heights:
    - a. Three anchors per jamb up to 60 inches (1500 mm) in height.
- b. Four anchors per jamb from 60 to 90 inches (1500 to 2250 mm) in height.
- c. Five anchors per jamb from 90 to 96 inches (2250 to 2400 mm) in height.
- d. One additional anchor per jamb for each 24 inches (600 mm) or fraction thereof more than 96 inches (2400 mm) in height.
- 3. In-Place Concrete or Masonry: Anchor frame jambs with minimum 3/8-inch- (9-mm-) diameter countersunk flat head bolts into expansion shields or inserts 6 inches (150 mm) from top and bottom of each jamb with intermediate anchors spaced a maximum of 26 inches (650 mm) o.c. Soffit face of frame shall be punched and dimpled to accept countersunk bolt head. Reinforce frame with spacer to prevent bowing. Bolt head shall be set slightly below soffit face, filled and ground smooth at time of installation.
- F. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, formed of same material as frame, 12 gauge (0.093 inch) (2.3 mm) thick, and punched with two holes to receive two 0.375 inch (9.5 mm) fasteners. Where floor fill or setting beds occur support frame by adjustable floor anchors bolted to the structural substrate. Terminate bottom of frames at finish floor surface. Weld floor anchors to frames with at least 4 spot welds per anchor.
- G. Head Strut Supports: Provide 3/8-by-2-inch (9-by-50-mm) vertical steel struts extending from top of frame at each jamb to supporting construction above. Bend top of struts to provide flush contact for securing to supporting construction above by bolting, welding, or other suitable anchorage. Provide adjustable wedged or bolted anchorage to frame jamb members to permit height adjustment during installation. Adapt jamb anchors at struts to permit adjustment.
- H. Head Reinforcement: For frames more than 48 inches (1200 mm) wide in masonry wall openings, provide continuous steel channel or angle stiffener, 12 gauge (0.093 inch) (2.3 mm) thick for full width of opening, welded to back of frame at head. Head reinforcements shall not be used as a lintel or load-bearing member for masonry.
- I. Spreader Bars: Provide removable spreader bar across bottom of frames to serve as bracing during shipment and handling and to hold frames in proper position do not tack weld bars to frames.
- J. Door Silencer Holes: Drill strike jamb stop to receive three silencers on single door frames and for two silencers on double door frames. Insert plastic plugs in holes to keep holes clear during installation.
- K. Plaster, Mortar and Grout Guards and Removable Access Plates: Provide minimum 26 gauge (0.016-inch-) (0.4-mm-) thick guards or dust-cover boxes of same material as frame, welded to frame at back of hardware cutouts to close off interior of openings and prevent mortar or other materials from obstructing hardware and hardware fastener installation and hardware operation. Provide removable access plates in the heads of frames to receive overhead concealed door closers.

# 2.6 STOPS AND MOLDINGS

A. Provide continuous stops and moldings around solid, glazed, and louvered panels where indicated.

- B. Form fixed stops and moldings integral with frame, on the exterior (non-secured) side of the frame.
- C. Provide removable stops and moldings formed of 20 gauge (0.032-inch-) (0.8-mm-) thick steel sheets matching hollow metal frames. Secure with countersunk oval head machine screws spaced uniformly not more than 12 inches (300 mm) on center. Form corners with butted or mitered hairline joints.
- D. Coordinate rabbet width between fixed and removable stops with type of glass or panel and type of installation indicated.

## 2.7 FABRICATION

- A. Fabricate doors and frames rigid, neat in appearance, and free of defects, warp, wave, and buckle. Accurately form metal to sizes and profiles indicated. Accurately machine, file, and fit exposed connections with hairline joints. Weld exposed joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
- B. Exposed Fasteners: Provide countersunk flat heads for exposed screws and bolts, unless otherwise indicated.
- C. Hardware Preparation: Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final hardware schedule and templates provided by hardware supplier. Secure reinforcement by spot welding. Comply with applicable requirements of ANSI/BHMA A156.115 and A156.115W specifications for door and frame preparation for hardware. Factory-reinforce doors and frames to receive surface-applied hardware. Factory drill and tap for surface-applied hardware, except at pushplates and kickplates provide reinforcing only.
  - 1. Locate hardware as indicated on the Drawings or in Section 08 71 00 "Door Hardware" or, if not indicated, according to HMMA 831, "Recommended Hardware Locations for Custom Hollow Metal Doors and Frames."

## 2.8 METALLIC-COATED STEEL FINISHES

- A. General: Clean, treat and prime surfaces of fabricated steel door and frame work, inside and out, whether exposed or concealed in the construction.
- B. Surface Preparation: Clean surfaces with non-petroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
  - 1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.

1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, lead- and chromatefree, primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for zinc-coated steel; compatible with substrate and field-applied finish paint system indicated.

## 2.9 STEEL SHEET FINISHES

- A. General: Clean, treat and prime surfaces of fabricated steel door and frame work, inside and out, whether exposed or concealed in the construction.
- B. Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale, shavings, filings, and rust, if present, complying with SSPC-SP 3, "Power Tool Cleaning."
- C. Factory Priming for Field-Painted Finish: Apply shop primer immediately after surface preparation and pretreatment. Apply a sufficient number of coats, baked on, to obtain uniformly smooth exposed surfaces. Touch up surfaces having runs, smears, or bare spots.
  - 1. Shop Primer: Manufacturer's or fabricator's standard, fast-curing, corrosion-inhibiting, lead- and chromate-free, universal primer complying with ANSI A250.10 acceptance criteria; compatible with substrate and field-applied finish paint system indicated.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

- A. General: Install doors and frames according to the referenced standards, the Architect reviewed shop drawings, and manufacturer's written recommendations and installation instructions.
- B. Frames: Install frames where indicated. Extend frame anchorages below fills and finishes. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.
  - 1. Welded Frames:
    - a. Set masonry anchorage devices where required for securing frames to in-place concrete or masonry construction.
      - 1) Set anchorage devices opposite each anchor location as specified and anchorage device manufacturer's written instructions. Leave drilled holes rough, not reamed, and free of dust and debris.
    - b. Placing Frames: Remove temporary spreader bars prior to installation of the frames. Set frames accurately in position; plumb; align, and brace securely until permanent anchors are set.
      - 1) At concrete or masonry construction, set frames and secure in place with machine screws and masonry anchorage devices. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

- 2) Anchor bottom of frames to floors through floor anchors with threaded fasteners.
- 3) Field splice only at approved locations indicated on the shop drawings. Weld, grind, and finish as required to conceal evidence of splicing on exposed faces.
- 2. At fire-rated openings, install frames according to NFPA 80.
- C. Doors:
  - 1. Non-Fire Rated Doors: Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
    - a. Jambs and Head: 3/32 inch (2 mm).
    - b. Meeting Edges, Pairs of Doors: 1/8 inch (3 mm).
    - c. Bottom: 3/8 inch (9 mm), if no threshold or carpet.
    - d. Bottom: 1/8 inch (3 mm), at threshold or carpet.
  - 2. Fire-Rated Doors: Install with clearances as specified in NFPA 80.
- D. Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow metal manufacturer's written instructions.
  - 1. Secure stops with countersunk flat or oval head machine screws spaced uniformly not more than 9 inches (230 mm) on center and not more than 2 inches (50 mm) on center from each corner.
- E. Wood Door Installation: Refer to 08 14 16 "Flush Wood Doors."
- F. Apply hardware in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." Drill and tap for machine screws as required. Do not use self tapping sheet metal screws. Adjust door installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.

## 3.2 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
  - 1. Finish Painting: Refer to Section 09 91 00 "Painting"
- C. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise defective.

D. Institute protective measures required throughout the remainder of the construction period to ensure that the hollow metal doors and frames will be without damage or deterioration, at time of Substantial Completion.

END OF SECTION 08 11 13

### SECTION 08 14 16 - FLUSH WOOD DOORS

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-core doors flush wood doors.
  - 2. Shop priming flush wood doors.
  - 3. Factory fitting flush wood doors to frames and factory machining for hardware.
  - 4. The integration of a security system into the flush wood door work is required. The Contractor shall be responsible for the total and complete coordination of the security system components into the Work.
- B. Related Requirements:
  - 1. Section 08 11 13 "Hollow Metal Doors and Frames."
  - 2. Section 08 71 00 "Door Hardware."
  - 3. Section 09 91 00 "Painting" for field finishing doors.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of door. Include details of core and edge construction and trim for openings.
- B. Shop Drawings: Drawings indicating location, size, thickness, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; use same reference numbers for details and openings indicated on Architectural Drawings. Coordinate with final Door Hardware Schedule. Include the following:
  - 1. Details of each different wall opening condition.
  - 2. Identification of hardware sets.
  - 3. Dimensions and locations of blocking.
  - 4. Dimensions and locations of mortises and holes for hardware.
  - 5. Dimensions and locations of cutouts.
  - 6. Undercuts.
  - 7. Shop priming requirements.

# 1.3 CLOSEOUT SUBMITTALS

A. Warranty.

## 1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with the applicable provisions and recommendations of Architectural Woodwork Standards, 2nd edition, published jointly by AWI, AWMAC, and WI, unless more stringent requirements are specified or shown.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fireprotection ratings indicated, based on testing according to NFPA 252, and UL 10C "Standard for Positive Pressure Fire Tests of Door Assemblies." Fire classification labels at all doors with fire ratings greater than 20 minutes shall indicate the temperature rise developed on the unexposed surface of the door after the first 30 minutes of fire exposure.
  - 1. Provide metal labels permanently fastened on each door which is within the size limitations established by the labeling authority having jurisdiction.
  - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 degrees F maximum in 30 minutes of fire exposure.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

#### 1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

#### 1.7 WARRANTY

- A. A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
    - b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
  - 2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.
  - 3. Marshfield Door Systems, Inc.
  - 4. Oshkosh Door Company.
  - 5. VT Industries Inc.

## 2.2 FLUSH WOOD DOORS, GENERAL

- A. General:
  - 1. Comply with referenced quality standard.
  - 2. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain added formaldehyde.
- B. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
  - 1. Grade: Custom.
  - 2. Face Veneer: Medium-density overlay.
  - 3. Thickness: 1-3/4 inch, unless otherwise indicated.
  - 4. Temperature-Rise Limit: At vertical exit enclosures provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F above ambient after 30 minutes of standard fire-test exposure.
  - 5. Cores: Provide mineral core as needed to provide fire-protection rating indicated.
  - 6. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
  - 7. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
  - 8. Construction: Five or seven plies.
- C. Mineral-Core Doors:
  - 1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
  - 2. Blocking: Provide composite blocking, of same thickness as core, with improved screwholding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware and as follows:

- a. 5-1/2 inch wide minimum top-rail blocking consisting of minimum 1/2 inch wide single length mill option hardwood outer band and single length lumber inner band fabricated of same materials as vertical edges.
- b. Provide either two 4-1/2 inch by 18 inch minimum sized lock blocks on each door stile or a single 10 inch high continuous lock rail located on lockcase body center-lines.
- 3. Vertical Edge Construction: Provide manufacturer's standard laminated-edge construction meeting label requirements, with intumescent seals concealed by outer stile matching face veneer, and meeting or exceeding the specified direct screw withdrawal, split resistance, cycle slam, and hinge loading criteria. Finish outer bands to match door faces without joints.
  - a. Split Resistance: Not less than 696 pounds when tested in accordance with WDMA TM-5; or, not less than 1305 pounds when tested in accordance with ASTM D 143.
  - b. Cycle/Slam: Not less than 200,000 cycles with no loosening of hinge screws or other visible signs of failure when tested in accordance with the requirements of WDMA TM-7; or, not less than 502,000 cycles when tested in accordance with ANSI A151.1
  - c. Direct Screw Withdrawal: Not less than 700 pounds when tested in accordance with WDMA TM-10; or, not less than 877 pounds when tested in accordance with ASTM D 1037 using #12 x 1-1/4 steel screws, threaded to the head with either A or AB wood threads.
  - d. Hinge Loading: Not less than 684 pounds average when tested in accordance with WDMA TM-8.

# 2.3 LIGHT FRAMES

A. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard woodveneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated. Include finish nails for removable stops sized as required for fire rating indicated.

## 2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
  - 1. Comply with NFPA 80 requirements for fire-rated doors.
- 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, BHMA-156.115-W, and hardware templates.
  - 1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.

- C. Openings: Factory cut and trim openings through doors.
  - 1. Light Openings: Trim openings with moldings of material and profile indicated.
  - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 08 80 00 "Glazing."

## 2.5 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces, all four edges, edges of cutouts, and mortises with one coat of wood primer specified in Section 09 91 00 "Painting."
  - 1. Surfaces shall be clean and dry before priming.
  - 2. Apply primer/sealer uniformly without bare spots, runs, or sags.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. Hardware: Apply hardware to new doors in accordance with hardware manufacturer's instructions and Section 08 71 00 "Door Hardware." For particleboard core doors drill pilot holes of proper size for installing hinge screws. Adjust hardware items just prior to final inspection. Leave work in complete and proper operating condition.
  - 1. Factory wrapping shall be maintained on new doors during construction period, and all hardware shall be installed by cutting the factory wrapping at the mounting location of the hardware item.
- B. General Door Installation Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
  - 1. Install fire-rated doors in accordance with NFPA 80.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge, matching clearances specified for factory prefitting, and to contact stops uniformly. Field cutting, fitting or trimming, if required, shall be executed in a workmanlike manner.
  - 1. Clearances: Comply with NFPA 80.

D. Field Painting: Comply with requirements for field-applied coatings specified in Section 09 91 00 "Painting."

### 3.3 ADJUSTING

- A. Rehang or replace doors that do not swing or operate freely.
- B. Replace doors that are damaged, warped, twisted, demonstrate core show through, are not true in plane, cannot be refinished to the satisfaction of the Architect or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.
- C. Protection: Protect wood doors to ensure that the wood door work will be without damage or deterioration until final acceptance.

END OF SECTION 08 14 16

## SECTION 08 14 33 - STILE AND RAIL WOOD DOORS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Interior stile and rail wood doors.
  - 2. Fitting stile and rail wood doors to frames and machining for hardware.
  - 3. Factory finishing.

## B. Related Sections:

- 1. Section 087100 "Door Hardware" for door hardware requirements.
- 2. Section 088000 "Glazing."

### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include details of construction and glazing.
  - 2. Include factory-finishing specifications.
- B. Shop Drawings: For stile and rail wood doors. Indicate location, size, and hand 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); and other pertinent data, including the following:
  - 1. Dimensions of doors for factory fitting.
  - 2. Locations and dimensions of mortises and holes for hardware.
  - 3. Requirements for veneer matching.
  - 4. Doors to be factory finished and finish requirements.
- C. Samples for Verification: Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edgings representing typical range of color and grain for each species of veneer and solid lumber required. Finish Sample with same materials proposed for factory-finished doors.

### 1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.
- B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 for Category II materials.

1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.

### 1.4 QUALITY ASSURANCE

A. Quality Standard: Comply with AWI/AWMAC/WI's "Architectural Woodwork Standards," 2nd Edition/2014.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in opaque plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

### 1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

### 1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship, or have warped (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch (1067-by-2134-mm) section, within specified warranty period.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 2. Warranty shall be in effect during the life of the installation from date of Substantial Completion:

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Algoma Hardwoods, Inc.
  - 2. Eggers Industries.
  - 3. Enjo Architectural Millwork.

- 4. Maiman Company (The).
- 5. Marshfield Door Systems, Inc.
- 6. Pinecrest Inc.

### 2.2 MATERIALS

- A. General: Use only materials that comply with referenced standards and other requirements specified.
  - 1. Assemble interior doors, including components, with either dry-use or wet-use adhesives complying with ASTM D 5572 for finger joints and with ASTM D 5751 for joints other than finger joints.
- B. Low-Emitting Materials: Fabricate doors with adhesives and composite wood products that do not contain urea formaldehyde.
- C. Panel Products: Any of the following unless otherwise indicated:
  - 1. Medium-density fiberboard made from wood fiber, with binder containing no ureaformaldehyde, complying with ANSI A208.2, Grade 130.
  - 2. Veneer-core plywood, made with adhesive containing no urea-formaldehyde.
- D. Adhesives for Gluing: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
  - 1. VOC Content Limits: Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. Safety Glass: Provide products specified in Section 088000 and complying with testing requirements in 16 CFR 1201, for Category II materials.

## 2.3 INTERIOR STILE AND RAIL WOOD DOORS

- A. Interior Stile and Rail Wood Doors: Interior custom doors complying with referenced quality standard and other requirements specified.
  - 1. Grade: Custom.
  - 2. Panel Designs: Drawings indicate designs for doors, glazing, moldings and trim.
    - a. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
  - 3. Wood (Lumber and Veneer) Species and Cut for Transparent Finish: As indicated on Drawings.
    - a. Matching of adjacent veneer leaves: Book matched.
    - b. Veneer matching within panel face: Balance and center match.

- 4. Stile and Rail Construction: Clear lumber; may be edge glued for width. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.
  - a. Stile and Rail Widths: As indicated on Drawings.
  - b. Thickness: 2-1/4 inches.
- 5. Glazing Panels: Provide products specified in Section 088000.
- 6. Raised-Panel Construction: Veneered, wood-based panel product with mitered, raised rims made from matching clear lumber.
  - a. Profile and thickness: As indicated.
- 7. Flat-Panel Construction: Veneered, wood-based panel product.
  - a. Thickness: As indicated.
- 8. Moldings and Trim (Glazing Beads): Clear lumber to match stiles and rails. Select lumber for similarity of grain and color, and arrange for optimum match between adjacent pieces.
  - a. Profiles and dimensions: As indicated.
- 9. Finish: Factory-applied transparent finish.

#### 2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels unless otherwise indicated:
  - 1. Clearances: Provide 1/8 inch (3 mm) at heads, jambs, and between pairs of doors. Provide 1/2 inch (13 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide not more than 3/8 inch (10 mm) from bottom of door to top of threshold.
  - 2. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
- 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, BHMA-156.115-W, and hardware templates.
  - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Glazed Openings: Factory install glazing in doors, complying with Section 08 80 00 "Glazing." Install glass using manufacturer's standard elastomeric glazing sealant complying with ASTM C 920. Secure glass in place with removable wood moldings. Miter wood moldings at corner joints.

### 2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard's requirements for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
- B. Finish wood doors at factory.
- C. Finish faces and all four edges of doors, including mortises and cutouts. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- D. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
  - 1. Grade: Custom.
  - 2. Finish: AWI's, AWMAC's, and WI's "Architectural Woodwork Standards" System 5, conversion varnish.
  - 3. Staining: Match Architect's sample.
  - 4. Effect: Match Architect's sample.
  - 5. Sheen: Match Architect's sample.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
  - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
  - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. General: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
- B. Hardware Installation: Comply with requirements specified in Section 08 71 00 "Door Hardware."
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

## 3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 08 14 33

### SECTION 083113 - ACCESS DOORS AND FRAMES

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Wall access doors and frames.
  - 2. Ceiling access doors and frames.
- B. Related Sections:
  - 1. Section 092216: Non-Structural Metal Framing.
  - 2. Section 092900: Gypsum Board.
  - 3. Section 093000: Tiling.
  - 4. Section 099100: Painting.

### 1.2 SUBMITTALS

- A. Product Data: For each type of door and frame indicated. Include construction details, materials, individual components and profiles, and finishes for access doors and frames.
- B. Schedule: Provide complete door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain doors and frames through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

#### 1.4 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed equipment, and indicate on schedule specified in "Submittals" Article.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect doors and frames from damage during transit, job storage, and installation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
- 2. Karp Associates, Inc.
- 3. Milcor Limited Partnership.
- 4. Nystrom, Inc.
- 5. Chicago Metallic Corporation.

## 2.2 STEEL MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
  - 1. ASTM A 123, for galvanizing steel and iron products.
  - 2. ASTM A 153, for galvanizing steel and iron hardware.
- B. Steel Sheet: Uncoated or electrolytic zinc-coated, ASTM A 591 with cold-rolled steel sheet substrate complying with ASTM A 1008, Commercial Steel (CS), exposed.
- C. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS) with A60 zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924.
- D. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

## 2.3 STAINLESS-STEEL MATERIALS

A. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304 or Type 316.

#### 2.4 ACCESS DOORS AND FRAMES

- A. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.
  - 1. Locations: Gypsum board wall surfaces.
  - 2. Door: Minimum 0.060-inch-thick sheet metal, set flush with exposed face flange of frame.
  - 3. Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim.
  - 4. Hinges: Spring-loaded concealed pin type.
  - 5. Lock: Key-operated cylinder lock.
- B. Flush Access Doors and Frames with Exposed Trim: Fabricated from stainless-steel sheet.
  - 1. Locations: Ceramic-tile wall surfaces.
  - 2. Door: Minimum 0.060-inch-thick sheet metal, set flush with exposed face flange of frame.
  - 3. Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim.
  - 4. Hinges: Spring-loaded concealed pin type.
  - 5. Lock: Key-operated cylinder lock.

- C. Recessed Access Doors and Trimless Frames: Glass-reinforced gypsum fabrications.
  - 1. Locations: Gypsum board ceiling surfaces.
  - 2. Basis of Design: "GRG Access Doors"; Chicago Metallic Corporation.
  - 3. Door: Glass-reinforced gypsum fabrication with integral flange at perimeter; gravity-held in-place atop panel frame.
  - 4. Frame: Glass-reinforced gypsum fabrication; nominal 3-inch width with radius corners at interior opening to precisely match door panel perimeter; outside edges square.

### 2.5 FABRICATION

- A. General: Provide access door assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
  - 1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
  - 2. For trimless frames with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.
  - 3. Provide mounting holes in frames to attach frames to framing members in drywall construction.
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
  - 1. For cylinder lock, furnish two keys per lock and key all locks alike.

### 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

#### 2.7 STEEL FINISHES

- A. Surface Preparation: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface-preparation specifications and environmental exposure conditions of installed metal fabrications:
  - 1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. 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."

- 2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
  - a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.
- B. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

## 2.8 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
  - 1. Bright, Directional Polish: No. 4 finish.
  - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

### PART 3 - EXECUTION

#### 3.1 **PREPARATION**

A. Advise installers of other work about specific requirements relating to access door and floor door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or received to receive finish material.
- D. Field-Applied Coatings: Comply with requirements specified in Section 099100.

### 3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

# END OF SECTION 083113

### SECTION 08 41 13 – ALUMINUM-FRAMED ENTRANCES

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes aluminum entrance assemblies. The aluminum entrance work includes the following:
  - 1. Swinging aluminum entrance doors.
  - 2. Internal steel and aluminum reinforcements for aluminum entrances.
  - 3. Anchors, shims, fasteners, inserts, expansion devices, accessories, support brackets and attachments for aluminum entrances.
  - 4. Glass and glazing for aluminum entrances.
  - 5. Security system components may be incorporated into the door and frame openings of all aluminum entrance work at the Owner's option. Cooperate with the Owner's security system contractors if the Owner chooses to incorporate security system components during the course of the Work.
- B. Related Sections include the following:
  - 1. Division 07 Section "Sheet Metal Flashing and Trim."
  - 2. Division 07 Section "Joint Sealants" for installation of joint sealants installed with aluminum entrances to the extent not specified in this Section.
  - 3. Division 08 Section "Glazed Aluminum Curtain Wall."
  - 4. Division 08 Section "Door Hardware."
  - 5. Division 08 Section "Automatic Door Operators."
  - 6. Division 08 Section "Glazing."

#### 1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum entrances meeting or exceeding the following performance requirements indicated.
- B. Structural Properties:
  - 1. Wind Loads: The aluminum entrances including glass shall be designed, fabricated and installed to withstand the maximum inward and outward wind pressures (loads) determined in accordance with the Building Subcode based upon design wind speed, exposure and risky category indicated.
    - a. Design wind speed: 115 miles per hour.
    - b. Exposure category: B.
    - c. Risk category: II.
  - 2. Deflection Limitations:

- a. Deflections: Base calculations for the following deflections upon the combination of maximum direct wind loads, building deflections, thermal stresses, and erection tolerances.
  - 1) The deflection of any framing member in a direction normal to the plane of the wall when subjected to the full code required wind loads specified above shall not exceed 1/175 of its clear span or 3/4 inch whichever is less, except limit deflection of glass to 1 inch.
  - 2) Glass, sealants and interior finishes shall not be included to contribute to framing member strength, stiffness or lateral stability.
- b. Do not permit any permanent deformation (set) in the metal framing work. Permanent deformation, fastener, weld, or gasket failure, component breakage or disengagement shall not occur under wind loading equal to 1.5 times the wind loads (positive or negative). Permanent deformation shall be taken as deflection without recovery exceeding 1/1000 times span.
- 3. Dead Loads:
  - a. Maximum full deadload deflections, parallel (in-plane) to wall plane, of framing members shall not reduce glass bite or glass coverage, to less than 75 percent of the design dimension, and shall not reduce edge clearance to less than 25 percent of design dimension or 1/8 inch whichever is greater.
  - b. Limit deflections of metal members spanning door openings to 1/300. The clearance between the member and an operable door shall be no less than 1/16 inch.
  - c. Twisting (rotation) of the horizontals due to the weight of the glass shall not exceed 1 degree, measured between ends and center of each span.
- 4. Uniform Structural Loads: Satisfactory uniform wind loading tests of aluminum entrances (each swinging door assembly) shall have been conducted in accordance with the requirements of ASTM E330. Each assembly shall have been subjected to inward and outward acting uniform loads equal to 1.5 times the inward and outward acting design wind loads specified above under paragraph 'wind loads'. Satisfactory performance at these loads shall mean no glass or other component breakage, component disengagement, and no permanent deformation of framing members in excess of the permanent deformation criteria specified above.
- 5. Operational (Traffic) Loads: Design and fabricate aluminum entrances to withstand the operating loads which result from heavy traffic conditions using the specified hardware, without measurable permanent deflection. Limit elastic deflections so as to provide the normal degree of rigidity required to avoid glass breakage, air leaks and other objectionable results of excessive flexibility. Provide weatherstripping at stiles, sill and head rails of door leaves, to minimize air, water and sound leaks.
- C. Air Leakage: Air leakage through each aluminum entrance shall not have exceeded 0.06 cfm/sq. ft. of fixed wall area when tested in accordance with ASTM E 283 at a static-air-pressure difference of 6.24 lbf/sq. ft.
- D. Water Penetration:

- 1. Water penetration in this specification is defined as the appearance of uncontrolled water, other than condensation, on any indoor face of any part of aluminum entrances.
- 2. Provision shall be made to drain to the exterior face of the assembly any water entering the system.
- 3. No uncontrolled water penetration shall have occurred when aluminum entrances (each entrance and fixed framing area) was tested in accordance with the ASTM E331 for one 15 minute cycle at a static pressure difference of 12 lbf/sq. ft. minimum.
- E. Thermal Movements: Fabricate aluminum entrances to accommodate for such expansion and contraction of component materials, and supporting elements, as will be caused by surface temperatures ranging from -5 to +180 degrees F, without causing buckling, glass breakage, failure of joint sealants, undue stress on metal members and fasteners, failure of doors or other operating units to function properly, reduction of performance, and other detrimental effects.
  - 1. Dimensions shown on Drawings are based on an assumed design temperature of +70 degrees F. Fabrication and erection procedures shall take into account the ambient temperature range at the time of the respective operations.
- F. Building Frame Movement: Design, fabricate and install aluminum entrances to withstand building movements including thermal movements, loading deflections, shrinkage, creep and similar movements. Thermal movements shall be as specified above.
- G. Condensation Resistance: Provide aluminum entrances with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1.
- H. Average Thermal Conductance: Provide aluminum entrances with average U-values of not more than 0.63 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.1.
- I. Glass Statistical Factor: Glass thicknesses when shown on the Drawings, or specified, are for convenience of detailing only and are to be confirmed by the Contractor and/or glass manufacturer. All glass for the size openings shown will be provided in thicknesses such that the probability of breakage at the design "Wind Load" will not exceed 8 lights per 1000 lights (S.F. 2.5) based on a 60 second uniform wind load duration, and reflectance and shading indicated. The glass manufacturer shall provide, on request, substantiating glass breakage data if such data is not otherwise available as manufacturer's published data.
- J. Design Modifications:
  - 1. Submit design modifications necessary to meet the performance requirements and field coordination.
  - 2. Variations in details or materials shall not adversely affect the appearance, durability or strength of components.
  - 3. Maintain the general design concept without altering size of members, profiles and alignment.

## 1.3 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each aluminum entrance product specified.

September 1, 2021 Issued for Bid

- B. Shop Drawings: Submit shop drawings showing scaled elevations, plans, and sections of the aluminum entrances. Full-scale sections shall be prepared and submitted for details of the assemblies that cannot be shown in the elevations or sections. Include with shop drawings metal thickness of all metal components, glass thicknesses, metal finishes, and all other pertinent information as necessary or requested by the Architect to indicate compliance with the Contract Documents. Details of field connections, anchorage, and their relationship to the work of others shall be clearly indicated for the coordination of the work by other building trades. Details of fastening and sealing methods and product joinery shall be shown to ensure proper performance of the field installation. No work shall be fabricated until shop drawings for that work have been approved by Architect for fabrication.
- C. Samples for Verification: Submit for exposed finishes.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Structural Calculations: Submit, for information only, copies of structural calculations indicating complete compliance with the specified performance requirements. Calculations shall be prepared, signed and sealed by a Professional Engineer registered in the State wherein the work is to be erected.
- B. Product Test Reports: Submit certified product test reports based on tests performed by an AAMA Accredited Laboratory clearly describing in written form, and in shop drawing form, compliance of aluminum entrances with requirements indicated based on comprehensive testing.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Instructions: Submit copies of manufacturer's written instructions for adjustment, operation and maintenance of doors.
- B. Warranties: Special warranties specified in this Section.

#### 1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Award the fabrication of aluminum entrances to a single firm specializing in the fabrication of aluminum entrance components, who has successfully produced work similar in design and extent to that required for the Project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years. The fabricator shall have sufficient production capacity, have organized quality control and testing procedures, and published written and illustrated installation manuals, to produce and properly install the aluminum entrances required without causing delay in progress of the Work.
  - 1. Product Options: Information on Drawings and in Specifications establishes requirements for products aesthetic effects. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

- 2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- B. Installer Qualifications: Aluminum entrances work shall be performed by a firm which is specialized in the erection of aluminum entrances and that has successfully installed work similar in design and extent to that required for the Project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years.
- C. Standards: Comply with the applicable provisions and recommendations of the following standards below, where standards conflict the more stringent shall apply:
  - 1. Aluminum Association (AA):
    - a. No. 1 "Aluminum Standards and Data."
    - b. "The Aluminum Design Manual."
  - 2. American Architectural Manufacturers Association (AAMA):
    - a. AAMA "Aluminum Curtain Wall Design Guide Manual," Volumes 1-9.
    - b. AAMA "Aluminum Store Front and Entrance Design Guide Manual."
    - c. AAMA 611 "Anodized Architectural Aluminum."
  - 3. American Institute of Steel Construction (AISC), "Steel Construction Manual," Current Edition.
  - 4. Steel Structures Painting Council (SSPC): "Steel Structures Painting Manual, Vol. 2, Systems and Specifications."
  - 5. Federal Standard 16 CFR 1201, Consumer Product Safety Commission (CPSC): "Safety Standard for Architectural Glazing Materials," as published in the Code of Federal Regulations (CFR). Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal and Municipal authorities having jurisdiction, wherever requirements conflict the more stringent shall be required. Obtain approvals from all such authorities. As a minimum provide safety glazing complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for Category II materials.
  - 6. Welding Standards: Welding shall be performed by skilled and qualified mechanics. Welding shall be performed in accordance with the applicable provisions of AWS D1.1 "Structural Welding Code - Steel" and AWS D1.2, "Structural Welding Code--Aluminum."

## 1.7 IDENTIFICATION, DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the applicable provisions of AAMA "Curtain Wall Manual #10" for the care and handling of aluminum entrances from fabrication shop to site.
- B. All components of aluminum entrances shall be identified after fabrication by marks clearly indicating their location in the building. Packaging of components shall be so selected to protect the components from damage during shipping and handling.
- C. Storage on Site:

- 1. Store aluminum entrance components in a location and in a manner to avoid damage to the components. Stacking shall be done in a way which will prevent bending, excessive pressure, abrasion or other permanent damage of the component and its finished surfaces.
- 2. Store aluminum entrance components and materials in a clean, dry location, away from uncured concrete, masonry work, sprayed on fireproofing work, and other construction activities. Cover with non-staining waterproof paper, tarpaulin, or polyethylene sheeting in a manner that will permit circulation of air inside the covering.
- D. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of metals.

### 1.8 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of supporting structure by field measurements before fabrication so that the aluminum entrance work will be accurately designed, fabricated and fitted to the structure. Indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work. Use Contractor's lines and benchmarks as a basis for measurements.
- B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating aluminum entrances without field measurements. Coordinate supporting structure construction to ensure actual dimensions correspond to established dimensions.

#### 1.9 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a 2 year written warranty, beginning from date of substantial completion, and executed by the Contractor, manufacturer and the aluminum entrance Installer, agreeing to repair or replace components of aluminum entrances that develop defects in materials or workmanship within the specified warranty period. Defects include, structural failures, sealant failures, deterioration of metals, metal finishes, and other materials beyond normal weathering, failure of operating components to function properly, uncontrolled water leakage, uncontrolled air leakage, and any other evidence of failure or deterioration of the aluminum entrances to meet performance requirements.
- C. Special Warranty for High Performance Organic Coatings: Manufacturer's warranty form in which manufacturer agrees to repair or replace coated finishes that show evidence of deterioration of factory-applied finish within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Kawneer North America.
  - 2. Oldcastle Building Envelope
  - 3. United States Aluminum.
  - 4. YKK AP America Inc.

### 2.2 MATERIALS

- A. Aluminum: Conform to the requirements published in AA "Aluminum Standards and Data," referenced ASTM standards and the following. All aluminum extrusions shall be manufactured to dimensional tolerances so as to eliminate any edge projection or misalignment at joints. Unless otherwise specified, provide alloy and temper as required to suit performance requirements and finishes indicated. Provide concealed extruded bars, rods, shapes and tubes in alloys as recommended by the fabricator to join or reinforce assembly of exposed aluminum components.
  - 1. Alloys:
    - a. Sheet and Plate: Alloy 5005 and ASTM B 209, 'Anodizing Quality.'
    - b. Extruded Bars, Rods, Shapes, and Tubes: Alloy 6063 and ASTM B 221, 'Anodizing Quality.'
    - c. Bars, Rods, and Wire: ASTM B 211.
  - 2. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Carbon Steel: For carbon steel components required to join, reinforce or support the assembly of aluminum components provide carbon steel conforming to ASTM A 36 for structural shapes, plates, and bars; ASTM A 1008 for cold-rolled sheet and strip; or ASTM A 1011 for hot-rolled sheet and strip.

## 2.3 ALUMINUM ENTRANCES

- A. Doors: Manufacturer's standard glazed doors, for manual swing operation.
  - 1. Basis of Design: "500 Tuffline Entrances"; Kawneer Company, Inc.
  - 2. Door Construction: 2-inch overall thickness, with minimum 0.188-inch thick, extrudedaluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
  - 3. Door Design: Wide stile; 5-inch nominal width.

- a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches above floor or ground plane.
- 4. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
- 5. Finish: High performance organic coating finish.
- B. Door Framing Members: Manufacturer's standard extruded aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Finish: High performance organic coating finish; match doors.
- C. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- D. Weather Stripping: Manufacturer's standard replaceable weather stripping as follows:
  - 1. Compression Weather Stripping: Molded neoprene complying with ASTM D 2000 requirements or molded PVC complying with ASTM D 2287 requirements.
- E. Door Hardware: Provide products indicated on Drawings.

## 2.4 GLAZING SYSTEMS

- A. Glass and Glazing Materials: As specified in Section 08 80 00 "Glazing."
- B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

## 2.5 SEALING MATERIALS

- A. Concealed Sealing Materials: All sealing materials concealed within the aluminum entrances shall be silicone, compatible with and adherent to each material it will be in contact with, as recommended by the manufacturer to fulfill performance requirements.
- B. Exposed Sealing Materials: Refer to Section 07 92 00 "Joint Sealants," for all sealing materials exposed at perimeter of aluminum entrances in contact with adjacent materials.

## 2.6 FABRICATION

A. General: Fabricate the aluminum entrances to the designs, shapes, and sizes shown using the materials specified and shown to produce assemblies that meet or exceed the performance requirements. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and other work before shipment to Project site.

- 1. Metal Wall Thickness: Provide shapes as shown and as required to suit the performance requirements but with wall thickness of not less than 1/8 inch.
- B. Preglaze door units to greatest extent possible, in coordination with installation and hardware requirements. Glazing, whether in factory or in field, shall be performed in accordance with Section 08 80 00 "Glazing."
- C. Fabricate all doors and frames to accommodate the swing direction shown.
- D. Provide extruded aluminum entrance door inserts at door frames designed with bosses sized to receive selected door gasket.
- E. Provide continuous interior glazing stops with concealed fasteners for all doors and frames. Provide stops with hairline joints at corners. Provide stops with square, not beveled, shouldered profile unless otherwise shown.
- F. Doors and frames shall be cut, reinforced, drilled and tapped in strict accordance with the printed door hardware manufacturer's templates and instructions. Provide solid stainless steel or bronze hardware reinforcements, securely fastened to doors and frames where door hardware is to be attached.
  - 1. Security system components may be incorporated into the door and frame openings of all entrance doors and frames. Provide all cutouts required by the Owner's security system vendor and all prewiring for vendor provided security system devices. Wherever entrance framing components are to receive wiring, provide unobstructed clear paths free of burrs and sharp objects with pull strings to facilitate wiring.
- G. Joints in Metal Work: All exposed work shall be carefully fitted and matched to produce continuity of line and design, with all joints, being accurately fitted for hairline contact and rigidly secured. Where additional rigidity or strength is required to satisfy the performance requirements, reinforce entrance components with aluminum or carbon steel shapes, bars, and plates.
- H. Shop Assembly: As far as practicable, all fitting and assembly work shall be done in a fabrication shop.
  - 1. For exterior entrances, provide weepholes and internal water passages in the glazing framing recesses as recommended by the respective glass and framing manufacturers to conduct infiltrating water to the exterior. Provide weep baffles secured to inside of frame behind weepholes.
- I. Exposed Fasteners: Not permitted.
- J. Protection of Metals: Wherever dissimilar metals are in contact, except in the case of aluminum in contact with galvanized steel, zinc, separate such surfaces with a coating of zinc rich primer, bituminous paint, or separation gaskets as the condition requires. Wherever aluminum comes in contact with concrete surfaces separate such surfaces with a coating of zinc rich primer, bituminous paint, or separation gaskets as the condition requires.

### 2.7 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Appearance of Finished Work: During production, maintain large size color range samples for use in comparing against production material. Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable.
- C. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.
- D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Basis of Design: "Duranar XL Plus"; PPG Industries, Inc.
  - 2. Fluoropolymer 3-Coat System: Manufacturer's three-coat, polyvinylidene fluoride finish consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent of "ATO Atochem Kynar 500" or "Ausimont Hylar 5000" fluorocarbon resin specially formulated for spray application to extrusions and preformed aluminum metal shapes. Remove die markings, scratches, abrasions, dents and other blemishes before applying finish. Coating films shall be uniform and visibly free from flow lines, streaks, blisters, sags or other surface imperfections in the dry-film state on all surfaces.
    - a. Metal Preparation and Pretreatment: Pretreatment of aluminum surface and application of the finish shall be performed under specifications issued by the licensed formulator to approved applicator and the following as a minimum:
      - The products used to form the chemical conversion coating on aluminum extrusions shall conform to ASTM D1730, Type B, Method 5 (Amorphous Chromium Phosphate Treatment) or Method 7 (Amorphous Chromate Treatment).
      - The coating weight of the chemical conversion coating shall be a minimum of 40 mg. per ft.2 on exposed surfaces as specified in ASTM B449, Section 6, Class I. Processing shall conform to that specified in ASTM B449, Section 5.
    - b. Coating Performance Criteria: Meets or exceeds AAMA 2605.
    - c. Coating System Thickness: Minimum 1.6 mil total dry film thickness (0.25 mil primer +/- 0.05 mil and 1.35 mil topcoat).
    - d. Color and gloss: Match Architect's control sample.
- E. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

### 2.8 COATINGS FOR CONCEALED METAL SURFACES

- A. General: The following protective coatings shall be applied to surfaces of metals which are to be concealed in the construction:
  - 1. Coating for Carbon Steel: Hot dip galvanized, complying with ASTM A123.
  - 2. Coating for Aluminum and Carbon Steel: Where aluminum or carbon steel surfaces are to be in contact with each other or in contact with dissimilar materials such as masonry or concrete, and where hot dip galvanizing of carbon steel is incompatible with component parts because of galvanic action or component fabrication tolerances provide one of the following:
    - a. Bituminous Paint: Cold-applied, non-sagging, asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos. Apply in two coats for an overall minimum dry film thickness of 25 mils.
    - b. Zinc Rich Primer: Organic zinc-rich primer, complying with SSPC-Paint 20.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine the substrates, adjoining construction, and conditions under which the Work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Before beginning installation of aluminum entrances, examine all parts of the existing building structural frame and the existing construction indicated to support aluminum entrances. Notify Architect in writing, of any dimensions, or conditions, found which will prevent the proper execution of aluminum entrances, including specified tolerances.

### 3.2 PREPARATION

- A. Coordinate aluminum entrances with the work of other Sections and provide items to be placed during the installation of other work at the proper time to avoid delays in the work.
- B. Templates and Diagrams: Furnish templates, diagrams, and other data to fabricators and installers of related work, as necessary for coordinating aluminum entrance installation.
- C. Place such items, including concealed overhead framing, accurately in relation to the final location of aluminum entrance components.

# 3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing aluminum entrances. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight. Clean excess joint sealants from finished surfaces.

- 1. Cut and trim component parts of aluminum entrances during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely to protect material and remove all evidence of cutting and trimming. Remove and replace members where cutting and trimming has impaired strength or appearance, as directed by Architect.
- 2. Set components within the erection tolerances with uniform joints. Place components on shims and fasten to supporting substrates using bolts and similar fasteners. Use stainless steel shims at structural connections only. U-shaped shims at structural connections are not permitted. Use aluminum, stainless steel, or high impact polystyrene shims at other connections.
- 3. Do not erect components that are warped, deformed, bowed, dented, defaced or otherwise damaged as to impair its strength or appearance. Remove and replace members damaged in the process of erection.
- 4. Coat concealed surfaces of dissimilar materials, and any ferrous metal components, with a heavy coating of bituminous paint, zinc rich primer or other separation in accordance with manufacturer's recommendations. Where aluminum components will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- 5. No holes or slots shall be burned, cut into, or field drilled in any building framing member without the written acceptance of the Structural Engineer.
- B. Entrance Framing: Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- C. Install glazing to comply with requirements of Section 08 80 00 "Glazing," unless otherwise indicated.
- D. Entrance Doors: Doors shall be securely anchored in place to a straight, plumb and level condition, without distortion. Adjust doors to provide a tight fit at contact points for weathertight closure and to operate smoothly, without binding, with hardware functioning properly. Weatherstripping contact, and hardware movement, shall be field tested and final adjustment, and lubrication, made for proper operation and performance of doors.
- E. Set sill members in a bed of sealant to provide weathertight construction. Comply with requirements of Section 07 92 00 "Joint Sealants."
- F. Install perimeter sealant to comply with requirements of Section 07 92 00 "Joint Sealants," unless otherwise indicated.
- G. Concealed Sealing Components: Apply sealant and gasket components that are integral to aluminum entrances in strict accordance with the each component manufacturer's printed instructions. Before applying components, remove all mortar, dust, dirt, moisture, and other foreign matter that will be deleterious to the intended performance of the component. Mask adjoining exposed surfaces to avoid spilling, dripping, dropping or other unintended contact of the sealing components onto adjacent exposed surfaces.

## 3.4 ANCHORAGE

A. Anchorage of aluminum entrances to the structure and surrounding cladding shall be in accordance with the approved shop drawings.
## 3.5 WELDING

- A. Weld with electrodes and by methods recommended by manufacturer of material being welded, and in accordance with AWS D1.1 for concealed steel members.
- B. Welds and adjacent metal areas shall be thoroughly cleaned and coated with a single coat of bituminous paint.

### 3.6 ERECTION TOLERANCES

- A. Aluminum entrances shall be fabricated and erected to accommodate the dimensional tolerances of the structural frame and surrounding cladding while providing the following as installed tolerances.
  - 1. Variation from theoretical calculated position as located in plan or elevation in relation to established floors lines, column lines and other fixed elements of the structure, including variations from plumb, level, straight and member size: +/- 1/4 inch max in any 20'-0" run, column-to-column bay, or floor-to-floor height.
  - 2. Alignment: Where surfaces abut in line, and where they meet at corners, limit offset from true alignment to 1/32 inch.
  - 3. Variation from angle, or plumb, shown: +/- 1/8 inch max in any 10'-0" run or story height, non-cumulative.
  - 4. Variation from slope, or level, shown: +/- 1/8 inch max in any 20'-0" run or column-tocolumn bay, non-cumulative.

#### 3.7 REMOVAL OF DEBRIS

A. All debris caused by, or incidental to, the erection of the aluminum entrances shall be removed from the site and disposed of legally.

# 3.8 CLEANING

- A. Clean metal surfaces promptly after installation, exercising care to avoid damage to factory finished exposed surfaces.
- B. Wash glass on both faces not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer. Remove excess glazing and sealant compounds, dirt, and other substances.
- C. Immediately remove any deleterious material from surfaces of aluminum.

# 3.9 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that aluminum entrances will be without damage or deterioration, other than normal weathering, at time of acceptance.

OCA Architects, Inc. Project No. P21-008

END OF SECTION 08 41 13

## SECTION 084126 – ALL-GLASS ENTRANCES

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. This Section includes interior all-glass entrances.
- B. Related Sections include the following:
  - 1. Division 8 Section "Door Hardware" for hardware requirements.
  - 2. Division 8 Section "Glazing."

#### 1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details, including the following:
  - 1. Plans, elevations, and sections.
  - 2. Details of fittings and glazing.
  - 3. Hardware quantities, locations, and installation requirements.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Finishes: 6-inch-long sections of rails, fittings, and other items.
  - 2. Glass: 6 inches square, showing exposed-edge treatment.

## 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Standards for Accessible Design: For hardware and other operating devices, comply with requirements of the following:
  - 1. Chapter 11 of the Building Code incorporating the technical standards of ICC/ANSI A117.1.
  - 2. U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG) and 2010 ADA Standards for Accessible Design..
- C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 for Category II materials.

- 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."

# 1.4 **PROJECT CONDITIONS**

A. Field Measurements: Verify actual locations of walls and other construction contiguous with allglass systems by field measurements before fabrication and indicate measurements on Shop Drawings.

# 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of all-glass systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - b. Failure of operating components.
  - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Heat Soaked Tempered Glass Warranty: Submit a 5 year written warranty, beginning from date of substantial completion, and executed by the Contractor, manufacturer and the glass installer agreeing to replace glass units that spontaneously break as a result of Nickel Sulfide (NiS) inclusions within the specified warranty period without material or labor charges to the Owner.

# PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Arch Aluminum & Glass Company, Inc.
  - 2. Blumcraft of Pittsburgh Division of C.R. Laurence.
  - 3. Oldcastle Glass, Inc.
  - 4. Virginia Glass Products Corporation.
  - 5. Vistawall Architectural Products.

## 2.2 MATERIALS

- A. Ultra-Clear (Low-Iron) Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3, Class I (clear); minimum 91 percent visible light transmission and a minimum solar heat gain coefficient not less than 0.87; comply with additional requirements specified for applications and heat treatments.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. AFG Industries Inc.; Krystal Klear.
    - b. Guardian Industries Corp.; Ultrawhite.
    - c. Pilkington North America; Optiwhite.
    - d. PPG Industries, Inc.; Starphire.
  - 2. Thickness: As indicated on Drawings.
  - 3. Exposed Edges: Flat polished.
  - 4. Butt Edges: Flat ground.
  - 5. Comply with additional requirements specified in Division 8 Section "Glazing."
- B. Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), tested for surface and edge compression per ASTM C 1048 and for impact strength per 16 CFR 1201 for Category II materials.
  - 1. Provide Kind FT (fully tempered) float glass for all safety glazing applications or hazardous condition locations, except as otherwise indicated.
    - a. Surface compression shall be equal to or greater than 10,000 psi. After tempering, heat soak 100 percent of all fabricated glass units to European Union Standard EN14179 to eliminate inclusion related glass breakage. Statistical heat soaking shall not be permitted.
  - 2. For uncoated glass, comply with requirements for Condition A.
  - 3. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
- C. Aluminum Components: ASTM B 221, with strength and durability characteristics of not less than alloy 6063-T5.
- D. Stainless-Steel Cladding: ASTM A 666, Type 304 or 316.

#### 2.3 COMPONENTS

- A. Basis of Design: Provide products indicated on Drawings and Schedules.
- B. Rails and Fittings:
  - 1. Material: Stainless-steel-clad aluminum.
  - 2. Height: As indicated on Drawings.
  - 3. Profile and style: As indicated on Drawings.
- C. Sidelight Channels: Stainless-steel-clad aluminum.

- D. Anchors and Fastenings: Concealed.
- E. Glazing Accessories: Manufacturer's standard products for the following:
  - 1. Glazing gaskets and sealants.
  - 2. Setting blocks, edge blocks and spacers.

## 2.4 HARDWARE

A. Provide products specified in Division 8 Section "Door Hardware."

## 2.5 FABRICATION

- A. General: Fabricate entrances to the designs, shapes, and sizes shown using the materials and components specified. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and other work before shipment to Project site.
- B. Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
  - 1. Fully temper glass using horizontal (roller-hearth) process and fabricate so, when installed, roll-wave distortion is parallel with bottom edge of door or lites.
  - 2. Factory assemble components and factory install hardware to greatest extent possible.
- C. Fabricate all entrances to accommodate swing direction shown.

#### 2.6 STAINLESS-STEEL FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
  - 1. Remove tool and die marks and stretch lines or blend into finish.
  - 2. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- B. Stainless-Steel Finish: No. 4, bright directional polish.
- C. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

### PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing all-glass entrances.
- B. Install all-glass entrances in accordance with manufacturer's instructions and approved shop drawings.
  - 1. Install components and accessories to comply with accessible design standards.
  - 2. Do not install damaged components.
- C. Do not erect components which are warped, deformed, bowed, defaced or otherwise damaged to impair strength. Remove and replace members damaged in the process of erection.
- D. Set units level, plumb, and true to line, with uniform joints. Rigidly secure nonmovement joints.
- E. Install door hardware according to manufacturer's written instructions using concealed fasteners. Lubricate hardware and other moving parts according to manufacturer's written instructions.
- F. Maintain uniform clearances between adjacent components.

# 3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware to produce smooth operation and tight fit at contact points.
- B. Clean glass surfaces and exposed metal finishes using cleaning agents recommended by manufacturer.

# END OF SECTION 084126

# SECTION 084413 – GLAZED ALUMINUM CURTAIN WALL

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Glazed aluminum curtain wall.
  - 2. System type: Glazing is retained mechanically by compression plates and glazing gaskets on four sides.
- B. Related Sections include the following:
  - 1. Division 07 Section "Joint Sealants" for installation of joint sealants installed with curtain walls to the extent not specified in this Section.
  - 2. Division 08 Section "Aluminum-Framed Entrances" for door assemblies installed within curtain walls.
  - 3. Division 08 Section "Glazing" for insulating-glass requirements.

## 1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazed aluminum curtain wall assemblies.
- B. General Performance: Comply with performance requirements specified, as determined by testing of glazed aluminum curtain walls identical to those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction. Provide glazed aluminum curtain walls, including anchorage, capable of withstanding, without failure, the effects of the following
  - 1. Structural loads indicated.
  - 2. Thermal movements.
  - 3. Movements of supporting structure indicated on Drawings including, but not limited to twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  - 4. Dimensional tolerances of building frame and other adjacent construction.
  - 5. Failure includes the following:
    - a. Deflection exceeding specified limits.
    - b. Thermal stresses transferred to building structure.
    - c. Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
    - d. Glazing-to-glazing contact.
    - e. Glass breakage.
    - f. Noise or vibration created by wind and thermal and structural movements.
    - g. Loosening or weakening of fasteners, attachments, and other components.
    - h. Sealant failure.

- C. Structural Loads:
  - 1. Wind Loads: Determine loads in accordance with the Building Subcode based upon design wind speed, exposure and risk category indicated.
    - a. Design wind speed: 115 miles per hour.
    - b. Exposure category: B.
    - c. Risk category: II.
- D. Deflection of Framing Members: At design wind pressure, as follows:
  - 1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
  - 2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch or amount not exceeding that which reduces glazing bite below 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch, whichever is smaller.
- E. Structural-Test Performance: Provide glazed aluminum curtain wall systems tested according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Duration: As required by design wind velocity but not less than 10 seconds.
- F. Air Infiltration: Provide glazed aluminum curtain wall systems with maximum air leakage of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.
- G. Water Penetration Under Static Pressure: Provide glazed aluminum curtain wall systems that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind load, but not less than 15 lbf/sq. ft.
- H. Water Penetration Under Dynamic Pressure: Provide glazed aluminum curtain wall systems that do not evidence water leakage when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive design wind load, but not less than 15 lbf/sq. ft.
  - 1. Maximum Water Leakage: No uncontrolled water penetrating systems or appearing on systems' normally exposed interior surfaces from sources other than condensation according to AAMA 501.1. Water controlled by flashing and gutters that is drained to exterior and cannot damage adjacent materials or finishes is not considered water leakage.
- I. Condensation Resistance: Provide glazed aluminum curtain wall systems with condensationresistance factor (CRF) of not less than 73 frame and 68 glass (low-e) or 66 frame and 60 glass (clear) when tested according to AAMA 1503.

- J. Average Thermal Conductance: Provide glazed aluminum curtain wall systems with average U-factor of not more than 0.39 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.
- K. Thermal Movements: Provide glazed aluminum curtain wall systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.
  - 2. Test Performance: No buckling, stress on glass, glazing edge-seal failure, sealant failure, excess stress on curtain wall framing, anchors and fasteners, or reduction of performance when tested according to AAMA 501.5.
    - a. Test High Exterior Ambient Air Temperature: That which produces an exterior metal surface temperature of 180 degrees F.
    - b. Test Low Exterior Ambient Air Temperature: 0 degrees F.
    - c. Test Interior Ambient Air Temperature: 75 degrees F.

## 1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.
- B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of glazed aluminum curtain wall systems.
  - 1. Include plans, elevations, sections, details, and attachments to other work.
  - 2. Include details of interface with door assemblies.
  - 3. Include details of glazing methods, weatherseals and perimeter joint sealants.
  - 4. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
  - 5. Submit shop drawings including structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification: Submit 12-inch long sections of typical framing members with specified finish.

## 1.4 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency.
- B. Field Quality-Control Reports.

## 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed systems suitable to include in maintenance manuals.
- B. Warranties: Special warranties specified in this Section.

OCA Architects, Inc. Project No. P21-008

### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A firm which is specialized in the erection of glazed aluminum curtain wall systems and who has successfully installed work similar in design and extent to that required for the project, in not less than three projects of similar scope to the satisfaction of the Architect, and whose work has resulted in construction with a record of successful in-service performance for a period of 10 years. Capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
  - 1. Engineering Responsibility: Preparation of data for glazed aluminum curtain wall systems including Shop Drawings based on testing and engineering analysis of manufacturer's standard units configured in assemblies similar to those indicated for this Project.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
  - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- D. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code--Aluminum."
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to glazed aluminum curtain wall systems including, but not limited to, the following:
  - 1. Review structural load limitations.
  - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Review required testing, inspecting, and certifying procedures. Coordinate attendance of manufacturer's technical representative, Architect, and Installer at all testing and inspection procedures.

# 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain wall systems by field measurements before fabrication and indicate measurements on Shop Drawings.

# 1.8 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of glazed aluminum curtain wall systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including, but not limited to, excessive deflection.
    - b. Noise or vibration caused by thermal movements.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    - d. Water penetration through fixed glazing and framing areas.
    - e. Glazing failures.
    - f. Sealant failures.
  - 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Warranty for High Performance Organic Coatings: Manufacturer's warranty form in which manufacturer agrees to repair or replace coated finishes that show evidence of deterioration of factory-applied finish within specified warranty period.
  - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: 10 years from date of Substantial Completion.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Kawneer North America.
  - 2. Oldcastle BuildingEnvelope<sup>™</sup>.
  - 3. United States Aluminum.
  - 4. YKK AP.

#### 2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
  - 1. Sheet and Plate: ASTM B 209.
  - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM B 308.
  - 5. Welding Rods and Bare Electrodes: AWS A5.10.

- B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
  - 1. Structural Shapes, Plates, and Bars: ASTM A 36.
  - 2. Cold-Rolled Sheet and Strip: ASTM A 1008.
  - 3. Hot-Rolled Sheet and Strip: ASTM A 1011.

# 2.3 FRAMING SYSTEMS

- A. Basis of Design: "1600 Wall System 2"; Kawneer North America.
  - 1. Comparable products of other manufacturers may be considered.
- B. Framing Members: Manufacturer's extruded aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Method: Conventional pressure-glazing system with glazing gaskets and compression plates.
  - 4. Glazing Plane: Front.
  - 5. Finish: High performance organic coating finish.
- C. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
  - 1. Include snap-on aluminum trim that conceals fasteners.
- D. Metal Closures and Trim: Fabricate from aluminum extrusions or formed aluminum sheet; minimum 0.125-inch thickness.
  - 1. Profiles and dimensions: As indicated on Drawings.
  - 2. Finish: Match framing system components.
- E. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

# 2.4 GLAZING SYSTEMS

Copyright 2021 OCA

- A. Insulating Glass Units: Provide products specified in Division 8 Section "Glazing."
- B. Glazing Gaskets, Setting Blocks, Shims and Spacers: Manufacturer's standard permanent, nonmigrating types compatible with sealants and suitable for joint movement and system performance requirements. Comply with additional requirements specified in Division 8 Section "Glazing."

# 2.5 ALUMINUM-FRAMED ENTRANCES

A. Provide products specified in Division 8 Section "Aluminum-Framed Entrances."

# 2.6 ACCESSORY MATERIALS

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
  - 1. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
  - 2. Reinforce members as required to receive fastener threads.
  - 3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
  - 4. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel, wherever exposed fastening is unavoidable.
  - 5. Finish exposed portions to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - 1. Concrete Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.
- C. Concealed Flashing: Dead-soft, 0.018-inch-thick stainless steel, ASTM A 240 of type recommended by manufacturer.
- D. Framing Gaskets: As recommended by manufacturer for joint type.
- E. Framing Sealants: As recommended by manufacturer for joint type.
- F. Insulating Materials: As specified in Division 07 Section "Thermal Insulation."
- G. Joint Sealants: For installation at perimeter of framing systems, as specified in Division 07 Section "Joint Sealants."
- H. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

#### 2.7 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Fabricate components that, when assembled, have the following characteristics:
  - 1. Sharp profiles, straight and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Internal guttering systems or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to prevent glazing-to-glazing contact and to maintain required glazing edge clearances.

- 6. Provisions for field replacement of glazing from exterior. Include accommodations for using temporary support device (dutchman) to retain glazing in place while sealant cures.
- 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- C. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- D. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## 2.8 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: During production, maintain large size color range samples for use in comparing against production material. Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable.
- C. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- D. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Basis of Design: "Duranar XL Plus"; PPG Industries, Inc.
  - 2. Fluoropolymer 3-Coat System: Manufacturer's three-coat, polyvinylidene fluoride finish consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent of "ATO Atochem Kynar 500" or "Ausimont Hylar 5000" fluorocarbon resin specially formulated for spray application to extrusions and preformed aluminum metal shapes. Remove die markings, scratches, abrasions, dents and other blemishes before applying finish. Coating films shall be uniform and visibly free from flow lines, streaks, blisters, sags or other surface imperfections in the dry-film state on all surfaces.
    - a. Metal Preparation and Pretreatment: Pretreatment of aluminum surface and application of the finish shall be performed under specifications issued by the licensed formulator to approved applicator and the following as a minimum:
      - 1) The products used to form the chemical conversion coating on aluminum extrusions shall conform to ASTM D1730, Type B, Method 5 (Amorphous Chromium Phosphate Treatment) or Method 7 (Amorphous Chromate Treatment).
      - 2) The coating weight of the chemical conversion coating shall be a minimum of 40 mg. per ft.<sup>2</sup> on exposed surfaces as specified in ASTM B449, Section 6, Class I. Processing shall conform to that specified in ASTM B449, Section 5.
    - b. Coating Performance Criteria: Meets or exceeds AAMA 2605.

September 1, 2021 Issued for Bid

- c. Coating System Thickness: Minimum 1.6 mil total dry film thickness (0.25 mil primer +/- 0.05 mil and 1.35 mil topcoat).
- d. Color and gloss: Match Architect's control sample.
- E. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## 2.9 COATINGS FOR CONCEALED METAL SURFACES

- A. General: The following protective coatings shall be applied to surfaces of metals which are to be concealed in the construction:
  - 1. Coating for Carbon Steel: Hot dip galvanized, complying with ASTM A123.
  - 2. Coating for Aluminum and Carbon Steel: Where aluminum or carbon steel surfaces are to be in contact with each other or in contact with dissimilar materials such as masonry or concrete, and where hot dip galvanizing of carbon steel is incompatible with component parts because of galvanic action or component fabrication tolerances provide one of the following:
    - a. Bituminous Paint: Cold-applied, non-sagging, asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos. Apply in two coats for an overall minimum dry film thickness of 25 mils.
    - b. Zinc Rich Primer: Organic zinc-rich primer, complying with SSPC-Paint 20.

#### 2.10 SOURCE QUALITY CONTROL

A. Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, system fabrication reviews and checks.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine project areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

- A. General:
  - 1. Comply with manufacturer's written instructions and approved shop drawings unless project conditions require more stringent requirements for performance of the work.
  - 2. Do not install damaged components.
  - 3. Fit joints to produce hairline joints free of burrs and distortion.
  - 4. Rigidly secure nonmovement joints.

- 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- 6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
- 7. Seal joints watertight, unless otherwise indicated.
- B. Metal Protection:
  - 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
  - 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified Division 8 Section "Glazing."
- F. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.
- G. Install insulation materials as specified in Division 07 Section "Thermal Insulation."

## 3.3 ERECTION TOLERANCES

- A. Erection Tolerances: Install glazed aluminum curtain wall systems to comply with the following maximum tolerances:
  - 1. Plumb: 1/8 inch in 12 feet; 1/4 inch in 40 feet.
  - 2. Level: 1/8 inch in 12 feet; 1/4 inch in 40 feet.
  - 3. Alignment:
    - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
    - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
    - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or greater, limit offset from true alignment to 1/8 inch.
  - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/4 inch over total length.

# 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field Quality-Control Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as

follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

- 1. Water Spray Test: After the installation of glazed curtain wall system has been completed but before installation of interior finishes has begun, test entire curtain wall assembly according to AAMA 501.2 until there is no evidence of water penetration.
- C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION 084413

Copyright 2021 OCA

## SECTION 08 80 00 - GLAZING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
  - 1. Aluminum curtain walls.
  - 2. Aluminum entrances.
  - 3. All-glass entrances.
  - 4. Interior doors.
  - 5. Interior borrowed lites.

# B. Related Requirements:

- 1. Section 08 14 33 "Stile and Rail Wood Doors."
- 2. Section 08 41 26 "All-Glass Entrances."
- 3. Section 08 41 13 "Aluminum-Framed Entrances."
- 4. Section 08 44 13 "Glazed Aluminum Curtain Wall."
- 5. Section 10 22 39 "Sliding Glass Panel Partitions."

#### 1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide and install watertight and airtight glazing systems capable of withstanding thermal movement and wind and impact loads without failure of any kind, including loss or breakage of glass, failure of seal or gaskets, exudation of glazing sealants, and excessive deterioration of glazing materials.
- B. Delegated Glass Design: Glass thicknesses and heat treatments indicated are minimum requirements. Glazing details shown are for convenience of detailing only and are to be confirmed by the Contractor relative to cited standards and final framing and glazing details. Confirm glass thicknesses and heat treatments, verified by analysis, as required to meet the performance and testing requirements specified in individual product sections for glazing assemblies, Project loads and in-service conditions.

- 1. Glass Thicknesses for Exterior Glazing: Design glass including comprehensive engineering analysis by a qualified professional engineer to determine minimum glass thicknesses to comply with the Building Subcode and ASTM E 1300, according to the following requirements:
  - a. Design Wind Loads: Determine design wind loads applicable to Project based upon design wind speed, exposure category, occupancy category, and heights above grade indicated on Drawings, according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures":
    - 1) Basic Wind Speed: 115 miles per hour.
    - 2) Exposure Category: B.
    - 3) Risk Category: II.
  - b. Probability of Breakage for Vertical or Sloped Glazing: Not greater than 5 lites per 1000.
    - 1) Load Duration: 60 seconds or less.
  - c. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.
  - d. Maximum Lateral Deflection: For glass supported on all 4 edges, provide thickness required that limits center of glass deflection at design wind pressure to not more than 1/50 times the short side length or 1 inch, whichever is less.
  - e. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
  - f. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm, except as otherwise noted.
- 2. Glass Thicknesses for Interior Glazing: Select minimum glass thicknesses to comply with published recommendations of glass product manufacturers and referenced glazing publications.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 degrees F, ambient; 180 degrees F, material surfaces.
- D. Thermal and Optical Performance Properties: Provide insulating glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
  - 1. For insulating-glass units, properties are based on units with lites 6 mm thick and a nominal 1/2 inch wide interspace.
  - 2. Center-of-Glass U-Values: NFRC 100 methodology using LBL WINDOW 6.3 computer program, expressed as Btu/ sq. ft. x h x deg F.
  - 3. Solar Heat Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL WINDOW 6.3 computer program.
  - 4. Visible Reflectance (Solar Optical) Properties: Center-of-glazing values, according to NFRC 300.

## 1.4 ACTION SUBMITTALS

- A. Product Data: Submit product data for each glass product and glazing material indicated.
- B. Samples: Label samples to indicate product, characteristics, and locations in the Work. Furnish samples of the following:
  - 1. Submit samples of each glass type specified, in the form of 12 inch square Samples.
  - 2. Cured color selection Samples for glazing sealants.
- C. Shop Drawings: Include plans, elevations, and sections. Show fabrication and installation details. Include the following:
  - 1. Location of glass panels.
  - 2. Size, thickness and edge profiles of glass materials.
  - 3. Full-size details of glazing methods, mounting and attachment to other work.
  - 4. Delegated-Design: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Glazing Schedule: Use same designations indicated on Drawings for glass types in preparing a schedule listing glass types and thicknesses for each.
  - 1. Glazing Schedule may be submitted as part of Shop Drawings.

# 1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Submit a letter from glass manufacturer certifying that he has reviewed the glazing details proposed for the Project, including the use of gaskets and sealants, and that each product to be furnished is recommended for the application shown.
- B. Design Data: Submit the following from the glass manufacturer:
  - 1. Wind Load Analysis: For each glass unit type, each building elevation. Submit analysis that clearly demonstrates indicate that the statistical probability of breakage at the design wind pressure will not exceed the specified statistical probability of breakage.
- C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.
- D. Material Certificates: Submit glass treatment certificates signed by manufacturer of the heatsoaked glass products certifying that products furnished comply with requirements.

# 1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit data for each type of glass suitable to include in maintenance manuals.
- B. Warranties: Submit special warranties specified in this Section.

# 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations for Glass and Glazing Accessories: Obtain glass and glazing accessories from one source for each product indicated below:
  - 1. Primary glass.
  - 2. Coated glass.
  - 3. Heat-treated glass, including heat-strengthened, tempered, and heat-soaked glass.
  - 4. Insulating glass.
  - 5. Glazing gaskets.
- C. Safety Glass: Comply with the applicable requirements of the laws, codes, ordinances and regulations of Federal and Municipal authorities having jurisdiction. Wherever requirements conflict, the more stringent shall be required. Obtain approvals from all such authorities. As a minimum, provide Category II materials complying with testing requirements in 16 CFR 1201 (Consumer Product Safety Commission "Safety Standard for Architectural Glazing Materials," as published in the Code of Federal Regulations) and ANSI Z97.1.
  - 1. Building Subcode: Comply with Table 2406.2(1), "Minimum Category Classification of Glazing," in the Building Subcode.
  - 2. Subject to compliance with requirements, permanently mark safety glass with certification label of Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction. Locate permanent markings in one corner, and in the same location, of each glass lite in accordance with the requirements of the SGCC labeling guidelines. Markings shall have a nominal size of no greater than 1-inch in diameter, and be located with glass edge clearances, at the corner, by not more than 3/4-inch up and 3/4-inch over.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."
  - 2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines."
- E. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the Insulating Glass Certification Council (IGCC) or of the Associated Laboratories, Inc. (ALI).
- F. Quality Control (Production) Testing: As a minimum, provide the following quality control (production) testing for the exterior glass units:
  - 1. Bow and Warp Distortion (Flatness) Tolerance Testing:
    - a. During the production of the heat-treated glass lites, measure for bow and warp in accordance with ASTM C 1048. Measure the lites on a vertical plane with an aluminum straight edge or fishing line.

- 1) Measure the monolithic glass lites for compliance with the bow and warp tolerances under Article "Heat-Treated Float Glass," Paragraph "Flatness Tolerances," unless otherwise accepted by the Owner and Architect at the preconstruction glass mockup.
- b. During glass production, and once an hour, randomly select a single heat-treated glass lite and measure it. Document and record results. Tag each glass lite that falls outside of the maximum bow and warp limits and certify that these non-conforming glass lites were not incorporated into the Work.
- c. Provide written documentation of the bow and warp readings in fractions of an inch or millimeters for each tested glass lite to the Owner and Architect, if requested. Provide additional written documentation as requested by the Owner and Architect.
- 2. Roll Ripple Distortion (Flatness) Tolerance Testing:
  - a. During the production of the heat-treated glass lites, measure each low emissivity coated, unfritted, monolithic glass lite having a 1/4-inch thickness or greater using a LiteSentry or Osprey Series type optical scanning measurement device complying with ASTM C 1652 for digital grid scanning glass devices. During the production of the 100 percent full screen, frit-coated monolithic heat-treated glass lites having a 1/4-inch thickness or greater, and at a frequency of at least once an hour, randomly select a monolithic single lite and measure it using a trolley type scanning measurement device complying with ASTM C 1651.
    - 1) Measure the monolithic glass lites for compliance with the flatness tolerances under Article "Heat-Treated Float Glass," Paragraph "Flatness Tolerances," unless otherwise accepted by the Owner and Architect at the preconstruction glass mockup.
  - b. Document and record results for each glass lite. Tag each glass lite that falls outside of the maximum flatness limits and certify that these non-conforming glass lites were not incorporated into the Work.
    - 1) Provide written documentation of the flatness readings in fractions of an inch, in millimeters, and in millidiopters, for each glass lite to the Owner and Architect, if requested. Provide additional written documentation as requested by the Owner and Architect.
- 3. Insulating Glass Unit Testing Requirements: During production, test insulating glass units as follows:
  - a. Butterfly Unit Adhesion Pull Testing:
    - 1) Adhesion Criteria: Comply with the pass/fail requirements of the sealant manufacturer's published guidelines and/or sealant manufacturer's certification audit requirements/recommendations. Minimum pull back to 30 degrees from horizontal with no adhesive failure.
    - 2) Frequency: Test one minimum 24-by-36-inch size unit each eight-hour shift and after each sealant drum change.

- 3) Test units shall be fabricated on the same production line and processing equipment and with the same spacers and sealant used in the production of the insulating glass units fabricated for the Project.
- b. Desiccant Temperature Rise Testing:
  - 1) Test Criteria: Comply with the desiccant manufacturer's written recommendations.
  - 2) Frequency: Test a minimum of once every eight-hour shift and after each drum change.
- c. Bow/Warp and Air Space Measurement Concave/Convex Testing:
  - 1) Measure and record bow and warp once every hour on a vertical plane with an aluminum straight edge or with a laser.
  - 2) Measure and record unit center air space a minimum of once an hour with a checking gage (FDR Designs, or equal) and visually inspect all units.
- d. Skips and voids in the primary or secondary seals are prohibited and maximum gap at primary/secondary seal interface shall be 1 inch in length and 3/32 inch in width.
- e. Document and record results. Provide additional documentation upon request by the Owner or Architect.

# 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting (using either breather or capillary tubes) and sealing.

#### 1.9 FIELD CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
- B. Field Measurements: Verify actual dimensions of openings and construction contiguous with glazing by field measurements before fabrication and indicate measurements on Glazing Schedule.

#### 1.10 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in

addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulatingglass units whose hermetic seal has failed within specified warranty period indicated below. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass. Upon notification of such deterioration within the warranty period, furnish replacement glass units for failed glass units at the convenience of the Owner.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- C. Manufacturer's Special Warranty on Coated Glass Products: Written warranty, made out to Owner and signed by coated-glass manufacturer agreeing to furnish replacements for those coated-glass units whose coatings flake, peel, or crack within the specified warranty period indicated below. Upon notification of such deterioration within the warranty period, furnish replacement glass units for those glass units whose coatings have flaked, peeled, cracked or deteriorated at the convenience of the Owner.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- D. Heat-Soaked Tempered Glass Special Warranty: Executed by the Contractor, manufacturer and the glass installer agreeing to replace glass units that spontaneously break as a result of Nickel Sulfide (NiS) inclusions within the specified warranty period without material or labor charges to the Owner.
  - 1. Warranty Period: Five years from date of Substantial Completion.

# PART 2 - PRODUCTS

# 2.1 GLASS PRODUCTS AND MANUFACTURERS

- A. Basis of Design: Refer to Drawings and Glazing Schedule for extent of glass types and locations.
- B. The Contractor shall confirm the levels of heat-treatment required for each glass type scheduled as contained in "Performance Requirements" and "Quality Assurance" Articles.
  - 1. Where float glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to achieve compliance.
  - 2. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to achieve compliance.
  - 3. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Glass Type I-1: Solar-Control, Low-E, Insulating-Glass Units.
  - 1. Basis of Design: "SunGuard SNX 62/27 (2) Clear + Clear"; Guardian Glass, LLC.
  - 2. Overall Unit Thickness: 25 mm.
  - 3. Interspace Content: Air.
  - 4. Outdoor Lite: Class 1 clear float glass.

- a. Kind HS (heat strengthened), in non-hazardous glazing applications.
- b. Thickness: 6.0 mm, minimum.
- c. Low-E Coating: Vacuum-deposited sputter-coating on second surface.
- 5. Indoor Lite: Class 1 float glass.
  - a. Kind HS (heat strengthened), in non-hazardous glazing applications.
  - b. Thickness: 6.0 mm, minimum.
- 6. Visible Light Transmittance: 62 percent.
- 7. Visible Light Reflectance: 11 percent.
- 8. Solar Heat Gain Coefficient: 0.27 maximum.
- 9. Light to Solar Gain: 2.31.
- 10. Winter Nighttime U-Factor: 0.29 maximum.
- 11. Summer Daytime U-Factor: 0.27 maximum.
- 12. Application: Vision panels for exterior glazing.
- 13. Glass Panel Sizes: Comply with requirements indicated on Drawings.
- D. Glass Type I-2: Solar-Control, Low-E, Insulating-Glass Units.
  - 1. Basis of Design: "SunGuard SNX 62/27 (2) Clear + Clear"; Guardian Glass, LLC.
  - 2. Overall Unit Thickness: 25 mm.
  - 3. Interspace Content: Air.
  - 4. Outdoor Lite: Class 1 clear float glass.
    - a. Kind FT (fully tempered), in hazardous glazing applications.
    - b. Thickness: 6.0 mm, minimum.
    - c. Low-E Coating: Vacuum-deposited sputter-coating on second surface.
  - 5. Indoor Lite: Class 1 float glass.
    - a. Kind FT (fully tempered), in hazardous glazing applications.
    - b. Thickness: 6.0 mm, minimum.
  - 6. Visible Light Transmittance: 62 percent.
  - 7. Visible Light Reflectance: 11 percent.
  - 8. Solar Heat Gain Coefficient: 0.27 maximum.
  - 9. Light to Solar Gain: 2.31.
  - 10. Winter Nighttime U-Factor: 0.29 maximum.
  - 11. Summer Daytime U-Factor: 0.27 maximum.
  - 12. Application: Vision panels for exterior glazing.
  - 13. Glass Panel Sizes: Comply with requirements indicated on Drawings.
- E. Glass Type S-1: Single Monolithic Ultra-Clear (Low-Iron) Float Glass Units.
  - 1. Thickness: 6.0 mm.
  - 2. Heat Treatment: Kind FT (fully tempered) float glass.
  - 3. Application: Vision panels for interior glazing.
  - 4. Glass Panel Sizes: Comply with requirements indicated on Drawings.
- F. Glass Type S-2: Single Monolithic Ultra-Clear (Low-Iron) Float Glass Units.

- 1. Thickness: 12.0 mm.
- 2. Heat Treatment: Kind FT (fully tempered) float glass.
- 3. Application: Vision panels for interior glazing.
- 4. Glass Panel Sizes: Comply with requirements indicated on Drawings.

# 2.2 PRIMARY FLOAT GLASS

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); Class as indicated.
  - 1. Class 1: Ultra-Clear (Low Iron) Glass, unless otherwise indicated. Visible light transmission not less than 91 percent. Where indicated on Drawings or in Glazing Schedules as ultra-clear (low iron), provide one of the following products:
    - a. AGC Asahi Glass Co. Ltd.; Krystal Klear.
    - b. Guardian Glass, LLC; UltraWhite.
    - c. Pilkington North America; Optiwhite.
    - d. Vitro Architectural Glass (formerly PPG Industries, Inc.); Starphire.
  - 2. In order to reduce the possibility of glass color range rejection, the supplier of float (primary) glass products shall provide glass for the entire Project from a single facility using stockpiled batch run materials from a single source for the entire Project.
  - 3. Float Glass Quality Imperfection Limitations: In addition to the limitations included under ASTM C 1036, all glass shall be supplied meeting the following quality standards:
    - a. Point blemishes seeds/stones with distortion, stain spots, dirt, surface damage shall be limited to 0.060 inch maximum separated by 12 inches minimum.
    - b. Glass scratch/rubs shall be rejected if detectable at 10 feet.
    - c. Water blow-off stains, tag residue, and handprints will not be permitted.

## 2.3 HEAT-TREATED FLOAT GLASS

- A. General: Heat-treat glass where the need is determined by thermal stress analyses, by wind load analyses, and where required to meet safety glazing requirements.
  - 1. Provide Kind FT (fully tempered) float glass for all safety glazing applications or hazardous condition locations, except as otherwise indicated.
  - 2. Provide Kind HS (heat-strengthened) float glass wherever fully tempered float glass is not required, except as otherwise indicated.
- B. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of installed glass unit.
- C. Sizes and Cutting: Prior to heat treatment, cut glass to required sizes as determined by accurate measurement of openings to be glazed, making allowance for required edge clearances. Cut and process edges in accordance with glass manufacturer's recommendations. Do not cut or treat edges in the field.

- D. Heat-Strengthened Glass: Provide glass complying with ASTM C 1048 Kind HS. Surface compression range shall be between 4,000 psi and 7,000 psi for 1/4 inch thick glass.
  - 1. Heat-Strengthened Glass Quality Imperfection Limitations: In addition to the limitations included under ASTM C 1048, all glass shall be supplied meeting the following quality standards:
    - a. Chill cracks, roller marks, and picture framing shall not be permitted.
    - b. Tracking/cloud and heat dimples shall be rejected if detectable at 10 feet.
- E. Fully Tempered Glass: Provide glass complying with ASTM C 1048 Kind FT and meeting the requirements of ANSI Z97.1. Surface compression shall be equal to or greater than 10,000 psi. After tempering, heat-soak 100 percent of all fabricated glass units to European Union Standard EN14179 to reduce the potential for inclusion related glass breakage. Statistical heat soaking shall not be permitted.
  - 1. Tempered Glass Quality Imperfection Limitations: In addition to the limitations included under ASTM C 1048, all glass shall be supplied meeting the following quality standards:
    - a. Chill cracks, roller marks, and picture framing shall not be permitted.
    - b. Tracking/cloud and heat dimples shall be rejected if detectable at 10 feet.
- F. Flatness Tolerances: All heat-treated glass shall be fabricated to the following flatness tolerances. Verification of compliance for overall bow and warp shall be in accordance with ASTM C 1048. Verification of compliance for flatness shall be via an optical scanning device such as LiteSentry or Osprey Series.
  - 1. Overall Bow and Warp: Not greater than the maximum bow and warp tolerances in any direction as listed in ASTM C 1048 Table 2. Localized warp limited to 1/32 inch in 12 inches.
  - 2. Roll Ripple: The deviation from flatness at any peak (peak to valley deviation) shall not exceed 0.003 inches for 6 mm thick glass in the glass center, with leading and trailing edge deviation not to exceed 0.008 inches for 6 mm thick glass.
- G. Millidiopter Criteria: Maximum +/- 120 millidiopters overall or the highest overall measurement from the approved visual mockup that is less than +- 120 millidiopter overall whichever is less when viewed outdoors.

# 2.4 COATED FLOAT GLASS

- A. General: Provide coated glass complying with requirements indicated in this Article, under Paragraph "Insulating Glass," and in schedules.
  - 1. Sputter-Coated Float Glass: Float glass with the coating(s) specified in schedules, deposited by magnetron sputtered vacuum deposition process after manufacture and heat treatment (if any). Pyrolytic and wet chemical deposition glass coatings will not be permitted.
  - 2. Coating Quality: The allowable range of defects in coatings applied to glass shall be as accepted through glass sample submissions. Installed coated glass products which are outside of the accepted sample range shall be subject to rejection by the Architect. In

order to reduce the possibility of glass rejection, the supplier of coated glass products shall provide glass coating production runs for the entire Project from a single coating facility. All coated glass shall be provided from a single coating facility. The allowable range of defects are defined as follows:

- a. The vision glass area is defined as the field of glass which is greater than 1 inch from the glass unit edge.
  - 1) Pinholes: At an indoor viewing distance of 10 feet for non-reflective and reflective low emissivity coatings:
    - a) Pinholes greater than 1/16 inch in diameter shall not be permitted in 80 percent of the central portion of the vision glass area and separated by greater than or equal to 12 inches. Pinholes larger than 3/32 inch are not allowed in the outer 20 percent of the perimeter vision glass area and separated by greater than or equal to 12 inches;
    - b) No more than two readily apparent blemishes are allowed in a 3 inch diameter circle and no more than five readily apparent blemishes are allowed in a 12 inch diameter circle.
  - 2) Scratches: At an indoor viewing distance of 10 feet for non-reflective and reflective low emissivity coatings, and 15 feet for reflective coatings:
    - a) Scratches are allowed in 80 percent of the central glass area if not detectable at the viewing distance, and scratches less than or equal to 1 inch are allowed in the outer 20 percent area if not detectable at the viewing distance. Concentrated scratches or abraded areas are not allowed.
    - b) Scuffs, rub marks, cup marks, or abraded areas shall not be permitted in any glass area.
  - 3) Reflectance and Transmission Inspection: When viewed outdoors against a bright uniform opaque background at a distance of 10 feet for low emissivity coatings, color, reflectance and transmission will be permitted to have a slight variance subject to Architect's acceptance.
    - a) Mottling and streaking of the coating shall not be permitted.
    - b) Coating arcing will not be permitted.
    - c) Water blow-off stains will not be permitted.
    - d) Handprints will not be permitted.
    - e) Roller marks shall not be permitted.
    - f) Positive and negative air distortion shall not be permitted.
    - g) Tag residue shall not be permitted.

# 2.5 INSULATING GLASS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:
  - 1. AFG Industries, Inc.

- 2. JE Berkowitz, LP.
- 3. Cardinal Glass Industries.
- 4. Guardian Glass, LLC.
- 5. Oldcastle Glass, Inc.
- 6. Pilkington North America.
- 7. Viracon, Inc.
- 8. Vitro Architectural Glass, formerly PPG Industries, Inc.
- B. Insulating-Glass Units: Preassembled units, with dehydrated entrapped air, consisting of sheets of glass hermetically sealed at all edges with a polyisobutylene primary and a black silicone secondary elastomeric sealant. The lites of glass shall be separated by dessicant containing mill finished aluminum spacers. All insulating glass units shall be IGCC certified to comply with ASTM E 2190 and with requirements specified in this Article and in the Glass Schedule.
  - 1. Provide Kind HS (heat-strengthened) float glass where needed to comply with "Performance Requirements" Article. Provide Kind FT (fully tempered) where safety glass is indicated.
- C. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the Glass Schedule are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

# 2.6 GLAZING SEALANTS

- A. General:
  - 1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  - 2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  - 3. VOC Content: Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
- C. Structural Glazing Sealants: Refer to specific product section for framing system application; type specifically recommended by manufacturer.
- D. Gasket, Blocking, and Spacer Wet Glazing Materials: Silicone, compatible with and adherent to each material it will be in contact with, as recommended by the manufacturer to fulfill performance requirements.

## 2.7 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 in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

## 2.8 GLAZING GASKETS

- A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C 542, black.
- B. Dense Compression Gaskets:
  - 1. Neoprene: Continuous extruded neoprene with, cross sectional profile, physical properties, and tolerances as recommended by the window and curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 864, Option II. Provide injection molded corners.
  - 2. EPDM: Continuous extruded EPDM with cross sectional profile, physical properties, and tolerances as recommended by the window and curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 864, Option II. Provide injection molded corners.
  - 3. Silicone: Continuous extruded silicone with cross sectional profile, physical properties, and tolerances as recommended by the window and curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 1115, Type C. Provide injection molded corners.
  - 4. Thermoplastic Polyolefin Rubber: Continuous extruded thermoplastic polyolefin rubber with cross sectional profile, physical properties, and tolerances as recommended by the window and curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 1115. Provide injection molded corners.
  - 5. Any material indicated above.
- C. Soft Compression Gaskets: Continuous extruded expanded foam with, cross sectional profile, physical properties, and tolerances as recommended by the window and curtain wall manufacturer, and as required, to comply with the performance requirements specified and shown all in compliance with the applicable provisions of ASTM C 509, Option II, Type II; provide the following:
  - 1. EPDM.
  - 2. Silicone.

- 3. Thermoplastic polyolefin rubber.
- 4. Any material indicated above.
- D. Continuous Structural Gaskets/Spacers: Continuous extruded silicone or silicone compatible rubber, with cross sectional profile, physical properties, and tolerances as recommended by the framing system manufacturer, and as required, to comply with the performance requirements specified and shown. Gaskets/spacers shall be tested for compatibility with silicone sealants and shall be subject to the acceptance of the sealant manufacturer.

# 2.9 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 for application indicated, and with a proven record of compatibility with surfaces, and wet glazing materials, contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks:
  - 1. EPDM complying with ASTM C 864 (Option II), blocks, 85 +/- 5 Shore A durometer hardness, 1/16 inch less than the channel width, and length based on the face area of the glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations, but not less than 4 inches.
  - 2. Silicone complying with ASTM C 1115 (Type C), blocks, 85 +/- 5 Shore A durometer hardness, 1/16 inch less than the channel width, and length based on the face area of the glass unit to be supported in accordance with GANA standards and glass manufacturer recommendations, but not less than 4 inches.
- D. Edge Blocks:
  - 1. Silicone complying with ASTM C 1115 (Type C), blocks, 65 +/- 5 Shore A durometer hardness, minimum 4 inches long and sized to allow 1/8 inch clearance between edge of glass and block.
  - 2. EPDM complying with ASTM C 864 (Option II), blocks, 65 +/- 5 Shore A durometer hardness, minimum 4 inches long and sized to allow 1/8 inch clearance between edge of glass and block.
- E. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

# 2.10 HARDWARE COMPONENTS

- A. Hardware: Comply with requirements indicated on Drawings for profiles, configuration and arrangement of components.
  - 1. Material and Finish: Fabricate hardware components from Type 304 stainless steel.
  - 2. Manufacturer: Subject to compliance with requirements, provide products manufactured by one of the following:

- a. CHMI Custom Hardware Manufacturing, Inc.
- b. Laurence, C. R. Co., Inc.
- B. Fasteners, Anchors and Inserts: Provide stainless steel fasteners and devices as required for hardware installation.

# 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 written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
  - 1. Edge and Surface Conditions: Comply with the recommendations of AAMA "Structural Properties of Glass" for "clean-cut" edges, except comply with manufacturer's recommendations when they are at variance therewith.
- B. Cutting: Do not nip glass edges. Edges may be wheel cut or sawed and seamed at manufacturer's option. For glass to be cut at site, provide glass 2 inches larger than required in both dimensions, so as to facilitate cutting of clean cut edges without the necessity of seaming or nipping. Do not cut, seam, nip or abrade heat-treated glass.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine glass framing, with glazier and glass framing erector present, for compliance with the following:
  - 1. Compliance with the specified manufacturing and installation tolerances, including those for size, squareness, and 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. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Clean glazing stops, glazing channels, and rabbets which will be in contact with the glazing materials immediately before glazing. Loose particles present or resulting from fabrication and cleaning shall be removed by blowing out joints with oil-free compressed air, or by vacuuming joints. Remove protective coatings, oils from cutting and drilling operations, and residue on metallic surfaces with solvents that leave no residue. Do not allow solvent to air dry without wiping. Use only lint-free towels for wiping of surfaces. Wipe metal surfaces with IPA (isopropyl alcohol) unless otherwise required by compatibility and adhesion testing results.

- 1. Prime surfaces to receive glazing compounds. When priming, comply with wet glazing manufacturer's recommendations.
- B. Inspect each glass unit immediately before installation. Do not install any units which are improperly sized or have damaged edges, scratches or abrasion or other evidence of damage. Remove labels from glass immediately after installation.
- C. Seal vent (breather or capillary) tubes in insulating glass units in accordance with the insulating glass manufacturer's written recommendations.

# 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
  - 1. All glass units shall be installed in accordance with the glass manufacturer's recommendations.
- B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to surfaces indicated to receive glazing materials. Use primers as determined by preconstruction compatibility and adhesion testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless more stringent requirements are recommended by glass manufacturer. Place blocks to allow water passage to weep holes. Set blocks in thin course of silicone sealant.
  - 1. For Glass Units Less Than 72 inches: Locate setting blocks at sill one-quarter of the width in from each end of the glass, unless otherwise recommended by the glass manufacturer.
  - 2. For Glass Units 72 inches or Greater: Locate setting blocks at sill one-eighth of the width in from each end of the glass, but not less than 6 inches, unless otherwise recommended by the glass manufacturer.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
- 2. Provide 1/8 inch 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 prevent glass lites from moving sideways in glazing channel, sized and located to comply with the glass manufacturer's recommendations and the requirements in referenced glazing publications.
  - 1. Edge blocking will not be required at structural glazed window and curtain walls unless specifically required by the glass manufacturer for the conditions shown.
- I. Set glass lites with uniform pattern, draw, bow, and similar characteristics, producing the greatest possible degree of uniformity in appearance on the entire exterior wall elevation.
  - 1. Set glass units with void between edge of units and glazing channel.
  - 2. Orient and install insulating glass units made up with one lite of low emissivity coated glass with the uncoated glass lite on the inboard (building) side.
  - 3. Orient and install insulating glass units made up with one lite of tinted glass with the untinted glass lite on the inboard (building) side.
- J. Where wedge-shaped gaskets are driven into one side of channel to pressurize gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- K. Miter cut gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away and join with sealant recommended by gasket manufacturer which will provide an airtight and watertight seal at the joint.

## 3.4 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 necessarily 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 glazing unit 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.

## 3.5 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Use special tool to install and remove filler strips; lubricate in accordance with manufacturer's instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

## 3.6 PROTECTION AND CLEANING

- A. Protect glass from damage 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. 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, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way and from any source, including natural causes, accidents, and vandalism.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION 08 80 00

## SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

## PART 1 - GENERAL

## 1.1 SUMMARY

A. Section includes non-structural metal framing assemblies.

### 1.2 ACTION SUBMITTALS

A. Product Data: Submit product data for each product indicated.

### 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For non-structural metal framing assemblies with fireresistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Sound Transmission Characteristics: For non-structural metal framing faced with gypsum wallboard materials and having STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
  - 1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

#### 1.4 PRE-INSTALLATION MEETING

A. Preconstruction Conference: Prior to start of the non-structural metal framing work, and at the Contractor's direction, meet at Project site and review the installation procedures and coordination with other work. Meeting shall include Contractor, Architect and major material manufacturer as well as the Installer and other subcontractors whose work must be coordinated with the non-structural metal framing and the gypsum wallboard work.

#### 1.5 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.

### 1.6 FIELD CONDITIONS

A. Comply with ASTM C 754 requirements or wallboard material manufacturer's written recommendations, whichever are more stringent.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Gypsum Board Assembly Deflections:
  - 1. Typical Walls: Wall assemblies shall be constructed for deflection not to exceed 1/240 of the wall height when subjected to a positive and negative pressure of 5 psf (239 Pa).
  - 2. Walls with Tile Finish: Wall assemblies to receive tile finishes shall be constructed for deflection not to exceed 1/360 of the wall height when subjected to a positive and negative pressure of 5 psf (239 Pa).
  - 3. Ceilings, bulkheads, soffits, ceiling transitions, ledges, and coves shall be constructed for a deflection not to exceed 1/360 of the distance between supports.

## 2.3 STEEL SUSPENDED CEILING FRAMING

- A. Components, General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
- B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625 inch (1.59 mm) diameter wire, or double strand of 0.0475 inch (1.21 mm) diameter wire.
- C. Hanger Attachments to Overhead Decks: Suitable for application indicated, fabricated from corrosion-resistant materials, with eyepins, clips or other devices for attaching hangers and capable of sustaining, without failure, a load equal to 10 times that imposed by the complete ceiling system.
- D. Hangers: As follows:
  - 1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162 inch (4.12 mm) diameter.
    - a. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
    - b. Application: Hangers for conventional suspended ceiling framing.

- 2. Wire Hangers: ASTM A 641/A641M, Class 1 zinc coating, soft temper 0.1055 inch (2.68 mm) diameter.
  - a. Protective Coating: ASTM A 153/A 153M, hot-dip galvanized.
  - b. Application: Hangers for grid suspension ceiling systems.
- 3. Flat Hangers: Commercial-steel sheet, ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized.
  - a. Size: 1 by 3/16 inch (25.4 by 4.76 mm) by length indicated.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch (1.37 mm), a minimum 1/2 inch (12.7 mm) wide flange, with manufacturer's standard corrosion-resistant zinc coating.
- F. Furring Channels (Furring Members): Commercial-steel sheet with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating. No equivalent coatings allowed.
  - 1. Cold Rolled Channels: 0.0538 inch (1.37 mm) bare steel thickness, with minimum 1/2 inch (12.7 mm) wide flange, 3/4 inch (19.1 mm) deep.
  - 2. Steel Studs: ASTM C 645, 0.0312 inch (0.79 mm) minimum base metal thickness and minimum depth as required to suit deflection criteria.
  - 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22.2 mm) deep.
    - a. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
  - 4. Resilient Furring Channels: 1/2 inch (12.7 mm) deep members designed to reduce sound transmission.
- G. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

# 2.4 STEEL PARTITION AND SOFFIT FRAMING

- A. General: Provide steel framing members sized and spaced as indicated but not less than that required to comply with ASTM C 754 under the maximum deflection conditions specified under Article 'Assembly Performance Requirements.'
  - 1. In areas where top of partitions are dependent on ceiling system for lateral support, coordinate design and installation to comply with the above deflection limitation.
  - 2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating. No equivalent coatings (EQ) allowed.
- B. Steel Studs and Runners: ASTM C 645, in minimum depth indicated in partition type details.
  - 1. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
    - a. Allsteel & Gypsum Products, Inc.

- b. CEMCO.
- c. Clark Dietrich.
- d. Consolidated Fabricators, Corporation.
- e. Craco Manufacturing, Inc.
- f. Custom Stud, Inc.
- g. Marino\WARE.
- h. Phillips Manufacturing Company.
- i. Quail Run Building Materials, Inc.
- j. SCAFCO Corporation.
- k. Southeastern Stud & Components, Inc.
- l. Telling Industries.
- m. The Steel Network.
- 2. Minimum Base Metal Thickness:
  - a. Typical: As required to comply with deflection criteria.
  - b. Partitions Supporting Wall Mounted Casework: 0.033 inch (0.84 mm) minimum thickness.
  - c. Partitions Supporting plasma screens and equipment: 0.053 inch (1.3 mm) minimum thickness.
- 3. Depth: As indicated.
- C. Double-Runner System: ASTM C 645 top runners, inside runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
- D. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT).
    - b. Metal-Lite, Inc.; Slotted Track.
    - c. The Steel Network, Inc; VertiClip SLD Series or VertiTrack VTD Series.
- E. Firestop Track: ASTM C 645 top runner with custom fabricated flanges with depths sized to accommodate roof and floor deck live and dead load deflections but not less than 2 inch (50.8 mm) deep flanges. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip. Metal-Lite, Inc.; The System.
    - b. Metal-Lite, Inc.; The System.
    - c. The Steel Network, Inc: VertiClip SLD Series or VertiTrack VTD Series.

- F. Flat Strap and Backing Plate: 36 inch (914 mm) wide by 6 inch (150 mm) high steel sheet for blocking and bracing required for the attachment of surface mounted items and accessories indicated. Locate to span a minimum of 2 studs.
  - 1. Minimum Base Metal Thickness: 0.0312 inch (0.79 mm).
- G. Cold-Rolled Channel Bridging: For channel bridging for fixture attachment or lateral bracing provide 0.0538 inch (1.37 mm) bare steel thickness, with minimum 1/2 inch (12.7 mm) wide flange:
  - 1. Depth: 1-1/2 inches (38.1 mm).
  - 2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068 inch (1.73 mm) thick, galvanized steel.
- H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
  - 1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
  - 2. Depth: 7/8 inch (22.2 mm).
- I. Resilient Furring Channels: 1/2 inch (12.7 mm) deep, steel sheet members designed to reduce sound transmission.
- J. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members securely to substrates involved; complying with the recommendations of the gypsum board manufacturers for applications indicated.

## 2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
  - 1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
  - 2. AC-20 FTR; Pecora.
- C. Isolation Strip at Exterior Walls: Adhesive-backed, closed-cell, compressible, non-extruding, sound transmission reducing, vinyl foam tape strips with approximately 13 Shore 00 hardness that allow fastener penetration without foam displacement, 0.75 inch (19 mm) thick, in width 1/2 inch (12.7 mm) less than window mullion width.
  - 1. V7324 Norton Sealant Tape; gray color.
- D. Wood Blocking and Plywood Concealed in Partition Construction: Fire retardant treated, refer to Section 06 10 00 "Rough Carpentry."

E. Metal Post for Tube Framing at Partial Height Walls: Refer to Section 05 50 00 "Metal Fabrications."

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrates to which non-structural metal framing attaches or abuts, installed door frames 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.

### 3.2 INSTALLING STEEL FRAMING, GENERAL

- A. General: Install steel framing to comply with ASTM C 754, ASTM C 840 and the gypsum board manufacturer's recommendations, where standards conflict the more stringent shall apply.
- B. Install supplementary framing, blocking, backerplates and bracing at locations in gypsum board assemblies which are indicated to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement.
  - 1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
  - 2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.
    - a. Use deep-leg deflection track where indicated.
    - b. Use proprietary firestop track where indicated.

## 3.3 INSTALLING STEEL SUSPENDED CEILING FRAMING

- A. Suspended Ceiling Framing:
  - 1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and

hangers to support ceiling loads within performance limits established by referenced standards.

- 3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
- 4. Secure wire hangers by looping and wire-tying, to eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
- 5. Secure rod and flat hangers to structure, including intermediate framing members, by attaching to devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
- B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member and transversely between parallel members.
- C. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.
- D. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards unless more stringent spacings are recommended by the gypsum board manufacturer.
- E. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

# 3.4 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

- A. Install continuous runners (tracks) sized to match studs at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction. Secure runners to substrates with fasteners spaced a maximum of 24 inches (600 mm) on center unless closer spacing is recommended by the framing manufacturer for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks.
  - 1. Where studs are installed directly against exterior walls, install foam gasket isolation strip between studs and wall.
  - 2. Install two beads of sealant below floor tracks for acoustical and dust control.
- B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings and at partial height partitions. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  - 1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
  - 2. For fire-resistance-rated and STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and

decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.

- 3. Terminate partition framing at suspended ceilings where indicated.
- 4. Terminate partial height partition framing as indicated.
- D. Install steel studs and furring in sizes and at spacing indicated but not less than that required by the referenced steel framing installation standard to comply with maximum deflection and minimum loading requirements specified, unless more stringent requirements are recommended by the gypsum board manufacturer:
  - 1. Space studs 16 inches (400 mm) on center, unless otherwise indicated.
- E. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.
- F. Install backerplates for support of wall mounted items.
- G. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
  - 1. Install two studs at each jamb, unless otherwise indicated. Install one additional stud no more than 6 inches (150 mm) from jamb studs at single doors greater than 48 inches (1200 mm) and at all pairs of doors.
  - 2. Install cripple studs at head adjacent to each jamb stud. Provide runner track and typical studs above door openings with studs spaced not more than 24 inches (600 mm) on center.
  - 3. At all welded frames with fixed anchor clips secure stud reinforcing to jamb anchor clips with not less than two self tapping screws per clip.
  - 4. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- I. Isolation Strip Attachment: Where partitions abut exterior wall window mullions, and partition filler panels are not indicated, adhesively attach isolation strips to window mullions. Center isolation strips on mullion to form a continuous, sound resistant and lightproof, recessed joint seal for the entire length of the interface between the partition studs and trim members and the vertical window mullions.

## 3.5 CLEANING AND PROTECTION

- A. Clean floors of all non-structural metal framing debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure non-structural metal framing work remains without damage or deterioration at time of Substantial Completion.

OCA Architects, Inc. Project No. P21-008

END OF SECTION 09 22 16

## SECTION 09 29 00 - GYPSUM BOARD

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Interior gypsum board.
  - 2. Tile backing panels.
  - 3. Installation materials and accessories.
- B. Related Sections include the following:
  - 1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board.
  - 2. Division 09 painting Sections for primers applied to gypsum board surfaces.

### 1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

### 1.3 QUALITY ASSURANCE

- A. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- B. 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.

#### 1.4 PRE-INSTALLATION MEETING

A. Prior to start of each type of gypsum board system, and at the Contractor's direction, meet at the site and review the installation procedures and coordination with other Work. Meeting shall include Contractor, Architect and major material manufacturer, as well as the Installer and other subcontractors whose Work must be coordinated with the gypsum board Work.

#### 1.5 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. Stack gypsum panels flat to prevent sagging.
- C. Handle gypsum board to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

### 1.6 FIELD CONDITIONS

- A. Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Installation of gypsum board joint treatments shall not start until the space to receive gypsum board joint treatments is heated to maintain a continuous and uniform temperature of not less than 55 degrees F (8 degrees C), from one week prior to beginning of joint treatment until joint treatment is completed and thoroughly dry. Ventilation, either natural or supplied by fans, circulators or air conditioning systems shall be provided to remove excess moisture during joint treatment. Temperature requirements may be waived only on recommendation of gypsum board manufacturer.

## PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."
- B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.
  - 1. STC-Rated Assemblies: Indicated by design designations from GA-600, "Fire Resistance Design Manual."

#### 2.2 MATERIALS, GENERAL

A. General: For fire rated assemblies, provide materials, including accessories and fasteners produced by one manufacturer, or, when products of more than one manufacturer are used in a rated system, they shall be acceptable to authorities having jurisdiction.

## 2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. American Gypsum.
  - 2. CertainTeed Corp.
  - 3. Georgia-Pacific Gypsum LLC.
  - 4. Continental Building Products/Lafarge North America Inc.
  - 5. National Gypsum Company.
  - 6. PABCO Gypsum.
  - 7. USG Corporation.
- B. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- C. Gypsum Board: ASTM C 1396/C 1396M.
  - 1. Type X:
    - a. Thickness: 5/8 inch (15.9 mm).
    - b. Long Edges: Tapered.
    - c. Location: Vertical surfaces, where required for fire-resistance-rated assembly, and where indicated on Drawings.
- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M, manufactured to have more sag-resistance than regular-type gypsum board.
  - 1. Thickness: 1/2 inch (12.7 mm).
  - 2. Long Edges: Tapered.
  - 3. Location: Interior ceiling surfaces.
- E. Moisture and Mold Resistant Board: ASTM C 1396/C 1396M; with moisture- and mold-resistant core and facing surfaces.
  - 1. Core: 5/8 inch (15.9 mm).
  - 2. Long Edges: Tapered.
  - 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

## 2.4 TILE BACKING PANELS

- A. Tile Backing Panels: Glass-Mat, Water-Resistant Backing Board; ASTM C 1178/C 1178M, with core type and in thickness indicated.
  - 1. Manufacturers:
    - a. G-P Gypsum Corp.; Dens-Shield Tile Backer.
    - b. National Gypsum Company; GOLD BOND Brand  $E^2XP$  Tile Backer.
    - c. USG; Securock Glass Mat Sheathing.
- B. Cementitious Backer Units: ANSI A118.9, in thickness indicated.

Copyright 2021 OCA

- 1. Thickness: 1/2 inch (12.7 mm).
- C. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

## 2.5 TRIM ACCESSORIES

- A. Interior Steel Trim Accessories: ASTM C 1047; formed metal sheet steel zinc coated by hotdipped process. Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
  - 1. Cornerbead: Use at outside corners.
  - 2. LC-Bead with both face and back flanges to receive joint compound; use at exposed panel edges.
  - 3. U-Bead with face and back flanges; face flange formed to be left without application of joint compound: Use where indicated.
  - 4. Curved-Edge Cornerbead: With notched or flexible flanges; use at curved openings.
  - 5. Expansion (Control) Joint: One-piece control joint formed with V-shaped slot, with removable strip covering slot opening. Use where indicated.
- B. Aluminum Trim Accessories: Extruded aluminum trim with 1/4 inch (6.35 mm) diameter holes in fins for attachment to gypsum board or studs; longest lengths available in profiles indicated; primed for finish painting; sized for scheduled gypsum board thickness shown.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fry Reglet Corp.
    - b. Gordon, Inc.
    - c. MM Systems Corporation.
    - d. Pittcon Industries.

## 2.6 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of the products and joint treatment materials for each application indicated.
- B. Joint Tape:
  - 1. Interior Gypsum Board: Paper.
  - 2. Tile Backing Panels: As recommended by panel manufacturer.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.

- 3. Second Coat: For filling over tape, beads and fasteners. Use setting-type, sandable topping compound.
- 4. Third Coat: For finishing over tape, beads and fasteners. Use drying-type, all-purpose compound.
- 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels: As recommended by panel manufacturer.

## 2.7 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90. One of the following:
  - 1. SHEETROCK Acoustical Sealant; U.S. Gypsum.
  - 2. AC-20 FTR; Pecora.
- C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from slag wool, or rock wool.
  - 1. Product: Subject to compliance with requirements, provide the following:
    - a. Roxul AFB; Roxul Inc.
    - b. SAFB Blankets; Thermafiber LLC.
- E. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - 1. Use adhesives that 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 EXAMINATION

A. Examine substrates to which gypsum board assemblies attach or abut, installed door frames 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.

## 3.2 APPLYING AND FINISHING PANELS

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840, GA-216, and the gypsum board manufacturer's recommendations, where standards conflict, the more stringent shall apply. Install specialty gypsum board as specified below except where manufacturer's instructions conflict; follow manufacturer's instructions for specialty performance board to maintain warranty coverage.
- B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.
- C. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated. 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.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints or avoid them entirely.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    - b. At high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.
- D. Multilayer Application:
  - 1. On Partitions/Walls: Apply gypsum board indicated for base layers and 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, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
  - 2. On Ceilings: Apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply base layers in same sequence. Apply base layers at right angles to framing members and offset face layer joints 1 framing member, 16 inches minimum, from parallel base joints, unless otherwise indicated or required by fire-resistance-rated assembly.

- E. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- F. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws.
- G. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- H. Tile Backing Panels:
  - 1. Glass-Mat, Water-Resistant Backing Panel: Install with 1/4 inch (6 mm) gap where panels abut other construction or penetrations.
  - 2. Cementitious Backer Unit Application: ANSI A108.11 at showers and where otherwise indicated.
- I. 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.
- J. Locate edge and 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.
- K. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- L. Attach gypsum panels to framing provided at openings and cutouts.
- M. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Fit gypsum panels around ducts, pipes, and conduits.
  - 2. Where partitions intersect open exterior and interior wall kickers, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by the wall kickers and other structural members; allow 1/4 to 3/8 inch (6.4 to 9.5 mm) wide joints to install sealant.
  - 3. Where chase walls are shown, provide bracing between parallel rows of studs. Unless otherwise shown, provide gypsum board braces no less than 1/2 inch (12.7 mm) thick by 12 inches (300 mm) wide and cut to width of chase. Locate at quarter points in wall height between each pair of parallel studs. Fasten with not less than 3 screws at each stud.
- N. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. 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.
- O. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with

ASTM C 919 and manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

- P. Cut openings in gypsum board for electrical outlets, piping and other penetrations. Maintain close tolerances so that edges will be covered by plates and escutcheons. Cut both face and back paper. Do not install electrical outlets back to back on opposing sides of partitions.
- Q. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.
  - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
  - 2. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.
  - 3. Install fasteners not less than 3/8 inch (9.5 mm) from ends or edges of gypsum board sheets, spacing fasteners opposite each other on adjacent ends or edges.
  - 4. Begin fastening from center of gypsum board and proceed toward edges and corners.
  - 5. Apply pressure on surface of gypsum board adjacent to fasteners being driven to ensure that gypsum board will be secured tightly to supporting members.
    - a. Drive fastener with shank perpendicular to face of board.
    - b. Drive screws with a power screwdriver as recommended by gypsum board manufacturer. Set heads of screws slightly below surface of paper without cutting paper.

### 3.3 INSTALLING TRIM ACCESSORIES

- A. General: Fasten trim accessories according to manufacturer's written instructions for type, length, and spacing of fasteners.
- B. Install corner beads at external corners.
- C. Install interior trim accessories where edge of gypsum panels would otherwise be exposed or semiexposed. Provide interior trim accessories with face flange formed to receive joint compound.
- D. Install aluminum trim accessories where indicated.
- E. Install control joints in locations indicated and where directed by the Architect for visual effect, or if not indicated or directed by the Architect, provide control joints in accordance with ASTM C 840 which is as follows:
  - 1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic, or building control element) in the base building structure.
  - 2. Where a wall or a partition runs in an uninterrupted straight plane exceeding 30 linear feet (9,100 mm).
  - 3. Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 feet (15,000 mm) and total area between control joints does not exceed 2500 square feet (230 sq m).

- 4. Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 linear feet (9,100 mm) and total area between control joints does not exceed 900 square feet (84 sq m).
- 5. A control joint or intermediate blocking shall be installed where ceiling framing members change direction.

## 3.4 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Apply joint treatment at gypsum board joints, flanges of interior trim and aluminum trim accessories, interior angles, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration and levels of gypsum board finish indicated. Produce surfaces free of tool marks and ridges ready for decoration of type indicated. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- D. Glass-Mat, Water-Resistant Backing Panels: Do not use paper tape and joint compound. Finish according to manufacturer's written instructions.
- E. Cementitious Backer Units: Finish according to manufacturer's written instructions.
- F. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
  - 1. Level 1: Embed tape at joints in ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-resistance-rated assemblies and sound-rated assemblies.
  - 2. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile and where indicated.
  - 3. Level 3: Typically not used.
  - 4. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.
  - 5. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface where gypsum board is indicated to receive wall coverings, semi-gloss and high gloss paints.

## 3.5 CLEANING AND PROTECTION

- A. Clean floors of all gypsum board debris and leave broom clean. Excess material, scaffolding, tools and other equipment are to be removed upon completion of the Work.
- B. Provide final protection and maintain conditions that ensure gypsum board assemblies remain without damage or deterioration at time of Substantial Completion.

OCA Architects, Inc. Project No. P21-008

END OF SECTION 09 29 00

## SECTION 093000 - TILING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Tile materials.
  - 2. Setting and grouting materials.
  - 3. Stone thresholds installed as part of tile installations.
- B. Related Sections include the following:
  - 1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
  - 2. Division 09 Section "Gypsum Board" for tile backing boards.

#### 1.2 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.
- D. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499) excluding spacer lugs.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Dynamic Coefficient of Friction (DCOF): For tile installed on walkway surfaces, provide products with the following value as determined by testing identical products by the DCOF AcuTest Method per ANSI 137.1, 2012 Edition.
  - 1. Walkway Surfaces: Minimum 0.42.

### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification:

- 1. Full-size tile samples.
- 2. Cured samples of grout materials in 6-inch lengths for each type and color.
- 3. Stone thresholds in 6-inch lengths.

## 1.5 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
  - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
  - 1. Stone thresholds.
  - 2. Waterproofing and crack suppression membranes.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid latexes in unopened containers and protected from freezing.

### 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

### 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of quantity installed for each type, composition, color, pattern, and size indicated.

### PART 2 - PRODUCTS

### 2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:
  - 1. Match Architect's samples.
- D. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

### 2.2 TILE PRODUCTS

- A. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
  - 1. Facial Dimensions: As indicated on Drawings and Finish Schedules.
  - 2. Provide matching trim materials for project conditions indicated.
    - a. Exterior corners.
    - b. Interior corners.
    - c. Surface bullnose.
    - d. Coves.
    - e. Base.

#### 2.3 THRESHOLDS

- A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
- B. Marble Thresholds: ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish.
  - 1. Description: Uniform, fine- to medium-grained stone with veining.
  - 2. Variety and appearance: Match Architect's control Sample.

#### 2.4 SETTING MATERIALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Custom Building Products.
  - 2. LATICRETE International Inc.
  - 3. MAPEI Corporation.
- B. Latex Polymer Modified, Dry-Set Mortar (Thinset): ANSI A118.4.
  - 1. Acceptable types:
    - a. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
    - b. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrenebutadiene-rubber liquid-latex additive at Project site.
- C. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
- D. Portland Cement Mortar (Thickset): ANSI A108.1A and as specified below:
  - 1. Reinforcing Wire Fabric: Galvanized, welded wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.

#### 2.5 GROUT MATERIALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Custom Building Products.
  - 2. Laticrete International, Inc.
  - 3. MAPEI Corporation.
- B. Water-Cleanable Epoxy Grout: ANSI A118.3.
  - 1. VOC Content: Not more than 65 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Color: Match Architect's control Sample.
- C. Polymer-Modified Tile Grout: ANSI A118.7.
  - 1. Acceptable types:
    - a. Provide prepackaged, dry-grout mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
    - b. Provide prepackaged, dry-grout mix combined with acrylic resin or styrenebutadiene-rubber liquid-latex additive at Project site.
  - 2. Grout types:
    - a. Sanded grout mixture for joints greater than 1/8 inch.
    - b. Unsanded grout mixture for joints 1/8 inch and narrower.

c. Color: Match Architect's control Sample.

### 2.6 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE MATERIALS

- A. General: Provide manufacturer's standard products for bonded membrane installations that comply with applicable requirements of ANSI A118.10 or ANSI A118.12.
- B. Polyethylene-Sheet Product: Polyethylene faced on both sides with fleece webbing for adhering to latex-portland cement mortar; 39 inches wide by 0.008-inch nominal thickness.
  - 1. Product: KERDI; Schluter Systems L.P.
- C. Corrugated-Polyethylene Product: Corrugated polyethylene with dovetail-shaped corrugations for adhering to latex-portland cement mortar and with anchoring webbing on the underside; 39 inches wide by 3/16-inch nominal thickness.
  - 1. Product: DITRA; Schluter Systems L.P.

## 2.7 CEMENTITIOUS BACKER UNITS AND TILE BACKING PANELS

A. Provide products specified in Division 9 Section "Gypsum Board."

### 2.8 ELASTOMERIC SEALANTS

- A. Provide products specified in Division 7 Section "Joint Sealants."
  - 1. VOC Content: Not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### 2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D 4397, 6.0 mils thickness.
- C. Temporary Protective Coating: Product specifically recommended by tile manufacturer and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
- D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

#### 2.10 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

### PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - 1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
  - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Ensure that existing concrete substrates for tile floors installed with thin-set mortar comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
  - 1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
  - 2. Remove protrusions, bumps, and ridges by sanding or grinding.
- C. Blending: For tile exhibiting color variations within ranges approved during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show

same range of colors as those taken from other packages and match approved Samples. If not factory blended, blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: Where indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

## 3.3 INSTALLATION, GENERAL

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Jointing Pattern: Lay tile in pattern indicated on Drawings, and if not indicated, lay out tile work and center tile fields in both directions in each space or on each wall area. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
  - 1. Install full size tile and trim to the greatest extent. Do not install cut tile or trim in less than half unit widths or lengths unless directed or specifically approved in advance by the Architect.
  - 2. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
  - 2. Prepare joints for sealant application to comply with requirements in Division 7 Section "Joint Sealants."
- F. Grout tile to comply with requirements of the following tile installation standards:
  - 1. Polymer modified cement grout: Comply with ANSI A108.10.
  - 2. Water-cleanable epoxy grout: Comply with ANSI A108.6.
- G. At showers areas, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

#### 3.4 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATIONS

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
  - 1. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.
- B. Install crack-suppression membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

#### 3.5 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCNA installation methods and ANSI A108 Series of tile installation standards.
  - 1. Paver tiles sized 8 by 8 inches or larger: Comply with requirements and procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
- B. Joint Widths: Install tile on floors with joint widths indicated on Drawings.
- C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.

## 3.6 WALL TILE AND TRIM INSTALLATION

- A. General: Install types of tile and trim designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCNA installation methods and ANSI setting-bed standards.
- B. Joint Widths: Install tile and trim on walls with joint widths indicated on Drawings.

## 3.7 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

### 3.8 **PROTECTION**

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

## 3.9 TILE INSTALLATION SCHEDULE

- A. Floor Tile Installation: Interior floor installation over concrete subfloor.
  - 1. Ceramic Tile Installation: TCNA F113 and ANSI A108.5; thinset application.
  - 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
  - 3. Thinset Mortar: Latex polymer modified, dry-set mortar.
  - 4. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
  - 5. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.
- B. Floor Tile Installation Over Waterproofing Membrane: Interior floor installation on waterproof membrane over concrete.
  - 1. Ceramic Tile Installation: TCNA F122/F122A and ANSI A108.5; thin-set application.
  - 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
  - 3. Thinset Mortar: Latex polymer modified, dry-set mortar unless otherwise indicated.
    - a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
  - 4. Membrane Bond Coat: Latex polymer modified, dry-set mortar unless otherwise indicated.
    - a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
  - 5. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
  - 6. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.
- C. Floor Tile Installation Over Crack-Suppression Membrane: Interior floor installation on cracksuppression membrane over concrete.

- 1. Ceramic Tile Installation: TCNA F125 (Full Coverage) and ANSI A108.5; thin-set application.
- 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
- 3. Thinset Mortar: Dry-set portland cement mortar.
- 4. Membrane Bond Coat: Dry-set portland cement mortar.
- 5. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
- 6. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.
- D. Wall Tile and Trim Installation: Interior wall installation over glass mat water-resistant backing board.
  - 1. Ceramic Tile Installation: TCNA W248 and ANSI A108.5; thinset application.
  - 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
  - 3. Thinset Mortar: Latex polymer modified, dry-set mortar.
  - 4. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
  - 5. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.
- E. Wall Tile Installation Over Waterproofing Membrane: Interior wall installation over bonded waterproofing membrane on cementitious backer units.
  - 1. Ceramic Tile Installation: TCNA W244C and ANSI A108.5; thinset application.
  - 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
  - 3. Thinset Mortar: Latex polymer modified, dry-set mortar unless otherwise indicated.
    - a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
  - 4. Membrane Bond Coat: Latex polymer modified, dry-set mortar unless otherwise indicated.
    - a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
  - 5. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
  - 6. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.
- F. Shower Tile Installation (Bonded Waterproofing Membrane with Integrated Bonding Flange at Receptor): Interior wall and shower-receptor installation over cementitious backer units.
  - 1. Ceramic Tile Installation: TCNA B422, W244C and ANSI A108.5; thinset application.
  - 2. Ceramic Tile: As indicated on Drawings and Finish Schedule.
  - 3. Thinset Mortar: Latex polymer modified, dry-set mortar unless otherwise indicated.
    - a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
  - 4. Membrane Bond Coat: Latex polymer modified, dry-set mortar unless otherwise indicated.

- a. Exception: Provide dry-set portland cement mortar (thinset) if recommended by waterproofing membrane manufacturer.
- 5. Grout: Water-cleanable epoxy grout, ANSI A108.6, unless otherwise indicated.
- 6. Grout: Polymer-modified cement grout; ANSI A108.10, where indicated or where approved by Architect.

END OF SECTION 093000

## SECTION 095113 - ACOUSTICAL PANEL CEILINGS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Coordinate Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
  - 1. Ceiling suspension members.
  - 2. Method of attaching hangers to building structure.
  - 3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  - 4. Minimum Drawing Scale: 1/2 inch = 1 foot.
- C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
  - 1. Acoustical Panel: Set of 6-inch-square Samples of each type, color, pattern, and texture.
  - 2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch-long Samples of each type, finish, and color.

### 1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations:
  - 1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
  - 2. Suspension System: Obtain each type through one source from a single manufacturer.
- B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:
  - 1. Surface-Burning Characteristics: Provide acoustical panels with the following surfaceburning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:
    - a. Flame Spread: 25 or less.

- b. Smoke-Developed Index: 450 or less.
- C. Seismic Standard: Provide acoustical panel ceilings designed and installed to withstand the effects of earthquake motions according to the following:
  - 1. CISCA's Recommendations for Acoustical Ceilings: Comply with CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones 0-2."

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

### 1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

#### 1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

## 1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Panels: Full-size panels equal to 3.0 percent for each type of panel installed.
  - 2. Suspension System Components: 2 boxes of each exposed component, except for main runners.

### PART 2 - PRODUCTS

## 2.1 ACOUSTICAL PANELS
- A. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
- B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
  - 1. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 20 percent by weight.
- C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

## 2.2 METAL SUSPENSION SYSTEMS, GENERAL

- A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.
  - 1. Recycled Content: Provide products made from steel sheet with average recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content is not less than 20 percent.
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
  - 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.
- D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:
  - 1. Zinc-Coated Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.
  - 2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

#### 2.3 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc.
  - 2. Chicago Metallic Corporation.
  - 3. USG Interiors, Inc.

- B. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
- C. Fabricate main and cross runners from roll formed cold-rolled steel sheet, with prefinished metal caps on flanges.
  - 1. Structural Classification: Intermediate-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) or butt-edge type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material:
    - a. Normal environments: Steel or aluminum cold-rolled sheet.
    - b. High-humidity environments: Aluminum cold-rolled sheet.
  - 5. Cap Finish: Painted white.
  - 6. Steel finishes:
    - a. Normal environments: Prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653, not less than G30 coating designation
    - b. High-humidity environments: Hot-dip galvanized according to ASTM A 653, not less than G60 coating designation

## 2.4 METAL EDGE MOLDINGS AND TRIM

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc.
  - 2. Chicago Metallic Corporation.
  - 3. USG Interiors, Inc.
- B. Roll-Formed Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
  - 1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
  - 2. At ceiling perimeter, provide stepped edge molding that forms reveal between flange at exposed suspension member and partition face or soffit.
- C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with the following requirements:
  - 1. Basis of design: "Axiom Perimeter Trim"; Armstrong World Industries, Inc.
    - a. Profiles and dimensional requirements: As indicated on Drawings.
  - 2. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability

properties of aluminum extrusions complying with ASTM B 221 for alloy and temper 6063-T5.

- 3. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- 4. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
  - a. Organic Coating: Thermosetting, primer/topcoat system with a minimum dry film thickness of 0.8 to 1.2 mils.

## 2.5 ACOUSTICAL SEALANT

- A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and 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.
  - 1. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

# 3.3 INSTALLATION, GENERAL

- A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Suspend ceiling hangers from building's structural members and as follows:
  - 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
  - 3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
  - 4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
  - 5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
  - 6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical anchors, or power-actuated fasteners that extend through forms into concrete.
  - 7. Do not attach hangers to steel deck tabs.
  - 8. Do not attach hangers to steel roof deck. Attach hangers to structural members only.
  - 9. Space hangers not more than 48 inches on center along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
  - 10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
- C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
  - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
  - 2. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
  - 3. Do not use exposed fasteners, including pop rivets, on moldings and trim.
- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

- F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
  - 1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
  - 2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.

## 3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

# END OF SECTION 095113

## SECTION 096513 - RESILIENT WALL BASE AND ACCESSORIES

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient wall base.
  - 2. Resilient molding accessories.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: Manufacturer's standard-size Samples, but not less than 12 inches long, for each resilient product required.
- C. Maintenance Data: For resilient products to include in maintenance manuals.

## 1.3 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F or more than 90 degrees F.

#### 1.4 **PROJECT CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

#### 1.5 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for each type, color, pattern, and size of resilient product installed.

## PART 2 - PRODUCTS

- 2.1 RESILIENT BASE
  - A. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
  - B. Resilient Base Standard: ASTM F 1861.
    - 1. Rubber Materials: Type TS (rubber, vulcanized thermoset).
    - 2. Manufacturing Method: Group I (solid).

## C. Style:

- 1. Cove (with top-set toe) base is required for resilient flooring, unless otherwise indicated.
- 2. Straight (toeless) base is required for carpet, unless otherwise indicated.
- D. Minimum Thickness: 0.125 inch.
- E. Height: As indicated on Drawings and Finish Schedule.
- F. Lengths: Coils in manufacturer's standard length.
- G. Outside Corners: Job formed.
- H. Inside Corners: Job formed.
- I. Surface: Smooth, unless otherwise indicated.

## 2.2 RESILIENT MOLDING ACCESSORY

- A. Manufacturers: Provide products complying with requirements and manufactured by one of the following:
  - 1. Burke Mercer Flooring Products.
  - 2. Johnsonite.
  - 3. Roppe Corporation.
- B. Material: Rubber.
- C. Profile and Dimensions: As indicated on Drawings and Finish Schedules for the following:
  - 1. Cap for cove carpet.
  - 2. Carpet edge for glue-down applications
  - 3. Reducer strip for resilient floor covering.
  - 4. Joiner for tile and carpet.

# 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
  - 1. VOC Content Limits: Comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Wall Base Adhesives: Not more than 50 g/L.

## PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

## 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Job-Formed Corners:
  - 1. Outside Corners: Use straight pieces of maximum lengths possible with minimum 2 feet returns. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
  - 2. Inside Corners: Use straight pieces of maximum lengths possible with minimum 2 feet returns. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

#### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

#### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

## SECTION 096519 – RESILIENT TILE FLOORING

# PART 1 - GENERAL

# 1.1 SUMMARY

A. Section includes luxury vinyl floor tile.

# 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Samples for Verification: Full-size units of each color and pattern of floor tile required.

# 1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

# 1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

# 1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation.

## 1.6 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F or more than 90 degrees F. Store floor tiles on flat surfaces.

## 1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 90 degree F, in spaces to receive floor tile during the following time periods:

- 1. 48 hours before installation.
- 2. During installation.
- 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees F or more than 95 degrees F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### 2.2 LUXURY VINYL FLOOR TILE

- A. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
  - 1. Comparable Manufacturers: Subject to compliance with requirements, comparable products of the following manufacturers may be considered:
    - a. Armstrong World Industries, Inc.
    - b. Tarkett.
- B. Tile Standard: ASTM F 1700, Class III, Type B.
- C. Thickness: 0.125 inch.
- D. Size: As indicated on Drawings.

# 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

- 1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - a. VCT Adhesives: Not more than 50 g/L.
- C. Floor Polish: Protective, liquid floor-polish recommended by floor tile manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, maximum moisture content, and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Prepare concrete substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
    - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- C. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

- D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- E. Apply primer to concrete slabs, if recommended by the floor tile manufacturer, prior to application of adhesive.
- F. Move resilient floor tile and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
  - 1. Do not install floor tiles until they are the same temperature as the space where they are to be installed.
- G. Sweep and vacuum clean substrates to be covered by resilient floor tile immediately before installation.

#### 3.3 FLOOR TILE INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor tile.
- B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
  - 1. Lay tiles square with room axis, unless otherwise indicated.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, door frames, threshold, and edgings. Extend unexposed edges of flooring under bases and similar trim work.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings, unless otherwise indicated.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.
- G. Install floor tiles on covers for telephone and electrical ducts and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

## 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Perform the following operations immediately after completing floor tile installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
  - 2. Sweep and vacuum surfaces thoroughly.
  - 3. Damp-mop surfaces to remove marks and soil.
  - 4. Do not wash or apply floor polishes until flooring adhesives have cured, unless otherwise recommended by the floor tile manufacturer.
- C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
- D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.
  - 1. Apply polish using methods recommended in writing by the floor polish manufacturer. Apply no fewer than 2 coats of floor polish unless additional coats are recommended by the floor polish manufacturer for the application indicated.
- E. Cover floor tile until Substantial Completion.
  - 1. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved.

END OF SECTION 096519

## SECTION 096813 – TILE CARPETING

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Modular carpet tile.
  - 2. Installation accessories.

## B. Related Sections:

1. Division 9 Section "Resilient Wall Base and Accessories" for resilient base and molding accessories installed with carpet.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
  - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
  - 1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
  - 2. Existing flooring materials to be removed, if any.
  - 3. Existing flooring materials to remain, if any.
  - 4. Carpet tile type, color, and dye lot.
  - 5. Type of subfloor.
  - 6. Type of installation.
  - 7. Pattern of installation.
  - 8. Type, color, and location of edge, transition, and other accessory strips.
  - 9. Transition details to other flooring materials.
- C. Verification Samples: Full-size tile sample for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
- D. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
  - 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  - 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.
- E. Warranty: Special warranty specified in this Section.

## 1.3 QUALITY ASSURANCE

- A. Product and Installation Standards: Comply with the following publications of the Carpet and Rug Institute (CRI):
  - 1. "The Carpet Specifiers' Handbook."
  - 2. "CRI 2011 Carpet Installation Standard."
  - 3. "Green Label Plus" Standards.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
- C. Control Samples: Furnish approved full-size verification samples to carpet manufacturer for each carpet product style, color and texture required. Control samples shall be used to demonstrate aesthetic effects, visual characteristics and set quality standards for materials and manufacture.
  - 1. Final approval of carpet materials shall be based on control samples.

# 1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI Carpet Installation Standard, Section 5, "Storage and Handling."

## 1.5 PROJECT CONDITIONS

- A. Comply with *CRI Carpet Installation Standard*, Section 7, "Site Conditions" and Section 11, "Ventilation."
- B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

## 1.6 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, dimensional stability, and delamination.
  - 3. Warranty Period: 10 years from date of Substantial Completion.

## 1.7 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Carpet Tile: Full-size units equal to 3 percent of quantity installed for each type indicated.

### PART 2 - PRODUCTS

## 2.1 CARPET TILE

A. Basis of Design: Provide products indicated on Drawings and Finish Schedule.

## 2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided, recommended or approved by carpet manufacturer for applications indicated.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, high solids, low VOC emitting formulations that are specifically recommended by the carpet manufacturer, as verified through compatibility and adhesion testing for the intended substrate and application to suit products and subfloor conditions indicated, and that complies with flammability requirements for installed carpet.
  - 1. VOC Content Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

## PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with carpet manufacturer's requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
  - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
  - 2. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with *CRI Carpet Installation Standard*, Section 7.3, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

## 3.3 INSTALLATION

- A. General: Comply with *CRI Carpet Installation Standard*, Section 18, "Modular Carpet," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer and as follows:
  - 1. Perimeter tiles: Glue down; install every tile with full-spread, releasable, pressuresensitive adhesive.
  - 2. Field tile: Partial glue down; install periodic tiles with releasable, pressure-sensitive adhesive.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Carpet Installation Patterns: Comply with requirements indicated on Drawings and Finish Schedules for laying carpet tiles.
- H. Install patterns parallel to walls and borders, unless otherwise indicated.
- I. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

# 3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
  - 2. Remove yarns that protrude from carpet tile surface.
  - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with *CRI Carpet Installation Standard*, Section 20, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

## SECTION 099100 - PAINTING

## PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes surface preparation and field painting of exposed interior items and surfaces.
  - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

## 1.2 DEFINITIONS

- A. General: The following terms apply to this Section. Gloss level shall be determined according to ASTM D 523.
  - 1. Gloss Level 1(Flat, or Matte): Not more than 5 units at 60 degrees and 10 units at 85 degrees.
  - 2. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees.
  - 3. Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees.
  - 4. Gloss Level 4 (Satin or Low Luster): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees.
  - 5. Gloss Level 5 (Semigloss): 35 to 70 units at 60 degrees.
  - 6. Gloss Level 6 (Gloss): 70 to 85 units at 60-degrees.
  - 7. Gloss Level 7 (High Gloss): More than 85 units at 60 degrees.
- B. Exposed Surfaces: Includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
- C. Interior Surfaces: Interior surfaces to be painted are defined as those surfaces which are indicated in areas exposed to conditions which are controlled by building heating and cooling systems.

### 1.3 SUBMITTALS

- A. Product Data: For each paint system indicated including primers.
  - 1. Product List: An inclusive list of required coating materials. Identify each material by manufacturer's catalog number and general classification. Indicate each material and cross-reference specific coating, paint system, and application. Use same designations indicated on Drawings and in schedules.
  - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis, VOC content, and instructions for handling, storing, and applying each coating material.

- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat indicated, on representative Samples of the actual substrate.
  - 1. Provide stepped Samples, defining each separate coat, including primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
  - 2. Label each coat of each Sample.
  - 3. Label each Sample for location and application area.

## 1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain primers for each coating system from the same manufacturer as the finish coats.
- C. Benchmark Samples (Mockups): Provide a full-coat benchmark sample for each type of paint system and substrate required to verify product selections and to demonstrate aesthetic effects and set quality standards for materials and execution. Comply with procedures specified in PDCA P5. Duplicate finish of approved sample Submittals.
  - 1. Architect will select one room or surface to represent surfaces and conditions for application of each paint system.
    - a. Wall and Ceiling Surfaces: Provide samples on surface areas at least 100 square feet.
    - b. Small Areas and Items: Architect will designate items or areas required.
  - 2. Apply benchmark samples, according to requirements for the completed Work, after permanent lighting and other environmental services have been activated. Provide required sheen, color, and texture on each surface.
    - a. After finishes are accepted, Architect will use the room or surface to evaluate paint systems of a similar nature.
  - 3. Final approval of colors will be from benchmark samples.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.

- 7. Color name and number.
- 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.
  - 1. Maintain containers in clean condition, free of foreign materials and residue.
  - 2. Keep storage area neat and orderly.
  - 3. Remove rags and waste from storage areas daily.

## 1.6 PROJECT CONDITIONS

- A. Apply paints only when temperatures of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

## PART 2 - PRODUCTS

## 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide complete paint systems consisting of compatible products by the following:
  - 1. Benjamin Moore & Co. (Benjamin Moore).
  - 2. Sherwin-Williams Company (Sherwin-Williams).

#### 2.2 PAINT, GENERAL

- A. Material Compatibility:
  - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
  - 1. 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.

OCA Architects, Inc. Project No. P21-008 September 1, 2021 Issued for Bid

- C. Chemical Components of Field-Applied Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  - 1. Applicable State VOC content limit if more restrictive than requirements indicated.
  - 2. Flat Paints and Coatings: VOC content of not more than 50 g/L.
  - 3. Non-Flat Paints and Coatings: VOC content of not more than 150 g/L.
  - 4. Anticorrosive Coatings: VOC content of not more than 250 g/L.
  - 5. Varnishes and Sanding Sealers: VOC content of not more than 350 g/L.
  - 6. Stains: VOC content of not more than 250 g/L.
  - 7. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  - 8. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein.
    - b. Acrylonitrile.
    - c. Antimony.
    - d. Benzene.
    - e. Butyl benzyl phthalate.
    - f. Cadmium.
    - g. Di (2-ethylhexyl) phthalate.
    - h. Di-n-butyl phthalate.
    - i. Di-n-octyl phthalate.
    - j. 1,2-dichlorobenzene.
    - k. Diethyl phthalate.
    - l. Dimethyl phthalate.
    - m. Ethylbenzene.
    - n. Formaldehyde.
    - o. Hexavalent chromium.
    - p. Isophorone.
    - q. Lead.
    - r. Mercury.
    - s. Methyl ethyl ketone.
    - t. Methyl isobutyl ketone.
    - u. Methylene chloride.
    - v. Naphthalene.
    - w. Toluene (methylbenzene).
    - x. 1,1,1-trichloroethane.
    - y. Vinyl chloride.
- D. Colors: Comply with requirements indicated on Drawings and Finish Schedules.

## 2.3 INTERIOR PRIMERS

A. Interior Concrete and Masonry Primer: Factory-formulated alkali-resistant acrylic-latex primer.

- 1. Benjamin Moore; Eco Spec Interior Latex Primer Sealer 231: Applied at a dry film thickness of not less than 1.0 mils.
- 2. Sherwin-Williams; PrepRite Masonry Primer B28W300: Applied at a dry film thickness of not less than 3.0 mils.
- B. Interior Gypsum Board Primer: Factory-formulated latex-based primer.
  - 1. Benjamin Moore; Eco Spec Interior Latex Primer Sealer 231: Applied at a dry film thickness of not less than 1.0 mils.
  - 2. Sherwin-Williams; Harmony Interior Latex Primer B11W900: Applied at a dry film thickness of not less than 1.3 mils.
- C. Interior Wood Primer: Factory-formulated latex-based primer.
  - 1. Benjamin Moore; Eco Spec Interior Latex Primer Sealer 231: Applied at a dry film thickness of not less than 1.0 mils.
  - 2. Sherwin-Williams; Harmony Interior Latex Primer B11W900: Applied at a dry film thickness of not less than 1.3 mils.
- D. Interior Ferrous-Metal Primer: Factory-formulated latex-based primer.
  - 1. Benjamin Moore; IronClad Latex Low Lustre Metal and Wood Enamel 363: Applied at a dry film thickness of not less than 1.6 mils.
  - 2. Sherwin-Williams; type recommended by manufacturer for specified top coats.
- E. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
  - 1. Benjamin Moore; IronClad Latex Low Lustre Metal and Wood Enamel 363: Applied at a dry film thickness of not less than 1.6 mils.
  - 2. Sherwin-Williams; type recommended by manufacturer for specified top coats.

#### 2.4 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-latex paint.
  - 1. Benjamin Moore; Aura Matte Waterborne Interior Paint 522: Applied at a dry film thickness of not less than 1.9 mils.
  - 2. Benjamin Moore; Eco Spec Interior Latex Flat 219: Applied at a dry film thickness of not less than 1.2 mils.
  - 3. Sherwin-Williams; Harmony Interior Latex Flat B5 Series: Applied at a dry film thickness of not less than 1.7 mils.
- B. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex enamel.
  - 1. Benjamin Moore; Aura Eggshell Waterborne Interior Paint 524: Applied at a dry film thickness of not less than 2.0 mils.
  - 2. Benjamin Moore; Eco Spec Interior Latex Eggshell Enamel 223: Applied at a dry film thickness of not less than 1.4 mils.
  - 3. Sherwin-Williams; Harmony Interior Latex Eg-Shel B9 Series: Applied at a dry film thickness of not less than 1.6 mils.

- C. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss acrylic-latex enamel.
  - 1. Benjamin Moore; Aura Semi-Gloss Waterborne Interior Paint 528: Applied at a dry film thickness of not less than 1.6 mils.
  - 2. Benjamin Moore; Eco Spec Interior Latex Semi-Gloss Enamel 224: Applied at a dry film thickness of not less than 1.4 mils.
  - 3. Sherwin-Williams; Harmony Interior Latex Semi-Gloss B10 Series: Applied at a dry film thickness of not less than 1.6 mils.

## 2.5 INTERIOR WOOD STAINS AND VARNISHES

- A. Open-Grain Wood Filler: Factory-formulated paste wood filler applied at spreading rate recommended by manufacturer.
  - 1. Benjamin Moore; Benwood Paste Wood Filler No. 238.
  - 2. Sherwin-Williams; Sher-Wood Fast-Dry Filler.
- B. Interior Wood Stain: Factory-formulated alkyd-based penetrating wood stain for interior application applied at spreading rate recommended by manufacturer.
  - 1. Benjamin Moore; Benwood Penetrating Stain No. 234.
  - 2. Sherwin-Williams; Wood Classics Interior Oil Stain A-48 Series.
- C. Clear Sanding Sealer: Factory-formulated fast-drying alkyd-based clear wood sealer applied at spreading rate recommended by manufacturer.
  - 1. Benjamin Moore; Moore's Interior Wood Finishes Quick-Dry Sanding Sealer No. 413.
  - 2. Sherwin-Williams; Wood Classics Fast Dry Sanding Sealer B26V43.
- D. Interior Waterborne Clear Satin Varnish: Factory-formulated clear satin acrylic-based polyurethane varnish applied at spreading rate recommended by manufacturer.
  - 1. Benjamin Moore; Stays Clear Acrylic Polyurethane No. 423, Satin.
  - 2. Sherwin-Williams; Wood Classics Waterborne Polyurethane Satin, A68 Series.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry: 12 percent.
  - 3. Wood: 15 percent.

- 4. Gypsum Board: 12 percent.
- C. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.
- D. Comply with procedures specified in PDCA P4 for inspection and acceptance of surfaces to be painted.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

# 3.2 PREPARATION

- A. General: Comply with manufacturer's written instructions applicable to substrates, conditions, and paint systems indicated.
- B. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
  - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
  - 2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
  - 2. Provide barrier coats over incompatible primers or remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- D. Concrete and Cementitious Substrates: Remove efflorescence, chalk, dust, dirt, grease, oils, release agents, and curing compounds. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

- E. Concrete Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Clean ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, rust, loose mill scale, and other foreign substances. Clean using methods recommended in writing by paint manufacturer.
- G. Galvanized Substrates: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required.
  - 1. Scrape and clean knots, and apply a coat of knot sealer before applying primer.
  - 2. Sand surfaces that will be exposed to view smooth and dust off.
  - 3. Prime or seal wood immediately on delivery. Prime edges, ends, faces, undersides, and back sides of wood.
  - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.
- J. Previously Coated Surfaces:
  - 1. Clean all surface contamination such as oil, grease, loose paint, mill scale dirt, foreign matter, rust, mold, mildew, mortar, efflorescence, sealers and compounds to assure bonding to previous coatings that are tightly adhered.
  - 2. Clean and dull glossy surfaces of old paint films before repainting.
  - 3. Thoroughly wash surfaces with an abrasive cleanser that will clean and dull in one operation, or, wash thoroughly and dull by sanding.
  - 4. Spot prime any bare areas with the appropriate primer.
  - 5. Check coating compatibility by applying a minimum 4 square feet test patch of the scheduled coating system. Allow test patch to dry one week before testing adhesion in accordance with ASTM D 3359. Remove existing coating completely if coating system is not compatible (adhesion failure).
- K. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
  - 1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  - 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  - 3. Use only thinners approved by paint manufacturer and only within recommended limits.
- 3.3 PAINTING GENERAL

- A. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
  - 1. Painting includes field painting of exposed bare and covered pipes and ducts, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- B. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - 1. Prefinished items include the following factory-finished components:
    - a. Architectural woodwork.
    - b. Finished mechanical and electrical equipment.
    - c. Light fixtures.
  - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
    - a. Furred areas.
    - b. Ceiling plenums.
    - c. Pipe spaces.
    - d. Duct shafts.
  - 3. Finished metal surfaces include the following:
    - a. Anodized aluminum.
    - b. Stainless steel.
    - c. Chromium plate.
    - d. Copper and copper alloys.
    - e. Bronze and brass.
  - 4. Operating parts include moving parts of operating equipment and the following:
    - a. Valve and damper operators.
    - b. Linkages.
    - c. Sensing devices.
    - d. Motor and fan shafts.
  - 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

## 3.4 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions.
  - 1. Use applicators and techniques best suited for paint and substrate indicated.
  - 2. Provide finish coats that are compatible with primers used.
  - 3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

- 4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- 5. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
- 6. Paint front and backsides of access panels and removable or hinged covers, and similar hinged items to match exposed surfaces.
- 7. Sand lightly between each succeeding enamel or varnish coat.
- B. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat when multiple coats of same material are applied. Tint undercoats to match color of the topcoat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.
  - 1. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  - 1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  - 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
  - 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  - 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- D. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
  - 1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- E. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- F. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:

- 1. Mechanical Work:
  - a. Uninsulated metal piping.
  - b. Uninsulated plastic piping.
  - c. Pipe hangers and supports.
  - d. Tanks that do not have factory-applied final finishes.
  - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
  - f. Duct, equipment, and pipe insulation having cotton, canvas, and all-service jackets or other paintable jacket material.
  - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
- 2. Electrical Work:
  - a. Switchgear.
  - b. Panelboards.
  - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- G. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

## 3.5 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
  - 1. Owner will engage a qualified independent testing agency to sample paint materials being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
  - 2. Testing agency will perform tests for compliance with product requirements.
  - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces previously painted with the noncomplying materials. Contractor will be required to remove noncomplying

paint materials from previously painted surfaces if, on repainting with complying materials, the two paints or coatings are incompatible.

#### 3.6 CLEANING

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping or other methods. Do not scratch or damage adjacent finished surfaces.

#### 3.7 **PROTECTION**

- A. Protect work against damage from paint application. Correct damage to work by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in undamaged condition.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings.
- C. Touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.
- D. At completion of construction activities, touch up and restore damaged or defaced painted surfaces.

#### 3.8 INTERIOR PAINT SCHEDULE

- A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and masonry substrates:
  - 1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Interior concrete and masonry primer.
    - b. Finish Coats: Interior low-luster acrylic enamel.
- B. Gypsum Board: Provide the following paint systems over interior gypsum board surfaces:
  - 1. Flat Acrylic Finish: Two finish coats over a primer.
    - a. Primer: Interior gypsum board primer.
    - b. Finish Coats: Interior flat acrylic paint.
  - 2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Interior gypsum board primer.
    - b. Finish Coats: Interior low-luster acrylic enamel.
- C. Wood Substrates for Opaque Finish: Provide the following paint finish systems over interior wood surfaces:

- 1. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
  - a. Primer: Interior wood primer.
  - b. Finish Coats: Interior low-luster acrylic enamel.
- 2. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
  - a. Primer: Interior wood primer.
  - b. Finish Coats: Interior semigloss acrylic enamel.
- D. Wood Substrates for Interior Stain and Transparent Finish: Provide the following coating systems over interior wood surfaces:
  - 1. Waterborne Stain Satin-Varnish Finish: Two finish coats of waterborne clear satin varnish over a sealer coat and waterborne interior wood stain. Wipe wood filler before applying stain.
    - a. Filler Coat: Open-grain wood filler.
    - b. Stain Coat: Interior wood stain.
    - c. Sealer Coat: Clear sanding sealer.
    - d. Finish Coats: Interior waterborne clear satin varnish.
- E. Wood Substrates for Natural Transparent Finish: Provide the following coating systems over interior wood surfaces:
  - 1. Waterborne Satin-Varnish Finish: Two finish coats of waterborne clear satin varnish over a sanding sealer. Wipe wood filler before applying stain.
    - a. Filler Coat: Open-grain wood filler.
    - b. Sealer Coat: Clear sanding sealer.
    - c. Finish Coats: Interior waterborne clear satin varnish.
- F. Ferrous Metal: Provide the following paint systems over ferrous metal surfaces:
  - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Interior ferrous-metal primer.
    - b. Finish Coats: Interior semigloss acrylic enamel.
- G. Zinc-Coated Metal: Provide the following paint systems over interior zinc-coated metal surfaces:
  - 1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
    - a. Primer: Interior zinc-coated metal primer.
    - b. Finish Coats: Interior semigloss acrylic enamel.

## END OF SECTION 099100
# SECTION 10 11 00 - VISUAL DISPLAY SURFACES

### PART 1 - GENERAL

### 1.1 SUMMARY

- A. This Section includes magnetic, back-painted glass markerboards.
- B. Related Sections:
  - 1. Section 061000 "Rough Carpentry."
  - 2. Section 088000 "Glazing."

### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show fabrication and installation details. Include the following:
  - 1. Show markerboard panel sizes and locations of panel joints.
  - 2. Thickness and edge profiles of markerboard panel materials.
  - 3. Full-size details of glazing methods, mounting and attachment to other work.
- C. Verification Samples: Submit 12-inch-square samples of markerboards.

# 1.3 CLOSEOUT SUBMITTALS

- A. Maintenance Data: Submit data for markerboards to include in maintenance manuals.
- B. Warranty.

#### 1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for glass markerboard installation or an experienced installer who has performed glass markerboard installations similar in material, design, and extent to that indicated for this Project; whose work has resulted in installations with a record of successful in-service performance.

# 1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect glass markerboards according to manufacturer's written instructions and as needed to prevent damage to surfaces and edges.

# 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install markerboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Verify actual dimensions of construction contiguous with markerboards by field measurements before fabrication and indicate measurements of Shop Drawings.

# 1.7 WARRANTY

- A. Special Warranty for Back-Painted Glass Markerboards: Written warranty, executed by manufacturer agreeing to repair or replace markerboards that fail in materials and workmanship or deteriorate within warranty period. Warranty covers color-coating against peeling, cracking, delamination or discoloration. Warranty covers only deterioration due to normal conditions of use and not to handling, installing, and cleaning practices contrary to manufacturer's published instructions.
  - 1. Deterioration includes, but is not limited to, color fading in excess of 5 units in the Delta E Scale.
  - 2. Warranty Period: 5 years from date of Substantial Completion.

# PART 2 - PRODUCTS

#### 2.1 MARKERBOARDS

- A. Glass Markerboards: Magnetic, back-painted glass markerboards intended for use with dryerase markers and magnetic aids, consisting of float glass panels and manufacturer's proprietary back coating, complying with the following requirements:
  - 1. Basis of Design: "Frameless Glass Marker Board"; Eisys, Inc.
  - 2. Comparable Products: Comparable products complying with requirements of the contract documents and manufactured by one of the following may be considered:
    - a. Clarus Glassboards, LLC.
    - b. Skyline Design.
  - 3. Glass products: Ultra-clear (low-iron) float glass.
    - a. ASTM C 1048, Type I, Quality-Q3, Class I, complying with other requirements specified and with visible light transmission not less than 91 percent and solar heat gain coefficient not less than 0.87.
    - b. Strength: Provide Kind FT (fully tempered) float glass.
    - c. Thickness: 6 mm, except as otherwise indicated or recommended by manufacture for project applications.

- 4. Coating: Isocyanate-free coating type specifically recommended for glass markerboard application, and meeting the following performance:
  - a. Coating Performance:
    - 1) Chemical Makeup: Color coating must be free of chemical isocyanates (e.g., traditional isocyanate based urethanes are prohibited).
    - 2) Chemical Resistance: Coating must be tested using ASTM D 1308 to withstand 24-hour contact testing with the following chemicals: ethyl alcohol, mineral spirits, 5 percent sodium hydroxide solution, 5 percent hydrochloric acid solution, household glass cleaner (e.g., Windex), household surface cleaner (e.g., Fantastic), cold water immersion. Coating must show no visible degradation when viewed through the glass including blistering, cracking, peeling, or discoloration after such tests.
    - 3) Coating Adhesion: Coating must be tested for adhesion using ASTM D 3359 Method A and B and show a 4A/4B rating or better. In addition, coating must be tested to show pull-off adhesion strength (ASTM D 4541) of at least 2,000 psi.
    - 4) Coating Hardness: Coating must be tested using ASTM D 3363 and yield a pencil hardness result of at least 2H.
  - b. Coating Color(s): Match Architect's control samples.
- 5. Glass Markerboard Panel Sizes (Layout and Configuration): As indicated on Drawings.

# 2.2 HARDWARE COMPONENTS AND ACCESSORIES

- A. General: Provide products of material, size, and shape complying with requirements of markerboard manufacturer for applications indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Mounting Hardware: Stainless steel, corrosion-resistant or non-corrodible Z-type mounting clips and fasteners recommended by markerboard manufacturer for concealed mounting application.
- C. Trim Components and Accessories: Stainless steel units.
- D. Anchors and Inserts: Stainless steel, corrosion-resistant or non-corrodible type recommended by manufacturer for hardware installation.
- E. Adhesives: High-tensile strength, nonstaining, mildew-resistant, structural silicone adhesive for use with glass markerboards and specific project substrates indicated, as recommended in writing by markerboard manufacturer.
  - 1. Product standard: Neutral-curing, structural silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.
  - 2. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 3. Product: "995 Silicone Structural Glazing Sealant"; Dow Corning Corporation.

- F. Glazing Products: Comply with requirements specified in Section 088000 "Glazing" for the following:
  - 1. Cylindrical backing for glazing sealants.
  - 2. Cleaners.
  - 3. Primers.
  - 4. Gaskets.
  - 5. Setting blocks.
  - 6. Edge blocks.
  - 7. Spacers.

# 2.3 FABRICATION

- A. Fabricate glass markerboards with finished edges to produce smooth, polished edges without chips, scratches, or warps.
- B. Clean cut or flat grind vertical edges of adjacent panels in a manner that produces square edges with slight kerfs.
- C. Grind smooth and polish exposed glass edges and corners.
- D. Factory-apply concealed mounting components securely to facilitate field installation.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.
- B. Examine walls and partitions for proper preparation and backing for markerboards.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Comply with manufacturer's written instructions for surface preparation.
- B. Clean substrates of substances that could impair the performance of markerboard installation.

# 3.3 INSTALLATION

A. General: Install markerboards in accordance with approved shop drawings and manufacturer's written instructions unless project conditions require more stringent requirements for performance of the work.

- 1. Comply with applicable requirements of Section 088000 "Glazing."
- B. Install markerboards after other finishing operations, including painting, are completed.
- C. Install markerboards rigid, level, plumb, square, and true; positioned at locations and elevations indicated; in proper relation to adjacent construction; and aligned with conspicuous elements.
  - 1. Anchor markerboards using concealed mounting accessories securely to substrates and supports.
  - 2. Provide grounds, clips, backing materials, adhesives, anchors, and accessories necessary for complete installation.
- D. Protect marekerboard edges from damage during handling and installation. Replace damaged markerboards. Damaged markerboards include glass edge damage or other imperfections that, when installed, could weaken markerboards or impair performance and appearance.

# 3.4 CLEANING AND PROTECTION

A. Clean markerboard surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean markerboards according to manufacturer's written instructions.

### END OF SECTION 10 11 00

# SECTION 10 22 39 – SLIDING GLASS-PANEL PARTITIONS

# PART 1 - GENERAL

### 1.1 SUMMARY

- A. Section includes manually operated, sliding glass-panel partitions.
- B. Related Requirements:
  - 1. Section 05 50 00 "Metal Fabrications" for supports that attach supporting tracks to overhead structural system.
  - 2. Section 08 80 00 "Glazing" for glass requirements.
  - 3. Section 09 22 16 "Non-Structural Metal Framing" for adjacent construction enclosing panel partitions.
  - 4. Section 09 29 00 "Gypsum Board" for adjacent construction enclosing panel partitions.

#### 1.2 DEFINITIONS

A. STC: Sound Transmission Class.

#### 1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design sliding panel partitions, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Provide sliding panel partitions with suspension systems capable of withstanding the effects of gravity loads and operable loads and stresses imposed by sliding panel partitions without evidencing permanent deformation of operable panel components.
- C. Acoustical Performance: Provide sliding panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
  - 1. Sound-Transmission Requirements: Sliding panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E 90, determined by ASTM E 413, and rated for not less than the STC indicated.

### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Show typical head, jamb, sill, perimeter and storage conditions for sliding panel partitions.

- 2. Include numbered panel installation sequence.
- 3. Detail conditions for all glass doors.
- 4. Indicate storage, stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.
- 5. Show interface with ceiling construction and components.
- 6. Show structural members to which suspension systems will be attached.
- 7. Delegated Design: For installed products indicated to comply with design loads, include structural analysis data and calculations for anchorage and attachments, signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification: For each type of exposed material and finish prepared on Samples of size indicated below:
  - 1. Glass: 12 inches square.
  - 2. Metal Finishes: 6-inch-long sections of panel frames and trim materials.

### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For sliding panel partitions to include in maintenance manuals. Include data for the following hardware, tracks, carriers, seals and other operating components.
- B. Warranty.

# 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer; experienced in installing sliding glass-panel partitions similar in material, design, and extent to those indicated for this Project; and whose work has resulted in installations with a record of successful in-service performance.
  - 1. Installer's responsibilities include fabricating and installing sliding panel partition assemblies and providing professional engineering services required to demonstrate compliance with performance requirements indicated.
  - 2. Engineering Responsibility: Preparation of engineering data for panel assemblies, including Shop Drawings and structural calculations, based on testing and comprehensive engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Accessible Design Standards: For hardware and other operating devices, comply with requirements of the following:
  - 1. New Jersey Barrier-Free Subcode including technical standard ICC/ANSI A117.1.
  - 2. U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG).
- C. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 for Category II materials.

- 1. Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another certification agency acceptable to authorities having jurisdiction.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
  - 1. GANA Publications: GANA's "Glazing Manual."
- E. Preinstallation Conference: Conduct conference at Project site.
- F. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
  - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

# 1.7 DELIVERY, STORAGE, AND HANDLING

A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

# 1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of sliding panel partition openings by field measurements before fabrication and indicate measurements on Shop Drawings.

# 1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sliding glass-panel partitions that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Faulty operation of sliding glass-panel partitions.
    - b. Deterioration of metals, metal finishes, and other materials beyond normal use.
  - 2. Warranty Period: 10 years from date of Substantial Completion.
- B. Anodized Coating Warranty: Submit a warranty for a period of 3 years, warranting that the anodized aluminum will not develop excessive fading or excessive non-uniformity of color or shade, and will not crack, peel, pit, or corrode; all within the limits defined as follows:

- 1. "Excessive Fading" means a change in appearance which is perceptible and objectionable as determined by the Architect when viewed visually in comparison with the original color range samples.
- 2. "Excessive Non-Uniformity" means non-uniform fading during the period of the warranty to the extent that adjacent panels have a color difference greater than the original acceptable range of color.
- 3. "Will Not Pit or Otherwise Corrode" means there shall be no pitting or other type of corrosion discernable from a distance of 10 feet.

# PART 2 - PRODUCTS

# 2.1 SLIDING GLASS–PANEL PARTITIONS

- A. Basis of Design: Project design and Contract Documents are based on the following:
  - 1. "HSW60" Single Track Sliding Partition System; Nana Wall Systems, Inc.
- B. Sliding Glass-Panel Partitions: Aluminum framed, glass-panel partition system, including panels, all-glass doors, suspension system, operators, and accessories.
- C. Panel Operation: Manually operated, individual panels.
- D. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
  - 1. Factory-Glazed Fabrication: Glaze glass panels in the factory where practical and possible for applications indicated. Comply with manufacturer's written instructions and with requirements in Section 08 80 00 "Glazing."
- E. Panel Frame Materials: Aluminum extrusions; AA Alloy 6063 and ASTM B 221, 'Anodizing Quality,' with tempering, strength and durability characteristics required to suit performance requirements, type of use, corrosion resistance, and finishes specified.
  - 1. Frame Reinforcement: Manufacturer's standard steel or aluminum.
- F. Glass and Glazing: Provide products specified in Section 08 80 00 "Glazing."
  - 1. Glass Thickness: Manufacturer's standard thickness for indicated requirements.
  - 2. Glazing System: Manufacturer's standard factory-glazing system.
- G. Dimensions: Fabricate sliding panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
  - 1. Panel Widths: As indicated on Drawings.
  - 2. Partition Layout and Configuration: As indicated on Drawings.

- H. STC: Not less than 30.
- I. Hardware: Manufacturer's standard as required to operate sliding panel partition and accessories; with decorative, protective finish.

# 2.2 SEALS

- A. General: Provide seals that produce sliding panel partitions complying with performance requirements and the following:
  - 1. Manufacturer's standard seals unless otherwise indicated.
  - 2. Seals made from materials and in profiles that minimize sound leakage.
  - 3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between sliding panel partition perimeter and adjacent surfaces, when panel partition is extended and closed.

# 2.3 SUSPENSION SYSTEMS

- A. Suspension Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of sliding panel partition indicated. Size track to support partition operation and storage without damage to suspension system, sliding panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
  - 1. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.
  - 2. Color and finish: Match Architect's control Sample.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
  - 1. Multidirectional Carriers: Capable of negotiating intersections without track switches.
- C. Track Intersections and Accessories: As required for operation, storage, track configuration, and layout indicated for sliding panel partitions, and compatible with partition assembly specified. Fabricate track intersections from steel or aluminum.
  - 1. L Intersections: Allow panels to change 90 degrees in direction of travel.
  - 2. T Intersections: Allow panels to pass through or change 90 degrees to another direction of travel.
  - 3. X Intersections: Allow panels to pass through or change travel direction full circle in 90degree increments, and allow one partition to cross track of another.
- D. Aluminum Finish: Manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.
  - 1. Color and finish for exposed or semi-exposed components: Match Architect's control Sample.

- E. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.
  - 1. Color and finish for exposed or semi-exposed components: Match Architect's control Sample.

# 2.4 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish Application: Apply anodized coatings to all exposed surfaces.
- C. Appearance of Finished Work: During production, maintain large size color range samples for use in comparing against production material. Variations in appearance of abutting or adjacent pieces are acceptable if they are within the range of approved samples. Noticeable variations in the same piece are not acceptable.
- D. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- E. Class II, Color Anodic Finish: Complying with AA-M12C22A32/A34 for an Architectural Class II finish and the following:
  - 1. Metal Preparation and Pretreatment: Remove die markings prior to finishing operations. Perform this work in addition to the finish specified. Scratches, abrasions, dents and similar defects are unacceptable.
  - 2. Thickness: Minimum 0.4 mil, weighing not less than 15.5 mg per square inch, minimum apparent density of 38 g per cubic inch.
  - 3. Performance Criteria: Meets or exceeding AAMA 611.
  - 4. Color: Black; medium matte finished, integrally colored or electrolytically deposited color anodized to match Architect's control Sample.
  - 5. Post Anodizing Finish (Sealing): Anodized finishes shall be fully sealed by the manufacturer or processor according to procedures recommended by the licensor of the process. Maximum weight loss shall be 2.6 mg/ sq. in.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of sliding glass-panel partitions.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Comply with ASTM E 557 except as otherwise required by sliding panel partition manufacturer's written installation instructions or where project conditions require extra precautions for performance of the work.
  - 1. Install sliding panel partitions in accordance with approved Shop Drawings.
  - 2. Install operable components and accessories within reach ranges to comply with accessible design standards.
- B. Install sliding panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- C. Install panels from marked packages in numbered sequence indicated on Shop Drawings.
- D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- E. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

# 3.3 ADJUSTING

- A. Adjust sliding panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.
- B. Adjust doors to operate smoothly and easily, without binding or warping.
- C. Verify that safety devices are properly functioning.

# 3.4 CLEANING

A. Clean soiled surfaces of sliding panel partitions to remove dust, loose fibers, fingerprints, adhesives, and other foreign materials according to manufacturer's written instructions.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sliding panel partitions.
  - 1. Review data in maintenance manuals.
  - 2. Schedule training with Owner with at least 10 days' advance notice.

# END OF SECTION 10 22 39

### SECTION 104400 – FIRE PROTECTION SPECIALTIES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Portable fire extinguishers.
  - 2. Fire-protection cabinets.

### 1.2 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.
  - 1. Fire Extinguishers: Include rating and classification.
  - 2. 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. Samples for Verification: For each type of exposed factory-applied color finish required for fire-protection cabinets.
- C. Contract Closeout Submittals: Operation and maintenance data suitable to include in maintenance manuals.

#### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by FMG or an independent testing agency acceptable to authorities having jurisdiction.

#### 1.4 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B.
- B. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

# 2.2 PORTABLE FIRE EXTINGUISHERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. J. L. Industries, Inc.; a division of Activar Construction Products Group.
  - 2. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
  - 3. Larsen's Manufacturing Company.
  - 4. Potter Roemer LLC.
- B. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet indicated.
- C. 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.
  - 1. Valves: Manufacturer's standard.
  - 2. Handles and Levers: Manufacturer's standard.
  - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

# 2.3 FIRE-PROTECTION CABINET

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. J. L. Industries, Inc.; a division of Activar Construction Products Group.
  - 2. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
  - 3. Larsen's Manufacturing Company.
  - 4. Potter Roemer LLC.
- B. Basis of Design: "Occult Series"; Larsen's Manufacturing Company
- C. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
  - 1. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.
  - 2. Cabinet Capacity: Suitable for fire extinguisher.
  - 3. Cabinet Construction: Nonrated.
  - 4. Cabinet Material: Enameled-steel sheet.
- D. Door Style: Vertical duo panel with frame.
  - 1. Door Material: Enameled-steel sheet.

- 2. Door Glazing: Tempered float glass (clear).
- E. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
  - 1. Provide door pull and friction latch.
  - 2. Provide concealed hinges permitting door to open 180 degrees.
- F. Identification: Provide lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
  - 1. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
    - a. Location: Applied to cabinet door.
    - b. Application Process: Engraved.
    - c. Lettering Color: Black.
    - d. Orientation: Vertical.
- G. Finishes: Manufacturer's standard baked-enamel paint finish for the following:
  - 1. Exterior of cabinet, door, and trim.
  - 2. Interior of cabinet and door.
  - 3. Color and gloss: Match Architect's samples.

#### 2.4 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.
- 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. Miter and weld perimeter door frames.

#### 2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish fire-protection cabinets after assembly.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

#### 2.6 STEEL FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.
- B. Examine fire extinguishers for proper charging and tagging.
  - 1. Remove and replace damaged, defective, or undercharged units.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

A. Prepare recesses for fire-protection cabinets as required by type and size of cabinet and trim style.

#### 3.3 INSTALLATION

- A. General: Install fire-protection specialties in locations and at mounting heights indicated.
  - 1. Fire-Protection Cabinets: 48 inches above finished floor to top of cabinet, unless otherwise indicated.
- B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.

#### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties 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 fireprotection cabinet manufacturer.
- 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 104400

# SECTION 12 36 61 - SIMULATED STONE COUNTERTOPS

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. Section Includes:
  - 1. Solid-surface-materials for countertop applications.
  - 2. Quartz-based surfacing for countertop applications.

# B. Related Sections:

- 1. Division 6 Section "Interior Architectural Woodwork."
- 2. Division 7 Section "Joint Sealants."
- 3. Division 22 Section "Plumbing Fixtures" for non-integral sinks and plumbing fittings.

### 1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
  - 1. Surfacing materials: Include data on physical properties.
  - 2. Installation accessories and other manufactured products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
- C. Samples for Verification: Submit 6-inch square samples for each type of surfacing material indicated. Include two or more Samples in each set and show the full range of variations in appearance characteristics expected in completed Work.
- D. Maintenance Data: Submit data suitable for inclusion in maintenance manuals. Include Product Data for maintenance-care products used or recommended by Installer, and names, addresses, and telephone numbers of local sources for products.

# 1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that indicated for this Project and whose products have a record of successful inservice performance.
- B. Installer Qualifications: Fabricator of countertops.

C. Source Limitations for Surfacing Materials: Obtain each type of surfacing material from a single source with resources to provide materials of consistent quality in appearance and physical properties.

### 1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements of construction to receive countertops before fabrication and indicate measurements on Shop Drawings.

### 1.5 COORDINATION

A. Coordinate locations of utilities and services that will penetrate countertops or backsplashes.

# PART 2 - PRODUCTS

# 2.1 COUNTERTOP MATERIALS

- A. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.
  - 1. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
  - 2. Colors and Patterns: As indicated on Drawings and Finish Schedules, and if not indicated, match Architect's control samples.
- B. Quartz-Based Surfacing: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1; composed of minimum 93 percent natural quartz.
  - 1. Basis of Design: Provide products indicated on Drawings and Finish Schedules.
  - 2. Colors and Patterns: As indicated on Drawings and Finish Schedule, and if not indicated, match Architect's control samples.
- C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.
- D. Adhesives: Adhesives shall not contain urea formaldehyde.
  - 1. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

# 2.2 SOLID-SURFACE COUNTERTOPS

A. Configuration: Provide countertops in configurations and profiles indicated on Drawings.

- 1. Front: Straight, slightly eased at top.
- 2. Backsplash: Straight, slightly eased at corner.
- 3. Endsplash: None, except as otherwise indicated.
- B. Fabricate countertop components and sections from solid surface materials, 1/2-inch thick unless otherwise indicated.
- C. Fabrication: Fabricate tops in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

### 2.3 QUARTZ-BASED COUNTERTOPS

- A. Configuration: Provide countertops in configurations and profiles indicated on Drawings.
  - 1. Front: Straight, slightly eased at top.
  - 2. Backsplash: Straight, slightly eased at corner.
  - 3. Endsplash: None, except as otherwise indicated.
- B. Fabricate countertop components and sections from quartz-based surfacing, 3/4-inch thick unless otherwise indicated.
- C. Fabrication: Fabricate tops in one piece with shop-applied edges and backsplashes unless otherwise indicated. Comply with quartz-based surfacing manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

# PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates indicated to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install countertops in accordance with manufacturer's written instructions and approved shop drawings unless project conditions require more stringent requirements for performance of the work.
- B. Set countertops to comply with requirements indicated on Drawings and Shop Drawings. Shim and adjust to locations indicated, with uniform joints of widths indicated and with edges and faces aligned according to established relationships and indicated tolerances. Install anchors and other attachments indicated or necessary to secure countertops in place.

- 1. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
- 2. Do not cut countertops in field. If countertops require additional fabrication, return to shop for adjustment.
- C. Apply mildew-resistant silicone sealant to joints and gaps indicated for filling with sealant. Comply with Division 7 Section "Joint Sealants." Remove temporary shims before applying sealant.

# 3.3 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/16 inch in 48 inches.
- B. Variation from Level: Do not exceed 1/8 inch in 96 inches.
- C. Variation in Joint Width: Do not vary joint thickness more than 1/32 inch.
- D. Variation in Plane at Joints (Lipping): Do not exceed 1/64-inch difference between planes of adjacent units.
- E. Variation in Line of Edge at Joints (Lipping): Do not exceed 1/64-inch difference between edges of adjacent units, where edge line continues across joint.

# 3.4 ADJUSTING AND CLEANING

- A. In-Progress Cleaning: Clean countertops as work progresses. Remove adhesive and sealant smears immediately.
- B. Remove and replace countertops of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged surfacing materials.
  - 2. Defective countertops.
  - 3. Defective joints, including misaligned joints.
  - 4. Countertops not matching approved Samples.
  - 5. Countertops not complying with other requirements indicated.
- C. Replace in a manner that results in countertops matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- D. Clean countertops not less than seven days after completion of sealant installation, using clean water and soft rags. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage countertops.

### END OF SECTION 12 36 61