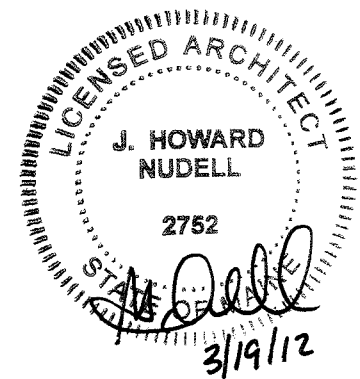


# Existing TSL Building Service & Showroom Addition

Portland, Maine



## PROJECT SPECIFICATIONS

JHN# 2008-279 / 2008-279.03

March 16, 2012

NUDELL ARCHITECTS



31690 W. Twelve Mile Road

Farmington Hills, Michigan 48334

t 248 324 8800 f 248 324 5550

**PROJECT NAME:** Existing TSL Building  
Service & Showroom Addition

**PROJECT LOCATION:** 191 Riverside Street  
Portland, Maine 04103

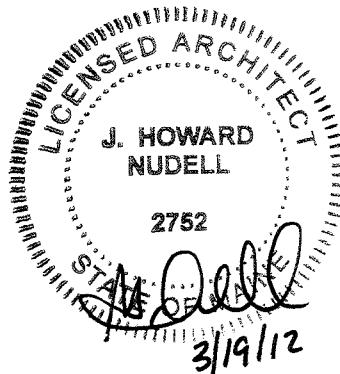
**PROJECT NO:** 2008-279                      Service Addition  
2008-279.03                      Showroom Addition

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**ARCHITECT:** Nudell Architects  
31690 W. Twelve Mile Rd  
Farmington Hills, MI 48334

**STRUCTURAL:** Becker Structural Engineers, Inc.  
75 York Street.  
Portland, Maine 04101

**CIVIL:** Sebago Technics  
One Chabot Street, P.O. Box 1339  
Westbrook, Maine 04098-1339



**ISSUED:** PERMITS March 16, 2012

**SECTION 000102 - INVITATION FOR BIDS**

**To:** All Bidders

**SUBJECT:** Existing TSL Building Service & Showroom Addition  
191 Riverside Street, Portland, Maine 04103

Enclosed are bid documents outlining the scope of work for the above project. We would appreciate receiving a bid from you for this work on the enclosed Contractor's "Bid Proposal Form" in strict accordance to the bid documents.

Bids **MUST** be addressed to: \_\_\_\_\_

<b>NOTICE:</b>  <i>FAILURE TO COMPLY WITH BID SUBMITTAL REQUIREMENTS WILL RESULT IN DISQUALIFICATION.</i>
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Not later than:

Weekday	Date	Month	Year	Time

The work will be bid as a complete Guaranteed Maximum Price (Lump Sum) with the General Contractor assuming direct responsibility for work and coordination of all trades. The contractor will also furnish and install all labor, materials and equipment necessary to provide a "**complete, turn-key**" job in accordance with the contract documents.

Proposals are considered confidential. Your proposal, properly executed, should be prepared and submitted in a sealed envelope clearly identified on the outside. Any proposal received after the above stipulated time and date will be returned to the contractor unopened.

We welcome suggestions regarding changes in specifications and/or modifications in design or production methods which will aid in reducing costs without impairing quality, or which will improve the quality, safety, and/or performance of the project on which you are quoting.

**However, your Guaranteed Maximum Bid Price must be submitted on the basis of the bid documents. All voluntary alternates are to be presented as a separate deduct price from the Base Bid.**

**The Bid Breakdown Form *MUST* be submitted within 24 hours of the Bid Date. Bidders failing to submit the Breakdown Form may have their Bid disqualified.**

**TENDERS**

To insure meeting the date and time due as specified in the bidding documents, it may be necessary to use some form of guaranteed delivery, i.e., Federal Express, Express Mail, UPS, etc. Original bid proposals rendered in the form of a telegram, telephone, or electronic transmission will not be accepted. Changes to bid proposals will be accepted if received in a sealed envelope marked as above at the location specified before the bid due time and due date.

**END OF SECTION 000102**

# NUDELL ARCHITECTS, INC.

31690 W. TWELVE MILE ROAD FARMINGTON HILLS, MICHIGAN 48334

(248) 324-8800

**FAX NUMBER (248) 324-5550**

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## REQUEST FOR CLARIFICATION

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DATE: \_\_\_\_\_

REFERENCE: EXISTING TSL BUILDING SERVICE & SHOWROOM  
ADDITION

JHN JOB NO.: 2008-279 / 2008-279.03

ATTENTION: BARBARA DERBIS

**REQUESTING GENERAL CONTRACTOR:**

REQUEST FOR  
CLARIFICATION NUMBER:

DO NOT WRITE IN THIS BOX  
FOR JHN USE ONLY

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### ITEM OF CLARIFICATION:

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### RESPONSE:

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FORM OF RESPONSE: ADDENDUM NO. \_\_\_\_\_ OTHER: \_\_\_\_\_

All questions received THREE (3) days prior to the bid date will be responded to in writing to all invited Contractors.

## **SECTION 00 0110 - TABLE OF CONTENTS**

### **PROCUREMENT AND CONTRACTING REQUIREMENTS**

#### **1.01 Division 00 -- Procurement and Contracting Requirements**

- A. 00 0101 - Project Title Page
- B. 00 0102 - Invitation for Bids
- C. 00 0105 - Request for Clarification
- D. 00 0110 - Table of Contents
- E. 00 2113 - Instructions to Bidders
- F. 00 4100 - Bid Proposal Form
- G. 00 5000 - Contracting Forms and Supplements

### **SPECIFICATIONS**

#### **2.01 Division 01 -- General Requirements**

- A. 01 2000 - Price and Payment Procedures
- B. 01 3000 - Administrative Requirements
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- D. 01 5000 - Temporary Facilities and Controls
- E. 01 5100 - Temporary Utilities
- F. 01 5213 - Field Offices and Sheds
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- I. 01 6000 - Product Requirements
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- K. 01 7800 - Closeout Submittals
- L. 01 7900 - Demonstration and Training

#### **2.02 Division 02 -- Existing Conditions**

- A. 023200 - Geotechnical Investigation
- B. 02 4100 - Demolition

#### **2.03 Division 03 -- Concrete**

- A. 03 3000 - Cast-in-Place Concrete

#### **2.04 Division 04 -- Masonry**

- A. 04 2000 - Unit Masonry

#### **2.05 Division 05 -- Metals**

- A. 05 1200 - Structural Steel
- B. 05 2000 - Open Web Steel Joist
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- D. 05 4000 - Cold-Formed Metal Framing
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**2.06 Division 06 -- Wood, Plastics, and Composites**

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- C. 06 4020 – Interior Architectural Woodwork

**2.07 Division 07 -- Thermal and Moisture Protection**

- A. 07 2100 - Thermal Insulation
- B. 07 2500 – Weather Barriers
- C. 074213 – Metal Siding Panels
- D. 07 5300 - Membrane Roofing
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- A. 08 1113 - Hollow Metal Doors and Frames
- B. 08 3050 – Access Doors
- B. 08 3613 – Sectional Overhead Doors
- C. 08 3615 – Vinyl Rolling Door
- E. 08 4110 – NanaWall
- F. 08 44 13 – Glazed Aluminum Curtain Walls
- G. 08 5113 – Aluminum Windows
- H. 08 7100 - Door Hardware
- I. 08 8000 - Glazing

**2.09 Division 09 -- Finishes**

- A. 09 2116 - Gypsum Board Assemblies
- B. 09 2216 - Non-Structural Metal Framing
- C. 093000 – Tile Work
- D. 09 5100 - Acoustical Ceilings
- F. 097750 – FRP Panels
- G. 09 9100 - Painting and Coating

**2.10 Division 10 -- Specialties**

- A. 102113 – Metal Toilet Compartments
- B. 10 2800 - Toilet Accessories
- C. 105230 – Fire Extinguishers

**2.11 Division 11 -- Equipment**

**2.12 Division 12 -- Furnishings**

**2.13 Division 13 -- Special Construction**

**2.14 Division 14 -- Conveying Equipment**

THE DIVISIONS LISTED BELOW ARE TO BE DESIGN-BUILT BY GENERAL CONTRACTOR

**2.15 Division 21 -- Fire Suppression**

**2.16 Division 22 -- Plumbing**

**2.17 Division 23 -- Heating, Ventilating, and Air-Conditioning (HVAC)**

**2.18 Division 26 -- Electrical**

**2.19 Division 27 -- Communications**

**2.20 Division 28 -- Electronic Safety and Security**

**2.21 Division 31 -- Earthwork**

**2.22 Division 32 -- Exterior Improvements**

**2.23 Division 33 -- Utilities**

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## SECTION 00 2113 - INSTRUCTIONS TO BIDDERS

### 1.01 INTRODUCTION

- A. These specifications, together with the drawings and other referenced documents, describe the requirements necessary for a bidder to follow in order to build a structure and related site work known as TSL Building Service Addition.

### 1.02 BIDDER'S RESPONSIBILITY

- A. Each Bidder by submitting Proposal, represents that he/she has reviewed and fully understands the contract documents.
- B. Each Bidder by submitting a Proposal, represents that he/she has visited the site and is familiar with all adjacent areas, means of approach to the site, and any other conditions relevant to the work to be performed.
- C. Bidders are cautioned to verify that all pages of the Proposal Documents are included in their bid package.
- D. Should a Bidder find any discrepancies, ambiguities, omissions, or be in doubt to any meaning contained in the Bid Documents, he/she shall immediately notify the designated project representative.
- E. Failure to request clarifications utilizing the specified format and procedure will not relieve the Contractor of his/her responsibilities to perform the work as intended by these Documents. All clarifications shall be submitted in writing by General Contractors utilizing the Request for Clarification form included in Section 000105. Forms shall be mailed or faxed to the office of NUDELL ARCHITECTS (the Owner's Representative) at the number provided.
- F. Each Bidder is required to submit the AIA A-305 Contractor's Qualification Statement as part of the Bid Proposal Documents.

### 1.03 FORM OF SPECIFICATIONS

- A. The form of these specifications generally follows the C.S.I. format as developed by the Construction Specifications Institute. The divisions of these specifications generally follow the work requirements of the major trades used to build the facility. The Contractor is not required to follow these trade divisions in letting the work; however, the Contractor shall be obligated to account for the work in conformance to these trade divisions.
- B. The specifications listed herein are performance- type and do not in most instances list the names of products to be used. If a product is named, it shall be the absolute minimum standard that must be met in every respect by the product offered by the Contractor for use in the facility. The performance requirements are absolute and must be met by test when the facility is complete and in operation, regardless of the encountered environmental conditions. The Contractor is obligated to show by best engineering design practices and calculations that the performance criteria have been met.

### 1.04 ADDENDA TO DRAWINGS AND SPECIFICATIONS

- A. During the bid process, Bidders may be furnished certain Addenda covering additions, deductions or alterations to the Drawings and/or Specifications. Such Addenda shall be included in the work covered by the Proposal and shall become a part of the Contract Documents. Only Contractors, who attended the Mandatory Pre-Bid Meeting will receive any Addenda issued during the bidding process. The General Contractor shall be responsible for



verifying that all Addenda items are covered in his submittal Proposal. Receipt of any Addenda shall be acknowledged on the Bid Proposal Form.

#### 1.05 FORM OF PROPOSAL

- A. The Forms provided are to be used and no others are permitted. Do not retype the Form of Proposal, and do not submit a proposal in any other form, unless specifically requested to do so. The Proposal forms may be photocopied.
- B. Submit three copies of the Form of Proposal to the Owner. All three copies must have original signatures.
- C. Fill out headings with the name of your firm, address, phone number and date. List the total base bid lump sum amount in both words and numerals. Use whole dollar amounts for the entire bid form where practical.
- D. The Bidder MUST submit to the Owner an itemized breakdown of the contract price within 24 hours of the Bid Date (see Breakdown of Lump Sum Bid). This breakdown is required by the Owner for his bid evaluation and will also be used as a basis for partial payments to the Contractor. For these uses, it is essential that the breakdown be as representative of the true cost of each item as possible. Failure to submit the completed form may be cause for disqualification of bid.
- E. Insert the number of calendar days to complete the work. Among equally competitive base bids, consideration will be given to the General Contractor who can complete the facility in the shortest period of time.
- F. Acknowledge receipt (and initial in the space provided) of all Addenda issued.
- G. Be sure the proposal is signed and dated.
- H. The bid shall be based on the items and brands named on the Contract Documents. Alternates may be presented as such, BUT NOT AS PART OF THE BASE BID PROPOSAL PRICE.
- I. The Bidder shall include in his proposal the cost of all applicable State and Local Sales or use Taxes, all Federal Taxes, and charges or duties of any nature, applicable to the work incorporated under this Contract.

#### 1.06 OWNERS RESERVATIONS

- A. The Owner reserves the unrestricted privilege to reject any, part of any, or all bids received and to waive any informalities in the bidding. Contracts will be awarded on the basis of the best qualified bid as determined by the Owner.
- B. No proposal shall be considered as accepted, nor any obligation hereunder assumed by the Owner until such time as the Owner may deposit in the U.S. Mail, or hand to the Contractor, personally, written notice, addressed to the successful Bidder at the address given on the Proposal, of acceptance of his Proposal.

#### 1.07 CONSTRUCTION PROGRESS SCHEDULE

- A. The successful Bidder, immediately after award of the Contract, shall furnish the Owner with a Construction Progress Schedule. The Schedule shall indicate the progress outline, the total number work days needed to complete the project, and agree with the Time for Completion days listed in the Bid Proposal Form.
- B. The successful Bidder shall be able to begin work immediately after award of Contract or issuance of building permit, whichever is later, progress substantially with the Construction

Progress Schedule and complete all work within the time shown thereon unless delayed by jurisdictional or general strikes beyond the control of the Contractor, act of God or national emergency.

#### 1.08 CONSTRUCTION SCHEDULE AND PLANNING

- A. Completing the work contained in this contract, within the owner indicated time frame, is of the utmost importance to the Owner.

#### 1.09 SPECIAL NOTES

- A. All **temporary and permanent services** shall be provided by the Contractor as part of the Proposal Bid.
- B. General Contractor shall pay for all **utility tap-in fees and building permits or any other applicable permits**. The Contractor shall pay for all **Testing and Inspection fees and services** or any other applicable fees as required.
- C. General Contractor shall read completely and thoroughly understand the Form of Contract, General Conditions and Supplementary Conditions.
- D. General Contractor shall provide Design Build Mechanical, Electrical, Plumbing, Fire Suppression System, and Fire Alarm System Engineering Services. The design should be provided by professional engineering firm licensed in the state where the project is located. The MEP construction documents should be signed and sealed by the design professional and submitted for permit.
- D. Temporary Construction Sign: The General Contractor shall provide and install, immediately upon award of the contract, one temporary construction sign. This sign shall be constructed and lettered in accordance with details to be provided by the Architect. The sign shall be 4 feet high x 8 feet wide constructed of MDO plywood and supported on wooded posts set in the ground. Any permit, approval and fees shall be obtained by and paid for the Contractor.

#### 1.10 CONSTRUCTION PHASING

- A. The construction of the miscellaneous project components shall be carried out in accordance with the sequencing worked out with the successful bidder and the Owner.

#### END OF INSTRUCTIONS TO BIDDERS

**SECTION 004100 - BID PROPOSAL FORM**

# BID PROPOSAL FORM

**PROJECT NAME:**

**LOCATION:**

**CONTRACTOR NAME:**

Address:

Contact:

Title:

Phone:

Fax:

## 1. CONSTRUCTION CONTRACT

The undersigned, hereinafter referred to as the Contractor, proposes to furnish all labor, material, tools, equipment and supervision required for the complete construction of Existing TSL Building Service Addition hereinafter referred to as the Owner, in strict accordance with Owner's General Conditions (included in the Specification Book Section 007200 and 007300), drawings and specifications for \_\_\_\_\_ \$\_\_\_\_\_ which sum includes all taxes of whatever character or description, including sales and/or use taxes on property .

The Contractor hereby affirms that his lump sum bid includes all costs to complete the various portions of the work within the time limits hereinunder set forth under the heading Time of Completion.

The Contractor also affirms that he has investigated the requirements of all applicable codes, ordinances, laws and regulations and that the lump sum bid includes all costs to comply with same.

## 2. BREAKDOWN OF CONTRACT

The undersigned, as bidder, shall list on the form attached to this proposal, the dollar amounts included in his Contract price for each selection. Unit prices are to include all charges for incidental expenses, supervision, taxes (including sales and use tax on property to be transferred to the Owner), insurance.

Unit prices shall be applicable to the pricing of additions or deletions to the work shown on the drawings and/or specifications.

**3. ADDENDA**

The undersigned acknowledges the following ADDENDA(s) covering revisions to the Drawings or Specifications, and the cost, if any, of such revisions has been included in the price here-in-before quoted.

Acknowledged by Contractor's Initials

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_  
Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

**4. TIME OF COMPLETION**

The General Contractor proposes to complete all construction work within the following number of calendar days (Saturdays, Sundays and holidays included) from the date of award of contract (not accumulative days). Contractor to take note that among approximately equal bids, that the contractor bidding the shorter time will be considered for award.

Start construction work. \_\_\_\_\_ Day's from award

Complete all work and Obtain Certificate of Occupancy \_\_\_\_\_ Day's from award

**5. SUBCONTRACTORS AND MATERIAL SUPPLIERS**

The Undersigned hereby agrees to submit for approval, upon the request of the Owner and within two (2) days of such request, a complete list of subcontractors and material suppliers to whom it is proposed to let portions of work, agreeing in every way to be responsible for the work, materials, equipment and supplies furnished by each and all of them. List to state amount of each subcontract.

**6. TAXES, PREMIUMS AND ASSESSMENTS**

The Contractor shall pay and include in the bid all applicable taxes, including social security, unemployment, sales or use taxes, and any other local city or state tax except real property taxes on the site.

**7. SUPPLEMENTAL FEES**

For additional work performed upon instruction of the Owner by subcontractors of the Undersigned, add to the subcontractor's prices for such additional work a fee of \_\_\_\_\_% which includes all the charges of the Undersigned for overhead and profit.

Any additional work performed upon instructions of the Owner by persons other than the subcontractors of the Undersigned, the charges will be actual cost of all labor and materials (less all discounts) plus the fee of \_\_\_\_\_ % to which shall be added the actual cost of insurance and taxes.

Each proposal covering extra work shall be accompanied with complete itemized material and labor breakdowns.

For all revisions involving the deletion of Contract work, it is agreed that full credit shall be given the Owner for such work, deleted, including overhead and profit as quoted hereinbefore.

**8. SUBSTITUTIONS**

This proposal shall be based upon the material specified or approved as equal by addendum. Proposals based upon use of alternate materials or equipment will be considered, provided that such proposal accompany a regular proposal, and the adjustment in price for each substitute is noted.

**9. PRICE GUARANTEE**

The price stated in this proposal must be guaranteed for minimum 90 days (Saturdays, Sundays and holidays included) from date thereof, and if authorized to proceed within that period, we will agree to complete the work covered by this proposal at said price.

**10. PERFORMANCE AND LABOR AND MATERIALS PAYMENT BOND(S)**

The undersigned certifies that he qualifies for Performance, Labor and Material Bonds in the amount of 100% of the Guaranteed Maximum Price Proposal, and these Bonds will be executed at the option of the Owner.

(\$ \_\_\_\_\_) is **INCLUDED** in the Base Proposal.

**11. MANDATORY UNIT PRICES**

- A. Cost per cubic yard to remove and dispose off-site of unsuitable soils: \$\_\_\_\_\_. 00/CY
- B. Cost per cubic yard to place and compact engineered fill: \$\_\_\_\_\_. 00/CY
- C. Cost per cubic yard to provide and place reinforced concrete foundations: \$\_\_\_\_\_. 00/CY

**12. MANDATORY ALTERNATES**

- A. Alternate #1: \_\_\_\_\_
- B. Alternate #2: \_\_\_\_\_
- C. Alternate #3: \_\_\_\_\_

**13. EXCLUSIONS**

The undersigned should provide list of all excluded items that are not part of this Bid Proposal.

**BREAKDOWN OF CONTRACT**

Project Name & Location:

Contractor Name:

	COLUMN A (Breakdown Cost \$)	COLUMN B (Total Cost \$)
<b>1. GENERAL:</b>		
1.1 Tap Fees & Permits		
1.2 Testing		
1.3 Contractor Fees:		
a) General Contractor General Conditions		
b) General Contractor Overhead and Profit		
<b>SUB-TOTAL - GENERAL</b>		
<b>2. SITE WORK:</b>		
2.1 Off-site construction (list these items).....		
2.2 Site cut and/or fill (soil bearing pressured used _____ psf)		
2.3 Demolition and/or site clearing		
2.4 Utility extension to property line		
2.5 Retaining Walls		
2.6 Other.....		
2.7 Other.....		
2.8 Concrete paving		
2.9 Gravel paving		
2.10 Asphalt paving and stone base		
2.11 Walks and curbs (on site)		
2.12 Site lighting: (_____ manuf)		
2.13 Fencing		
2.14 Landscaping		
2.15 Utilities - on site		
a. Mechanical - within 5'-0" of building		
b. Electrical - within 5'-0" of building		
2.16 Other.....		
<b>TOTAL - SITE WORK</b>		
<b>3. CONCRETE:</b>		
3.1 Concrete and Reinforcing		
3.2 Slabs (_____ psi)		
<b>SUB-TOTAL - CONCRETE</b>		
<b>4. MASONRY:</b>		
4.1 Interior		
4.2 Exterior		
<b>SUB-TOTAL - MASONRY</b>		
<b>5. METALS:</b>		
5.1 Structural (Includes Metal Decking)		
5.2 Cold Formed Metal Framing		
5.3 Metal Fabrications		
5.4 Fencing/Handrails		
<b>SUB-TOTAL - METALS</b>		

**BREAKDOWN OF CONTRACT**

Project Name & Location:

Contractor Name:

	COLUMN A (Breakdown Cost \$)	COLUMN B (Total Cost \$)
<b>6. WOOD AND PLASTICS:</b>		
6.1 Rough Carpentry		
6.2 Finish Carpentry		
<b>SUB-TOTAL - WOOD AND PLASTICS</b>		
<b>7. THERMAL AND MOISTURE PROTECTION:</b>		
7.1 Waterproofing & Dampproofing		
7.2 Insulation		
7.3 Fireproofing		
7.4 Roofing System (_____manuf.)		
7.5 Flashing & Sheet Metal		
7.6 Metal Siding		
7.7 Roof Specialties & Accessories		
<b>SUB-TOTAL - THERMAL AND MOISTURE PROTECTION</b>		
<b>8. DOORS AND WINDOWS:</b>		
8.1 Hollow Metal Doors & Frames		
8.2 Overhead Doors		
8.4 Finish Hardware		
8.6 Glazing		
<b>SUB-TOTAL - DOORS AND WINDOWS</b>		
<b>9. FINISHES:</b>		
9.1 Gypsum Wallboard		
9.2 Acoustical Treatment		
9.4 Resilient Flooring		
9.5 Special Flooring		
9.7 Painting		
<b>SUB-TOTAL - FINISHES</b>		
<b>10. SPECIALTIES:</b>		
10.1 Toilet Partitions		
10.2 Toilet and Bath Accessories		
<b>SUB-TOTAL - SPECIALTIES</b>		
<b>11. BUILDING EQUIPMENT INSTALLATION (Not Used)</b>		
<b>12. FURNISHINGS:</b>		
<b>SUB-TOTAL - FURNISHINGS</b>		

**BREAKDOWN OF CONTRACT**

Project Name & Location:

Contractor Name:

	<b>COLUMN A</b> (Breakdown Cost \$)	<b>COLUMN B</b> (Total Cost \$)
<b>15. PLUMBING:</b> (to 5'-0" outside building)		
15.1 Materials and Methods (including pipe and pipe fittings, piping specialties, valves, special piping systems, piping supports, insulation, insulation installation, plumbing specialties)		
15.2 Equipment		
15.3 Plumbing Fixtures		
<b>SUB-TOTAL - PLUMBING</b>		
<b>HVAC:</b> (to 5'-0" outside building)		
15.5 Materials and Methods (including pipe and pipe fittings, piping specialties, valves, vibration isolation)		
15.6 Equipment (including heating and cooling equipment, air distribution equipment, air distribution specialties)		
<b>SUB-TOTAL - HVAC</b>		
<b>16. ELECTRICAL:</b> (to 5'-0" outside building)		
16.1 Electrical Materials and Methods		
16.2 Building Lighting		
16.3 Building Power (includes Dealer Equipment)		
16.4 Telephone and Data Raceways		
<b>SUB-TOTAL - ELECTRICAL</b>		
<b>CONTRACT SUM (GRAND TOTAL)</b>		



**ADDRESSES, LEGAL STATUS AND SIGNATURE OF BIDDER:**

The Undersigned Bidder does hereby designate the address given below as the legal address to which all notices, directions or other communications may be serviced or mailed:

Contractor Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

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

\_\_\_\_\_ Co-Partnership \_\_\_\_\_ Individual \_\_\_\_\_ Corporation Inc.

Under Laws for the State of \_\_\_\_\_

Name \_\_\_\_\_  
(Typed)

Title \_\_\_\_\_

Signed and Sealed this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_  
(year)

Signature \_\_\_\_\_

**END OF BID PROPOSAL FORM**

## **SECTION 00 5000 - CONTRACTING FORMS AND SUPPLEMENTS**

### **PART 1 - GENERAL**

**1.01 Contractor is responsible for obtaining a valid license to use all copyrighted documents specified but not included in the Project Manual.**

### **1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT**

- A. See Section 00 5200 for the Agreement form to be executed.
- B. See Section 00 7200 for the General Conditions.
- C. The Agreement is based on AIA A101.
- D. The General Conditions are based on AIA A201.

### **1.03 FORMS**

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.
- B. Bond Forms:
  - 1. Performance and Payment Bond Form: AIA A312.
- C. Post-Award Certificates and Other Forms:
  - 1. Schedule of Values Form: AIA G703.
  - 2. Application for Payment Form: AIA G702 and G703.
- D. Clarification and Modification Forms:
  - 1. Supplemental Instruction Form: AIA G710.
  - 2. Construction Change Directive Form: AIA G714.
  - 3. Change Order Form: AIA G701.
- E. Closeout Forms:
  - 1. Certificate of Substantial Completion Form: AIA G704.

### **1.04 REFERENCE STANDARDS**

- A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum; 2007.
- B. AIA A201 - General Conditions of the Contract for Construction; 2007.
- C. AIA A312 - Performance Bond and Payment Bond; 1984.
- D. AIA G701 - Change Order; 2001.
- E. AIA G702 - Application and Certificate for Payment; 1992.
- F. AIA G703 - Continuation Sheet; 1992.
- G. AIA G704 - Certificate of Substantial Completion; 2000.
- H. AIA G710 - Architect's Supplemental Instructions; 1992.
- I. AIA G714 - Construction Change Directive; 2007.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION - NOT USED**

**END OF SECTION**

## **SECTION 01 2000 - PRICE AND PAYMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Procedures for preparation and submittal of application for final payment.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.
- B. Document 00 7200 - General Conditions

#### **1.03 SCHEDULE OF VALUES**

- A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- B. Forms filled out by hand will not be accepted.

#### **1.04 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Percentage of Completion.
  - 9. Balance to Finish.
  - 10. Retainage.
- E. Execute certification by signature of authorized officer.
- F. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- G. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of Work.
- H. Submit three copies of each Application for Payment.

#### **1.05 MODIFICATION PROCEDURES**

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Contractor will issue a document signed by Owner and Architect for

subsequent inclusion in a Change Order.

1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Contractor and Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 8 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other contractors. Document any requested substitutions in accordance with Section 01 6000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.

#### **1.06 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  1. All closeout procedures specified in Section 01 7000.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION**

## **SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Progress photographs.
- E. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Submittal procedures.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- B. Section 01 7800 - Closeout Submittals: Project record documents.

#### **1.03 PROJECT COORDINATION**

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for construction traffic access, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
  - 1. Requests for interpretation.
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Manufacturer's instructions and field reports.
  - 6. Applications for payment and change order requests.
  - 7. Progress schedules.
  - 8. Coordination drawings.
  - 9. Closeout submittals.

### **PART 2 - PRODUCTS - NOT USED**

### **PART 3 - EXECUTION**

#### **3.01 PRECONSTRUCTION MEETING**

- A. Owner will schedule a meeting after Notice of Award.

- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.
- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract, and Architect.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.02 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Attendance Required: Construction Manager, Job superintendent, Owner, Architect, as appropriate to agenda topics for each meeting.
- C. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of Work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Maintenance of progress schedule.
  - 7. Corrective measures to regain projected schedules.
  - 8. Planned progress during succeeding work period.
  - 9. Maintenance of quality and work standards.
  - 10. Effect of proposed changes on progress schedule and coordination.
  - 11. Other business relating to Work.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.03 CONSTRUCTION PROGRESS SCHEDULE**

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 10 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

### **3.04 PROGRESS PHOTOGRAPHS**

- A. Submit new photographs at least once a month, within 3 days after exposure.
- B. Photography Type: Digital; electronic files.

- C. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect.

### **3.05 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
  - 1. Product data.
  - 2. Shop drawings.
  - 3. Samples for selection.
  - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - CLOSEOUT SUBMITTALS.

### **3.06 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

### **3.07 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. When the following are specified in individual sections, submit them at project closeout:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

### **3.08 NUMBER OF COPIES OF SUBMITTALS**

- A. Documents for Review:
  - 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches (215 x 280 mm): Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

### 3.09 SUBMITTAL PROCEDURES

- A. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- D. Schedule submittals to expedite the Project, and coordinate submission of related items.
- E. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- F. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- G. Provide space for Contractor and Architect review stamps.
- H. When revised for resubmission, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- J. Submittals not requested will not be recognized or processed.

**END OF SECTION**



## **SECTION 01 4000 - QUALITY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Control of installation.
- B. Testing and inspection services.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 6000 - Product Requirements: Requirements for material and product quality.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C 1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008.
- B. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2008.
- C. ASTM C 1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2008.
- D. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2008.
- E. ASTM E 329 - Standard Specification for Agencies Engaged Construction Inspection and/or Testing; 2008.
- F. ASTM E 543 - Standard Specification for Agencies Performing Nondestructive Testing; 2008a.

#### **1.04 SUBMITTALS**

- A. Testing Agency Qualifications:
  - 1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Conformance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.

2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
  1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
  2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
  1. Submit report in duplicate within 30 days of observation to Architect for information.
  2. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

#### 1.05 TESTING AND INSPECTION AGENCIES

- A. Contractor shall employ and pay for services of an independent testing agency to perform required testing. The selected testing agency should be acceptable to the Owner.
- B. The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.
- C. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
- D. Contractor Employed Agency:
  1. Testing agency: Comply with requirements of ASTM E 329, ASTM E 543, ASTM C 1021, ASTM C 1077, and ASTM C 1093.
  2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
  3. Laboratory: Authorized to operate in the State in which the Project is located.
  4. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
  5. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

#### 1.06 REQUIRED TESTING AND SPECIAL INSPECTIONS

- A. Contractor shall confirm with the 2006 IBC Special Inspections Requirements Chapter 17 as well as the local authority inspection requirements.
  1. Steel Construction, Refer to 2006 IBC Table 1704.3:
    - a) Material verification of high-strength bolts, nuts and washers
    - b) Inspection of high-strength bolting
    - c) Material verification of structural steel
    - d) Material verification of weld filler materials
    - e) Inspection of welding

- f) Inspection of steel frame joint details for compliance with approved construction documents
2. Concrete construction, Refer to 2006 IBC Table 1704.4:
  - a) Inspection of reinforcing steel, including pre-stressing tendons and placement
  - b) Inspection of reinforcing steel welding in accordance with Table 1704.3
  - c) Inspect bolts to be installed in concrete prior to and during placement of concrete where allowable loads have been increased
  - d) Verifying use of required design mix
  - e) At the time fresh concrete is sampled to fabricate specimens for strength test, perform slump and air content test, and determine the temperature of the concrete
  - f) Inspection of concrete placement for proper application techniques
  - g) Inspection for maintenance of specified curing temperature and techniques
3. Masonry construction: shall be inspected and evaluated in accordance with the 2006 IBC Sections 1704.5.1 through 1704.5.3 depending on the classification of the building or structure or nature of the occupancy.
5. Soils: Special inspections for existing site soil conditions, fill placement and load-bearing requirements shall be as required by 2006 IBC Section 1704.7 and Table 1704.7:
  - a) Verify materials below footings are adequate to achieve the design bearing capacity.
  - b) Verify excavations are extended to proper depth and have reached proper material
  - c) Perform classification and testing of controlled fill materials
  - d) Verify use of proper materials, densities and lift thicknesses during placement and compaction of controlled fill.
  - e) Prior to placement of controlled fill, observe sub-grade and verify that site has been prepared properly.
10. Exterior Insulation and Finish System (EIFS): shall be inspected and evaluated in accordance with the 2006 IBC Section 1704.12.

## **PART 2 - PRODUCTS - NOT USED**

## **PART 3 - EXECUTION**

### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

### 3.02 TESTING AND INSPECTION

- A. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 2. Perform specified sampling and testing of products in accordance with specified standards.
  - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
  - 5. Perform additional tests and inspections required by Architect.
  - 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

### 3.03 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

**END OF SECTION**

## **SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 5100 - Temporary Utilities.
- B. Section 01 5213 - Field Offices and Sheds.
- C. Section 01 5500 - Vehicular Access and Parking.
- D. Section 01 5813 - Temporary Project Signage.

#### **1.03 TEMPORARY UTILITIES - See Section 01 5100**

- A. Contractor will provide the following:
  - 1. Electrical power and metering, consisting of connection to existing facilities.
  - 2. Water supply, consisting of connection to existing facilities.
- B. Provide and pay for all electrical power, lighting, water, heating and cooling, and ventilation required for construction purposes.
- C. Existing facilities may not be used.
- D. New permanent facilities may be used.

#### **1.04 TELECOMMUNICATIONS SERVICES**

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:
  - 1. Telephone Land Lines: One line, minimum; one handset per line.
  - 2. Internet Connections: Minimum of one; DSL modem or faster.
  - 3. Email: Account/address reserved for project use.
  - 4. Facsimile Service: Minimum of one dedicated fax machine/printer, with dedicated phone line.

#### **1.05 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

#### **1.06 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

#### **1.07 FENCING**

- A. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

#### **1.08 INTERIOR ENCLOSURES**

- A. Provide temporary partitions and ceilings as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

#### **1.09 SECURITY**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

#### **1.10 VEHICULAR ACCESS AND PARKING**

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

#### **1.11 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

#### **1.12 PROJECT IDENTIFICATION**

- A. Provide project identification sign of design and construction indicated on Drawings.
- B. Erect on site at location indicated.
- C. No other signs are allowed without Owner permission except those required by law.

**1.13 FIELD OFFICES - See Section 01 5213**

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION - NOT USED**

**END OF SECTION**

## **SECTION 01 5100 - TEMPORARY UTILITIES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Temporary Utilities: Electricity, lighting, heat, and water.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 5000 - Temporary Facilities and Controls:

#### **1.03 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- D. Provide main service disconnect and over-current protection at convenient location and meter.
- E. Permanent convenience receptacles may be utilized during construction.
- F. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

#### **1.04 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft (21 watt/sq m).
- B. Provide and maintain 1 watt/sq ft (10.8 watt/sq m) lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- D. Maintain lighting and provide routine repairs.

#### **1.05 TEMPORARY HEATING**

- A. Cost of Energy: By Contractor.
- B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
- C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.

#### **1.06 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

### **PART 2 - PRODUCTS - NOT USED**

### **PART 3 - EXECUTION - NOT USED**

**END OF SECTION**



## **SECTION 01 5213 - FIELD OFFICES AND SHEDS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Temporary field offices for use of Contractor.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 5000 - Temporary Facilities and Controls:
- B. Section 01 5500 - Vehicular Access and Parking: Parking and access to field offices.

#### **1.03 USE OF EXISTING FACILITIES**

- A. Designated existing spaces may be used for field offices: Contractor to discuss this with the Owner and obtain Owner's written agreement.

#### **1.04 USE OF PERMANENT FACILITIES**

- A. When permanent facilities are enclosed with operable utilities, relocate offices into building, with written agreement of Owner, and remove temporary buildings.

### **PART 2 - PRODUCTS**

#### **2.01 Contractor OFFICE AND FACILITIES**

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Telephone: As specified in Section 01 5000.
- C. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- D. Other Furnishings: Contractor's option.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Parking: Two hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.

#### **3.02 MAINTENANCE AND CLEANING**

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.

#### **3.03 REMOVAL**

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

**END OF SECTION**

## **SECTION 01 5500 - VEHICULAR ACCESS AND PARKING**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Construction parking controls.
- E. Haul routes.
- F. Maintenance.
- G. Removal, repair.
- H. Mud from site vehicles.

### **PART 3 - EXECUTION**

#### **2.01 PREPARATION**

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

#### **2.02 ACCESS ROADS**

- A. Use of designated existing on-site streets and driveways for construction traffic is permitted.
- B. Tracked vehicles not allowed on paved areas.
- C. Construct new temporary all-weather access roads from public thoroughfares to serve construction area, of a width and load bearing capacity to provide unimpeded traffic for construction purposes.
- D. Location as approved by Owner.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 foot (6 m) width driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants free of obstructions.

#### **2.03 PARKING**

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. Do not allow heavy vehicles or construction equipment in parking areas.
- C. Arrange for temporary parking areas to accommodate use of construction personnel.
- D. When site space is not adequate, provide additional off-site parking.

#### **2.04 HAUL ROUTES**

- A. Confine construction traffic to designated haul routes.
- B. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

#### **2.05 MAINTENANCE**

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.

- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

#### **2.06 REMOVAL, REPAIR**

- A. Remove temporary roads when permanent paving is usable.
- B. Repair existing facilities damaged by use, to original condition.
- C. Repair damage caused by installation.

#### **2.07 MUD FROM SITE VEHICLES**

- A. Provide means of removing mud from vehicle wheels before entering streets.

**END OF SECTION**

## **SECTION 01 5813 - TEMPORARY PROJECT SIGNAGE**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Project identification sign.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 00 2113 – Instructions to bidders: Special Notes: Temporary Construction Sign

#### **1.03 REFERENCE STANDARDS**

- A. FHWA (SHS) - Standard Highway Signs; Federal Highway Administration, U.S. Department of Transportation; 2004.

#### **1.04 QUALITY ASSURANCE**

- A. Design sign and structure to withstand 50 miles/hr (80 km/hr) wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.

### **PART 2 - PRODUCTS**

#### **2.01 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch (19 mm) thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Paint and Primers: Exterior quality, two coats;

#### **2.02 PROJECT IDENTIFICATION SIGN**

- A. One painted sign, 32 sq ft area, bottom 4 feet above ground.
- B. Content:
  - 1. Project number, title, logo and name of Owner as indicated on Contract Documents.
  - 2. Names and titles of Architect and Consultants.
  - 3. Name of Prime Contractor.
- C. Graphic Design, Colors, Style of Lettering: Designated by Architect.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Install sign surface plumb and level, with butt joints. Anchor securely.

#### **3.02 MAINTENANCE**

- A. Maintain signs and supports clean, repair deterioration and damage.

### 3.03 REMOVAL

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

**END OF SECTION**

## **SECTION 01 6000 - PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

#### **1.02 RELATED REQUIREMENTS**

- A. Document 00 2113 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.

#### **1.03 SUBMITTALS**

- A. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
  - 1. Submit within 15 days after date of Agreement.
  - 2. For products specified only by reference standards, list applicable reference standards.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

### **PART 2 - PRODUCTS**

#### **2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.
- D. Reused Products: Reused products include materials and equipment previously used in this or other construction, salvaged and refurbished as specified.
- E. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required. See Drawings for the specific information.

#### **2.02 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by the Contract Documents.

## 2.03 PRODUCT OPTIONS

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

## 2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

## PART 3 - EXECUTION

### 3.01 SUBSTITUTION PROCEDURES

- A. Contractor to verify with Architect time restrictions for submitting requests for substitutions during the bidding period.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
  - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- D. Substitution Submittal Procedure:
  - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
  - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
  - 3. The Architect will notify Contractor in writing of decision to accept or reject request.

### 3.02 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

### 3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- G. Prevent contact with material that may cause corrosion, discoloration, or staining.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**



## **SECTION 01 7000 - EXECUTION AND CLOSEOUT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition.
- C. Cutting and patching.
- D. Cleaning and protection.
- E. Closeout procedures, except payment procedures.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Administrative Requirements: Submittals procedures.
- B. Section 01 4000 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 5000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- D. Section 01 5100 - Temporary Utilities: Temporary heating, cooling, and ventilating facilities.
- E. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
- F. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

#### **1.03 PROJECT CONDITIONS**

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

#### **1.04 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that

are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 - PRODUCTS**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### 3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
  - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 5000 in locations indicated on drawings.
  - 2. Provide sound retardant partitions of construction indicated on drawings in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
  - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
  - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
  - 2. Relocate items indicated on drawings.
  - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Fire Alarm, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.
  - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

- F. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
  - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

### 3.05 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-conforming work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.

- J. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.06 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.07 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

### **3.08 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.09 FINAL CLEANING**

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- D. Clean filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.

- G. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.10 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
- B. Notify Architect when work is considered ready for Substantial Completion.
- C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.
- D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- E. Notify Architect when work is considered finally complete.
- F. Complete items of work determined by Architect's final inspection.

**END OF SECTION**

## **SECTION 01 7800 - CLOSEOUT SUBMITTALS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.
- C. Individual Product Sections: Specific requirements for operation and maintenance data.
- D. Individual Product Sections: Warranties required for specific products or Work.

#### **1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
  - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

### **PART 2 - PRODUCTS - NOT USED**

### **PART 3 - EXECUTION**

#### **3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Addenda.
  - 3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
  - 1. Field changes of dimension and detail.
  - 2. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

### **3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
  - 1. Description of unit or system, and component parts.
  - 2. Identify function, normal operating characteristics, and limiting conditions.
  - 3. Include performance curves, with engineering data and tests.
  - 4. Complete nomenclature and model number of replaceable parts.
- B. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- C. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- D. Provide servicing and lubrication schedule, and list of lubricants required.
- E. Include manufacturer's printed operation and maintenance instructions.
- F. Include sequence of operation by controls manufacturer.
- G. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- H. Additional Requirements: As specified in individual product specification sections.

### **3.05 OPERATION AND MAINTENANCE MANUALS**

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.



### **3.06 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

**END OF SECTION**

## **SECTION 01 7900 - DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Training of Owner personnel in operation and maintenance is required for:
  - 1. All software-operated systems.
  - 2. HVAC systems and equipment.
  - 3. Plumbing equipment.
  - 4. Electrical systems and equipment.
  - 5. Conveying systems.
  - 6. Landscape irrigation.
  - 7. Items specified in individual product Sections.
- B. Training of Owner personnel in care, cleaning, maintenance, and repair is required for:
  - 1. Roofing, waterproofing, and other weather-exposed or moisture protection products.
  - 2. Finishes, including flooring, wall finishes, and ceiling finishes.
  - 3. Items specified in individual product Sections.

#### **1.02 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures; except:
- B. Training Manuals: Provide training manual for each attendee; allow for minimum of two attendees per training session.
  - 1. Include applicable portion of O&M manuals.
  - 2. Include copies of all hand-outs, slides, overheads, video presentations, etc., that are not included in O&M manuals.
  - 3. Provide one extra copy of each training manual to be included with operation and maintenance data.

#### **1.03 QUALITY ASSURANCE**

- A. Instructor Qualifications: Familiar with design, operation, maintenance and troubleshooting of the relevant products and systems.
  - 1. Provide as instructors the most qualified trainer of those contractors and/or installers who actually supplied and installed the systems and equipment.
  - 2. Where a single person is not familiar with all aspects, provide specialists with necessary qualifications.

### **PART 2 - PRODUCTS - NOT USED**

### **PART 3 - EXECUTION**

#### **3.01 DEMONSTRATION - GENERAL**

- A. Demonstrations conducted during system start-up do not qualify as demonstrations for the purposes of this section, unless approved in advance by Owner.
- B. Demonstrations conducted during Functional Testing need not be repeated unless Owner personnel training is specified.
- C. Demonstration may be combined with Owner personnel training if applicable.
- D. Operating Equipment and Systems: Demonstrate operation in all modes, including start-up, shut-down, seasonal changeover, emergency conditions, and troubleshooting, and maintenance procedures, including scheduled and preventive maintenance.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.
  - 2. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

- E. Non-Operating Products: Demonstrate cleaning, scheduled and preventive maintenance, and repair procedures.
  - 1. Perform demonstrations not less than two weeks prior to Substantial Completion.

### 3.02 TRAINING - GENERAL

- A. Commissioning Authority will prepare the Training Plan based on draft plans submitted.
- B. Conduct training on-site unless otherwise indicated.
- C. Owner will provide classroom and seating at no cost to Contractor.
- D. Do not start training until Functional Testing is complete, unless otherwise specified or approved by the Commissioning Authority.
- E. Provide training in minimum two hour segments.
- F. The Commissioning Authority is responsible for determining that the training was satisfactorily completed and will provide approval forms.
- G. Training schedule will be subject to availability of Owner's personnel to be trained; re-schedule training sessions as required by Owner; once schedule has been approved by Owner failure to conduct sessions according to schedule will be cause for Owner to charge Contractor for personnel "show-up" time.
- H. Review of Facility Policy on Operation and Maintenance Data: During training discuss:
  - 1. The location of the O&M manuals and procedures for use and preservation; backup copies.
  - 2. Typical contents and organization of all manuals, including explanatory information, system narratives, and product specific information.
  - 3. Typical uses of the O&M manuals.
- I. Product- and System-Specific Training:
  - 1. Review the applicable O&M manuals.
  - 2. For systems, provide an overview of system operation, design parameters and constraints, and operational strategies.
  - 3. Review instructions for proper operation in all modes, including start-up, shut-down, seasonal changeover and emergency procedures, and for maintenance, including preventative maintenance.
  - 4. Provide hands-on training on all operational modes possible and preventive maintenance.
  - 5. Emphasize safe and proper operating requirements; discuss relevant health and safety issues and emergency procedures.
  - 6. Discuss common troubleshooting problems and solutions.
  - 7. Discuss any peculiarities of equipment installation or operation.
  - 8. Discuss warranties and guarantees, including procedures necessary to avoid voiding coverage.
  - 9. Review recommended tools and spare parts inventory suggestions of manufacturers.
  - 10. Review spare parts and tools required to be furnished by Contractor.
  - 11. Review spare parts suppliers and sources and procurement procedures.
- J. Be prepared to answer questions raised by training attendees; if unable to answer during training session, provide written response within three days.

**END OF SECTION**

## **SECTION 023200 – GEOTECHNICAL INVESTIGATION**

### **1. GENERAL**

#### **1.01 Requirements, Codes**

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this section.
- B. The following are minimum requirements and shall govern except that all Federal, Local, and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

#### **1.02 Description**

- A. A subsurface exploration was performed at this site by Sebago Technics. A report for same was issued on January 25, 2010. A copy of that report is enclosed in the specification book.
- B. Comply with all recommendations contained in the report as well as satisfying any other conditions that may exist on the site in order to properly prepare the site to support the structures called for in the Contract Documents.

#### **1.03 Site Investigation**

- A. Visit the site and be acquainted with the site conditions.
- B. Prior to bidding the site development and excavating subcontractor or sub-subcontractors, (i.e., demolition, clearing, grading, drainage, utilities, excavation, etc.) shall perform any additional subsurface investigations necessary to completely familiarize and satisfy himself as to the existing conditions in order to comply with paragraph 1.02 B above.

**END OF SECTION**



# **Report on Subsurface and Foundation Investigation**

## **Proposed Service Addition to Portland Lexus/Toyota Portland, Maine**

for

Summit Automotive Partners, LLC  
5299 DTC Blvd., Suite 1050  
Greenwood Village, CO 80111

January 25, 2010

January 25, 2010  
08005

Mr. Ron Redfern  
Summit Automotive Partners, LLC  
5299 DTC Blvd, Suite 1050  
Greenwood Village, CO 80111

**Report on Subsurface and Foundation Investigation**  
**Proposed Service Addition to Portland Lexus/Toyota, Portland, Maine**

Dear Ron:

This letter report presents the results of our subsurface and foundation investigation for the proposed addition at the Portland Lexus/Toyota Dealership in Portland, Maine. This work was completed in accordance with our proposal dated October 29, 2009.

In summary, we recommend that the addition be supported on spread and continuous footings bearing on undisturbed, naturally deposited sand, existing fill or on compacted structural fill placed after removal of unsuitable soil. The lowest level floor may be designed as a slab-on-grade bearing on a minimum of 6 inches of compacted structural fill. Specific recommendations regarding design and construction are presented below.

**Introduction**

The existing building, located at 191 Riverside Street in Portland, was constructed in 2004/2005. The proposed service addition will have a plan area of approximately 11,000 square feet. It will be a single story with the same ground floor elevation as the existing building. A nominal raise-in-grade of less than 1 foot will be required. Column loads, provided by Becker Structural Engineers, vary from 10 kips to 49 kips.

A geotechnical investigation was completed by R.W. Gillespie & Associates, Inc., report dated November 14, 2003, for the original building. That investigation included nine borings with four borings in the area of the proposed addition. In our opinion, this is sufficient subsurface information to complete our evaluation of foundation requirements.

The existing building is supported on spread and continuous footings bearing on an approximately 3.5-foot thick mat of lightweight concrete that extends 5 feet beyond the building perimeter.

### **Subsurface Explorations**

On October 29, 2003, four borings, B-4, B-5, B-6, and B-7 were drilled at locations shown on Sheet 1, Boring Plan. Borings were drilled to depths below ground surface varying from 12 feet to 100 feet. R.W. Gillespie & Associates, Inc. monitored the borings and prepared the logs included as Appendix A. Table I summarizes the results of these borings. Field vane shear tests were conducted in other borings at various depths and thin-wall tube samples were recovered for laboratory soil testing.

The test borings and related information depict the subsurface conditions and water levels encountered at the locations and during the times indicated on the logs. Subsurface conditions at other locations will differ from those encountered in the test borings. The passage of time may result in a change in groundwater conditions at the test borings.

### **Subsurface Conditions**

The test borings disclosed three principal soil units at the site: fill, sand and marine clay. Encountered thickness and generalized descriptions of the units are presented below in order of increasing depth below ground surface.

**Fill** – Fill consists of medium dense to dense, brown gravelly SAND, trace silt; to silty SAND with trace to little organics and occasional cobbles. Encountered thickness varies from 3.0 feet to 9.0 feet.

**Sand** – Sand consists of loose to medium dense, brown to gray silty SAND. Encountered thickness varies from 3.5 feet to 8.0 feet.

**Marine Clay** – Marine clay consists of soft to medium stiff, gray silty CLAY. Borings penetrated more than 87.5 feet into the clay stratum.

Water was observed in the borings at depths below ground surface varying from 7.0 feet to 10.0 feet. Observations of water were made over a relatively short period of time and may not reflect the stabilized groundwater level. In addition, water levels at the site will vary with season, precipitation, temperature and construction activity in the area. Therefore, water levels during and following construction will vary from those observed in the test pits.

### **Strength and Compressibility Characteristics of Clay Stratum**

We estimated the stress history of the clay deposit from the consolidation plots in the 2003 report and by correlations with strength ratio, the ratio of shear strength to overburden stress, of similar clays in the area. The undrained shear strength of the clay stratum, as measured in borings by field vane shear tests, varies from 380 pounds per square foot (psf) to 730 psf at depths from 15 feet to 65 feet below ground surface. The stress history of the deposit was estimated from the maximum previous stress interpreted from the consolidation test and by comparing the strength ratio with correlations of strength ratio and stress history of clay from other projects in the area with similar conditions.

The stress-strain or compressibility characteristics (settlement) of clays are highly dependent upon their stress history. If clay is stressed within the limits of the maximum previous stress,  $\sigma_{vm}$ , the strain (settlement) will be a function of the recompression ratio (RR) of the clay. If the applied stress exceeds the maximum previous stress, the strain will be proportional to both the recompression ratio and the virgin compression ratio (CR). The compression ratio is typically 10 to 15 times the recompression ratio.

The stress history and appropriate compression ratios were estimated for the clay deposit as discussed above. The correlations indicate that the deposit is somewhat overconsolidated, that is, the existing overburden stress is approximately 400 psf less than the maximum previous stress in the lower portion of the clay and more than 2,000 psf near the top. The deposit likely became overconsolidated due to desiccation (drying) resulting from a lowering of the groundwater level at some time in the geologic past which created a stiff upper crust and also increased the effective overburden stress throughout the stratum.

### **Recommendations for Foundation Design**

#### **Recommended Foundation Type and Design Criteria**

We recommend that the addition be supported on spread and continuous footings bearing on undisturbed, naturally deposited sand, existing fill following local densification or on compacted structural fill placed after removal of unsuitable soils. All existing fill containing more than trace organics or other unsuitable materials should be removed from within the limits of foundations and replaced with compacted structural fill. We recommend that all bearing surfaces be densified following excavation with a minimum of 4 passes of a large vibratory plate compactor.

Footings may be proportioned for an allowable bearing stress in pounds per square foot (psf) equal to 800 multiplied by the least lateral dimension of the footing up to a maximum of 2,500 psf. All footings should be a minimum of 2.0 feet wide.

Exterior footings should be founded at least 4.5 feet below the lowest adjacent ground surface exposed to freezing. Interior footings should be founded a minimum of 1.5 feet below the ground floor slab.

Compacted structural fill supporting footings should extend laterally from the footings to at least the limits defined by 1 horizontal to 1 vertical lines sloped outward and downward from points located at least 1 foot horizontally beyond the bottom edges of the footings.

In order to consider foundations bearing above the clay stratum we estimated the settlement of the clay resulting from the increased stress from the building loads provided by Becker Structural Engineers and raise-in-grade. We estimate that the total settlement of the addition will be 1.2 inches or less with differential settlement less than 0.5 inch in 35 feet. We estimate that the loads from the addition will induce from 0.25 inch to 0.5 inch additional settlement of the existing footings along existing Column Line A and that adjacent new footings will settle approximately 0.25 inch more than the existing footings. Settlement will be long term settlement occurring over the next 30 years or more. We anticipate that settlement of this magnitude is acceptable. However, Becker Structural Engineers should determine final acceptability of settlement.



Ground Floor Slab

We recommend that the lowest level floor slab be designed as an earth-supported slab-on-grade bearing on a minimum of 6 inches of compacted structural fill. All existing fill containing more than trace organics or other unsuitable materials should be removed from within the building limits and replaced with compacted structural fill. The excavated subgrade should be proofrolled with fully loaded ten-wheel dump trucks or equivalent equipment prior to placing structural fill. Normal dampproofing and vapor barriers should be provided for the slab.

We recommend a modulus of subgrade reaction of 150 pounds per cubic inch for slab design.

Seismic Design Considerations

We understand that the City of Portland uses the 2003 edition of the International Building Code as a standard. We recommend that the building be designed in accordance with the seismic requirements of the 2003 edition of the International Building Code, the site classification is Class E; the site response coefficient  $F_a$  is 2.1 for a short period spectral response acceleration  $S_s$  of 0.375g; the site response coefficient  $F_v$  is 3.5 for the 1-second period spectral response acceleration  $S_1$  of 0.10g. The subgrade soils are not considered liquefaction susceptible.

Lateral Foundation Loads

We recommend that lateral loads be resisted by bottom friction on footings and that a coefficient of friction equal to 0.35 be used for footings. If this does not provide sufficient lateral resistance, we will consider the problem in more detail to take into account other factors.

Backfill Materials

Structural fill used below foundations and floor slabs and for backfill adjacent to walls should consist of sandy gravel to gravelly sand. It should be free of organic material, loam, trash, snow, ice, frozen soil and other objectionable material, and should conform to the following gradation:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3 inches	100
No. 4	30 to 90
No. 40	10 to 50
No. 200	0 to 8

Compacted structural fill should be placed in layers not exceeding eight inches in loose measure and compacted by self propelled vibratory equipment at the approximate optimum moisture content to a dry density of at least 95 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557. In confined areas, the loose layer thickness should be reduced to 6 inches and compaction performed by hand-guided vibratory equipment.

Compacted structural fill on the exterior of the foundation walls should extend laterally a minimum of 2 feet from the wall. Backfill beyond this limit on the exterior of the building may consist of common fill. The top 12 inches of fill on the exterior of the building should consist of

low permeability material or bituminous pavement to minimize water infiltration next to the building. Grading should provide for runoff away from the building.

Common fill may consist of inorganic mineral soil that can be placed in layers and compacted. Common fill should be placed and spread in layers not exceeding 12 inches in thickness and compacted at the approximate optimum moisture content to a dry density of at least 90 percent of the maximum dry density, as determined in accordance with ASTM Test Designation D1557.

## **Construction Considerations**

### General

The primary purpose of this section of the report is to comment on items related to excavation, earthwork and related geotechnical aspects of proposed construction. It is written primarily for the engineer having responsibility for preparation of plans and specifications. Since it identifies potential construction problems related to foundations and earthwork, it will also aid personnel who monitor the construction activity. The contractor must evaluate the construction problems on the basis of their own knowledge and experience in the Portland, Maine area, and on the basis of similar projects in other localities, taking into account their proposed construction methods, procedures, equipment and personnel.

### Excavation, Lateral Support and Control of Water

We anticipate that foundation excavation can be accomplished with sloped open excavation through the overburden soils provided safe side slopes can be maintained. Some sloughing and raveling should be anticipated in temporary slopes. Temporary excavations should be made in accordance with all OSHA and other applicable regulatory agency requirements.

We recommend that all previous construction, including pavement and abandoned utilities, if present, be removed from within the limits of the building.

Groundwater may be encountered at footing excavations. We anticipate that groundwater and water from other sources can be controlled by sumps and open pumping. In general, the contractor should control groundwater and water from runoff and other sources by methods which prevent disturbance of bearing surfaces or adjacent soils and allow construction in-the-dry.

### Subgrade Preparation

The subgrade soil is susceptible to disturbance from construction traffic. Equipment and personnel should not be permitted to travel across exposed footing bearing surfaces or exposed slab subgrades. Any subgrade areas that are disturbed should be recompacted prior to placing concrete. Subgrades should be protected against freezing temperatures if exposed during construction. Final excavation to subgrade should be performed using equipment with smooth-edge buckets.

Construction Monitoring

The foundation recommendations contained herein are based on the known and predictable behavior of a properly engineered and constructed foundation. Monitoring of the foundation construction is required to enable the geotechnical engineer to keep in contact with procedures and techniques used in construction. Therefore, we recommend that a person qualified by training and experience be present to provide monitoring at the site during excavation, preparation of foundation bearing surfaces, and placement of compacted structural fill.

Limitations of Recommendations

This report has been prepared for specific application to the subject project in accordance with generally accepted geotechnical engineering practices. In the event that any changes in the nature, design or location of the addition is planned, the conclusions and recommendations contained in this report should not be considered valid, unless the changes are reviewed and the conclusions of this report modified or verified in writing.

The recommendations presented herein are based in part on the data obtained from the referenced test borings. The nature and extent of variations between the test borings may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

We request that we be provided the opportunity for a general review of final design and specifications in order to determine that our earthwork and foundation recommendations have been interpreted and implemented in the design and specifications as they were intended.

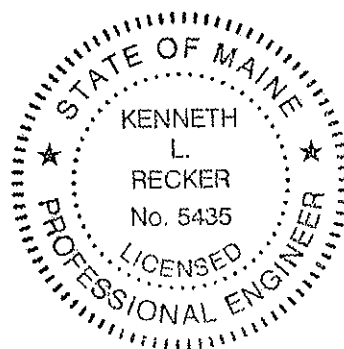
It has been a pleasure to work with you on this project. Please do not hesitate to contact us if you have any questions or need additional information.

Sincerely,

SEBAGO TECHNICS, INC.



Kenneth L. Recker, P.E.  
Geotechnical Engineering Manager



KLR:klr/dlf  
Enclosures:

- Sheet 1 - Boring Plan
- Appendix A - Logs of Existing Test Borings

**TABLE I  
SUMMARY OF BORINGS  
SERVICE ADDITION, PORTLAND LEXUS/TOYOTA  
PORTLAND, MAINE**

Boring Number	Depth (Ft)	Depth to Water (Ft)	Strata Thickness (Ft)		
			Fill	Sand	Clay
B-4	100.0	10.0	8.0	5.0	87.0*
B-5	17.0	8.0	9.0	3.5	4.5*
B-6	100.0	7.5	4.5	8.0	87.5*
B-7	12.0	7.0	3.0	6.0	3.0*

NOTES:

1. \* INDICATES DEPTH OF PENETRATION INTO STRATUM.

SPRING PLAN  
 BERLIN CITY LEXUS/TOYOTA  
 191 EVERETT STREET  
 BERLIN, MAINE  
 04915-1101

BERLIN CITY OF PORTLAND, INC.  
 181 BROAD STREET  
 PORTLAND, MAINE 04101

PROJECT NO.	DATE	BY	CHKD.
181	10/15/00	W. J. GIBSON	W. J. GIBSON
NO.	DATE	BY	CHKD.
1	10/15/00	W. J. GIBSON	W. J. GIBSON

DATE	BY	CHKD.
10/15/00	W. J. GIBSON	W. J. GIBSON
10/15/00	W. J. GIBSON	W. J. GIBSON
10/15/00	W. J. GIBSON	W. J. GIBSON

Sebago Technics  
 1000 Main Street  
 Portland, Maine 04101  
 TEL: 603-761-1111  
 FAX: 603-761-1112

**NOTE**  
 1. ALL DIMENSIONS AND LOCATIONS OBTAINED FROM REPORT SAID.  
 2. LOCATIONS OF BOXES OBTAINED FROM REPORT SAID.  
 NOVEMBER 13, 2000

**LEGEND**

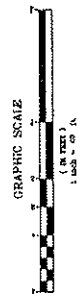
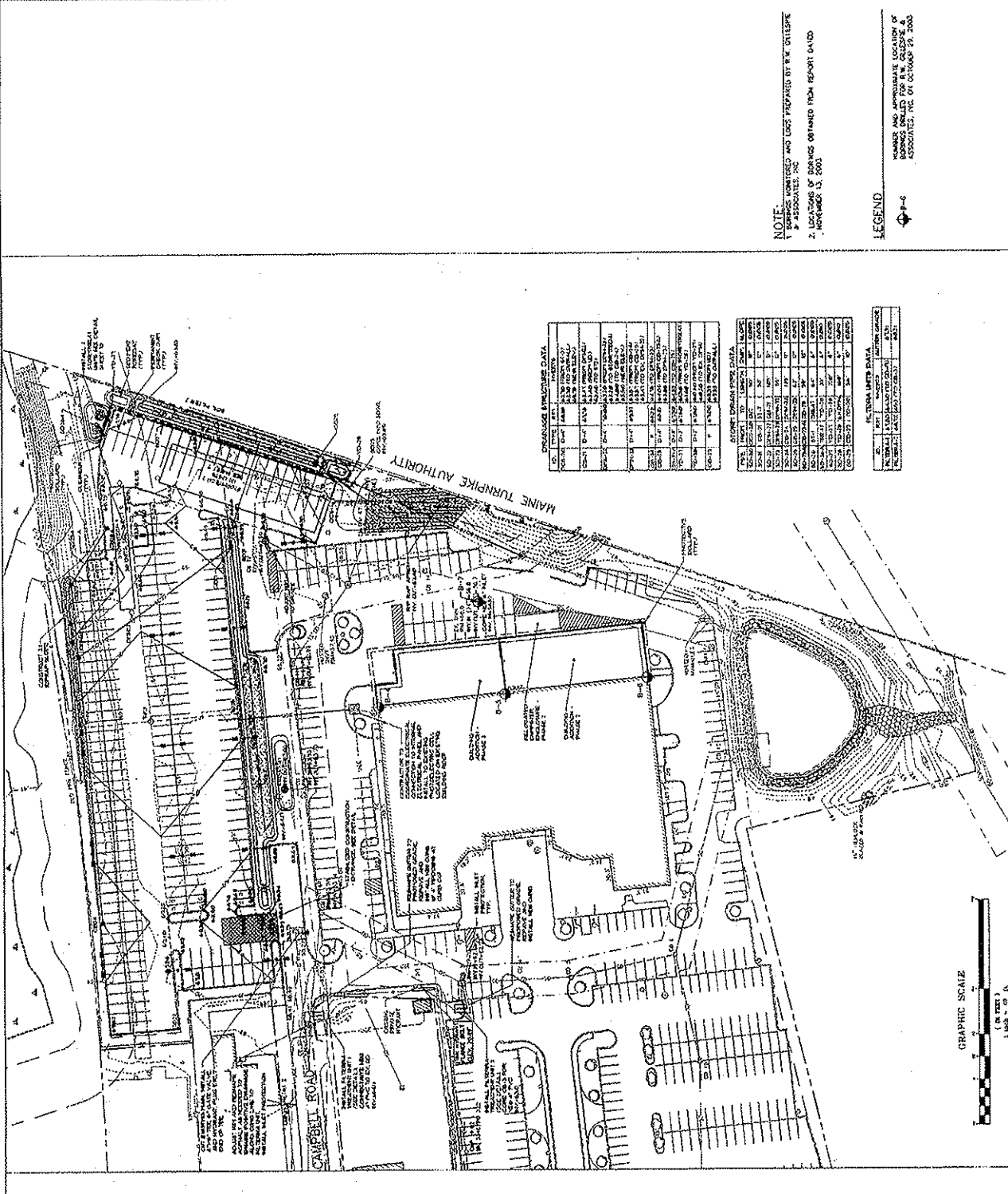
EXISTING	NEW
PROPERTY LINE	PROPERTY LINE
EXISTING DRIVE	NEW DRIVE
EXISTING SIDEWALK	NEW SIDEWALK
EXISTING CURB	NEW CURB
EXISTING DRIVEWAY	NEW DRIVEWAY
EXISTING UTILITY	NEW UTILITY
EXISTING TREE	NEW TREE
EXISTING SIGN	NEW SIGN
EXISTING LIGHT	NEW LIGHT
EXISTING FENCE	NEW FENCE
EXISTING WALL	NEW WALL
EXISTING ROOF	NEW ROOF
EXISTING FLOOR	NEW FLOOR
EXISTING CEILING	NEW CEILING
EXISTING DOOR	NEW DOOR
EXISTING WINDOW	NEW WINDOW
EXISTING STAIR	NEW STAIR
EXISTING ELEVATOR	NEW ELEVATOR
EXISTING MECHANICAL	NEW MECHANICAL
EXISTING ELECTRICAL	NEW ELECTRICAL
EXISTING PLUMBING	NEW PLUMBING
EXISTING HVAC	NEW HVAC
EXISTING INSULATION	NEW INSULATION
EXISTING PAINT	NEW PAINT
EXISTING FINISH	NEW FINISH
EXISTING LANDSCAPE	NEW LANDSCAPE
EXISTING SITEWORK	NEW SITEWORK
EXISTING CONCRETE	NEW CONCRETE
EXISTING MASONRY	NEW MASONRY
EXISTING METAL	NEW METAL
EXISTING WOOD	NEW WOOD
EXISTING GLASS	NEW GLASS
EXISTING RUBBER	NEW RUBBER
EXISTING FABRIC	NEW FABRIC
EXISTING OTHER	NEW OTHER

**STREET DRAIN FLOW DATA**

STREET	TO	FROM	FLOW
MAIN <td>100</td> <td>200</td> <td>100</td>	100	200	100
MAIN <td>200</td> <td>300</td> <td>200</td>	200	300	200
MAIN <td>300</td> <td>400</td> <td>300</td>	300	400	300
MAIN <td>400</td> <td>500</td> <td>400</td>	400	500	400
MAIN <td>500</td> <td>600</td> <td>500</td>	500	600	500
MAIN <td>600</td> <td>700</td> <td>600</td>	600	700	600
MAIN <td>700</td> <td>800</td> <td>700</td>	700	800	700
MAIN <td>800</td> <td>900</td> <td>800</td>	800	900	800
MAIN <td>900</td> <td>1000</td> <td>900</td>	900	1000	900

**DRAINAGE ENVELOPE DATA**

ENVELOPE	AREA	PERCENT
1	100	100
2	200	200
3	300	300
4	400	400
5	500	500
6	600	600
7	700	700
8	800	800
9	900	900
10	1000	1000



**LEGEND**

EXISTING	NEW
PROPERTY LINE	PROPERTY LINE
EXISTING DRIVE	NEW DRIVE
EXISTING SIDEWALK	NEW SIDEWALK
EXISTING CURB	NEW CURB
EXISTING DRIVEWAY	NEW DRIVEWAY
EXISTING UTILITY	NEW UTILITY
EXISTING TREE	NEW TREE
EXISTING SIGN	NEW SIGN
EXISTING LIGHT	NEW LIGHT
EXISTING FENCE	NEW FENCE
EXISTING WALL	NEW WALL
EXISTING ROOF	NEW ROOF
EXISTING FLOOR	NEW FLOOR
EXISTING CEILING	NEW CEILING
EXISTING DOOR	NEW DOOR
EXISTING WINDOW	NEW WINDOW
EXISTING STAIR	NEW STAIR
EXISTING ELEVATOR	NEW ELEVATOR
EXISTING MECHANICAL	NEW MECHANICAL
EXISTING ELECTRICAL	NEW ELECTRICAL
EXISTING PLUMBING	NEW PLUMBING
EXISTING HVAC	NEW HVAC
EXISTING INSULATION	NEW INSULATION
EXISTING PAINT	NEW PAINT
EXISTING FINISH	NEW FINISH
EXISTING LANDSCAPE	NEW LANDSCAPE
EXISTING SITEWORK	NEW SITEWORK
EXISTING CONCRETE	NEW CONCRETE
EXISTING MASONRY	NEW MASONRY
EXISTING METAL	NEW METAL
EXISTING WOOD	NEW WOOD
EXISTING GLASS	NEW GLASS
EXISTING RUBBER	NEW RUBBER
EXISTING FABRIC	NEW FABRIC
EXISTING OTHER	NEW OTHER

---

# Appendix A

## Logs of Existing Test Borings

# BORING LOG B-4

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 10'±

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS	
0	[Cross-hatched pattern]	[Solid black]	S-1	FILL: GRAVELLY SAND, medium dense to dense, moist, coarse to fine sand, little gravel, occasional cobbles, trace silt, brown.	10	5 7 8 10	15			
5			S-2		16	10 15 24 29	39			
10			[Vertical lines pattern]	S-3	SILTY SAND (SM); medium dense, moist, fine sand and silt, gray.	24	8 11 10 6	21		
15				S-4	SILTY CLAY (CL); soft, wet, gray.	24	WOR			
20	[Diagonal lines pattern]	[Solid black]		Probed with "A" rod and hydraulic push from 17' to 100'.  -GLACIOMARINE DEPOSITS-						
25										
30										
35										

**BORING LOG B-4**

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 10'±

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
40	[Hatched Pattern]							
45								
50								
55								
60								
65								
70								



**BORING LOG B-4**

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 10'±

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
75								
80								
85								
90								
95								
100			Bottom of Exploration at 100': not refusal.					
105								



### 3-BORING LOG B-5

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 8'

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
0	[Cross-hatched pattern]	S-1	S-1	FILL: GRAVELLY SAND, medium dense, moist, coarse to fine sand, little gravel, occasional cobble, trace silt, brown.	20	5 7 9 10	16		
5				FILL: SILTY SAND with organics, loose, moist then wet, medium to fine sand, little to some silt, little to some organics and topsoil, dark brown.	22	3 3 5 4	8		
10				SILTY SAND (SM); loose, wet, fine sand and silt, with thin silt seams, gray.	24	3 3 1 1	4		
15				SILTY CLAY (CL); soft, wet, gray.	24	WOH			
17				Bottom of Exploration at 17': not refusal.					
20									
25									
30									
35									

# BORING LOG B-6

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 7.5'

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
0			S-1	FILL: GRAVELLY SAND, medium dense, moist, coarse to fine sand, little gravel, occasional cobble, trace silt, brown.	18	2 4 10 14	14		
5			S-2	SILTY SAND (SM); loose to medium dense, moist then wet, medium to fine sand, little to some silt, stratified with thin silt seams, brown then gray.	20	3 4 6 10	10		
10			S-3		22	3 4 4 4	8		
15			S-4	SILTY CLAY (CL); soft, wet, gray.	24	WOR			
17				Probed with "A" rod and hydraulic push from 17' to 100'					
20				-GLACIOMARINE DEPOSITS-					
25									
30									
35									

**BORING LOG B-6**

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 7.5'±

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
40	[Hatched Area]							
45								
50								
55								
60								
65								
70								

R.W. Gillespie & Associates  
 Saco, Maine

Printed on 10/30/03 11:51 AM  
 R:\Projects\235-937\Boring Log B-6.dwg

**BORING LOG B-6**

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 7.5'

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
75									
80									
85									
90									
95									
100				Bottom of Exploration at 100'; not refusal.					
105									



# BORING LOG B-7

Project: Maine Mall Motors  
 Location: Portland, Maine

Approximate Surface Elevation:  
 Ground Water Depth: 7'±

Client: DSD Real Estate

Date: 29 October 2003

Project No. 235-937

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE #	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N BLOWS PER FT.	MOISTURE CONTENT	LAB TESTS
0			S-1	FILL: GRAVELLY SAND, loose, moist, coarse to fine sand, little gravel, trace silt, brown with trace organics.	18	1 4 5 5	9		
5			S-2	SAND (SM); medium dense, moist then wet, medium to fine sand, mostly fine, little to some silt, brown then gray.	21	2 7 9 10	16		
10			S-3	SILTY CLAY (CL); soft, wet, gray.	24	1/ 12" 1/ 12"			
12				Bottom of Exploration at 12'; not refusal.					
15									
20									
25									
30									
35									

## **SECTION 024100 - SELECTIVE DEMOLITION**

### **PART 1 -GENERAL**

#### **1.01 RELATED DOCUMENTS:**

- A. The following are minimum requirements and shall govern, except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

#### **1.02 GUIDELINE SPECIFICATIONS:**

- A. This specification is for general use only. Refer to demolition drawings for specific instructions.

#### **1.03 SUMMARY:**

- A. This Section requires the selective removal and subsequent offsite disposal or relocation of demolition work.

#### **1.04 QUALITY ASSURANCE:**

- A. Contractor Qualifications: Engage only subcontractors who can demonstrate not less than five years successful experience in work of similar character.
- B. To assure proper performance of these operations, the work in the Division is to be done by skilled personnel directed by qualified supervisors experienced in this type of work.
- C. Comply with all applicable requirements of regulatory agencies.
- D. If Contractor encounters asbestos during demolition, he shall stop work and notify Owner's representative immediately.
- E. Maintain public security as directed.

#### **1.05 SUBMITTALS:**

- A. Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services if required and subject to the Owner's agreement, together with details for dust and noise control protection. Comply with final completion date.

#### **1.06 JOB CONDITIONS:**

- A. Occupancy: Persons will be continuously occupying areas of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

- C. Salvage Items: Certain materials/products/fabrications indicated to be reused, relocated and hooked up in future. Others are to be removed but not reused such as doors with hardware, or relocated; verify each with Owner. Carefully remove, clean, protect and store such items. Turn over items to be removed but not reused or relocated to Owner and obtain receipt. Store owner salvage items where directed in an orderly manner.
- D. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.
- E. Protection: Provide temporary barricades and other forms of protection to protect Owner's personnel from injury due to selective demolition work.
- F. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.
- G. Environmental Controls: Use water sprinkling, temporary enclosures and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

## **PART 2 - PRODUCTS - NOT USED**

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. General: Provide interior and exterior needling, shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
- B. Erect and maintain dust-proof partitions and closures as required to prevent the spread of dust or fumes to occupied portions of the building. Include interior and exterior openings of all types, new and old. Partitions or closures shall be constructed of 2 x 4 framing with 5/8 gypsum wallboard both sides, sound insulated, and extended to floor above. Partitions to be fire rated where required.

### **3.02 DEMOLITION:**

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with phasing schedule and governing regulations.

### **3.03 DISPOSAL OF DEMOLISHED MATERIALS:**

- A. Remove from building debris, rubbish and other materials resulting from demolition operations. Transport and legally dispose of materials off-site.

### **3.04 CLEAN-UP AND REPAIR:**

- A. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction of surface soiled or damaged by selective demolition work. Repair fireproofing damaged or removed in accordance with fire marshal's requirements.

**END OF SECTION 02050**



## **SECTION 033000 - CAST-IN-PLACE CONCRETE**

### **PART 1 - GENERAL**

#### **1.01 RELATED DOCUMENTS**

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

#### **1.02 SUMMARY**

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mix design, placement procedures, and finishes.

#### **1.03 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

#### **1.04 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2006.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2005.
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1999.
- G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988 (Reapproved 2002).
- H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.
- J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.
- K. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- L. ASTM A 497/A 497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.
- M. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- N. ASTM A 767/A 767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2005.

- O. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2007b.
- P. ASTM A 884/A 884M - Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement; 2006.
- Q. ASTM C 33 - Standard Specification for Concrete Aggregates; 2007.
- R. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2005.
- S. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2007.
- T. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 2007.
- U. ASTM C 173/C 173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2008a.
- V. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.
- W. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.
- X. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2008a.
- Y. ASTM C 685/C 685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2007.
- Z. ASTM C 1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2005.
- AA. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).
- AB. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2009.
- AC. COE CRD-C 513 - COE Specifications for Rubber Waterstops; Corps of Engineers; 1974.

#### 1.05 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
  - 1. Indicate amounts of mix water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.
- E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork. Design and engineering of formwork are Contractor's responsibility.

- E. Welding Certificates: Copies of certificates for welding procedures and personnel.
- F. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- G. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
  - 1. Cementitious materials and aggregates.
  - 2. Form materials and form-release agents.
  - 3. Steel reinforcement and reinforcement accessories.
  - 4. Admixtures.
  - 5. Curing materials.
  - 6. Floor and slab treatments.
  - 7. Bonding agents.
  - 8. Adhesives.
  - 9. Vapor retarders.
  - 10. Epoxy joint filler.
  - 11. Joint-filler strips.
  - 12. Repair materials.

#### 1.06 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- 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 formwork and shoring and reshoring installations that are similar to those indicated for this Project in material, design, and extent.
- C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
  - 1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."
- F. ACI Publications: Comply with the following, unless more stringent provisions are indicated:
  - 1. Perform work of this section in accordance with ACI 301 and ACI 318.
  - 2. Follow recommendations of ACI 305R when concreting during hot weather.
  - 3. Follow recommendations of ACI 306R when concreting during cold weather.

4. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

## 1.07 TESTING

- A. Refer to Section 014000 for Required Concrete Testing and Special Inspections.
- B. In Addition to the Code Required Testing and Special Inspections the following Testing is Required for New and Existing concrete slab on grade: The slab must pass the following test standards: uniformly tested at 1 test per 1000 square feet of area:
  1. No calcium chloride test result may exceed the limit of 5 lbs per 1000 square feet
  2. No alkalinity test result may exceed a ph of 9
  3. No failure is permitted on any of the 72-hour bond tests.
  4. Notification of such testing is to be given to the architect-of-record and to the Construction Representative.
  5. A certified report of each test result is to be submitted to both for record prior to the installation of floor finish.
  6. The inspection is to be made in a preconditioned environment by Independent Floor Testing Company or another independent concrete slab inspection company approved by the Owner Representative
- C. The Construction Representative must be given the opportunity to inspect the condition of every new and existing floor slab prior to the installation of the specified floor finish. A 14-day prior notice must be given to the Construction Representative of intended finish floor installation.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle steel reinforcement to prevent bending and damage.
  1. Avoid damaging coatings on steel reinforcement.
  2. Repair damaged epoxy coatings on steel reinforcement according to ASTM D 3963/D 3963M.

## PART 2 - PRODUCTS

### 2.01 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  1. Plywood, metal or other approved panel materials.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips: Wood, metal, PVC, or rubber strips, **3/4 by 3/4 inch (19 by 19 mm)**, minimum.

- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than **1 inch (25 mm)** to the plane of the exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes not larger than **1 inch (25 mm)** in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

## 2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, **Grade 60 (Grade 420)**, deformed.
- B. Plain-Steel Wire: ASTM A 82, as drawn.
- C. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

## 2.03 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.

## 2.04 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
- B. Portland Cement: ASTM C 150, Type I/II.
  - 1. Fly Ash: ASTM C 618, Class C or F.
  - 2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- C. Normal-Weight Aggregate: ASTM C 33, uniformly graded, and as follows:
  - 1. Class: Moderate weathering region, but not less than 3M.
  - 2. Nominal Maximum Aggregate Size: **3/4 inch (19 mm)**.
  - 3. Combined Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on **No. 50 (0.3-mm)** sieve, and less than 8 percent may be retained on sieves finer than **No. 50 (0.3 mm)**.
- D. Water: Potable and complying with ASTM C 94.

## 2.05 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.
- B. Air-Entraining Admixture: ASTM C 260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

## 2.06 VAPOR RETARDERS

- A. Vapor Retarder: ASTM E 1745, Class B, five-ply, nylon- or polyester-cord-reinforced, high-density polyethylene sheet; **10 mils (0.25 mm)** thick. ***The joints in the vapor retarder shall be lapped not less than 6 inches.***
  - 1. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "Griffolyn T-85" by Reef Industries Inc.
- B. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a **No. 4 (4.75-mm)** sieve and 10 to 30 percent passing a **No. 100 (0.15-mm)** sieve; meeting deleterious substance limits of ASTM C 33 for fine aggregates.
- C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a **1-1/2-inch (38-mm)** sieve and 0 to 5 percent passing a **No. 8 (2.36-mm)** sieve.

## 2.07 FLOOR AND SLAB TREATMENTS

- A. Penetrating Liquid Floor Treatment: Chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
- B. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Penetrating Liquid Floor Treatment:
    - a. Titan Hard; Burke Group, LLC (The).
    - b. Chemisil Plus; ChemMasters.
    - c. Intraseal; Conspec Marketing & Manufacturing Co., Inc.
    - d. Ashford Formula; Curecrete Chemical Co., Inc.
    - e. Day-Chem Sure Hard; Dayton Superior Corporation.
    - f. Euco Diamond Hard; Euclid Chemical Co.
    - g. Seal Hard; L&M Construction Chemicals, Inc.
    - h. Vexcon Starseal PS; Vexcon Chemicals, Inc.

## 2.08 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- F. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Clear, Waterborne, Membrane-Forming Curing Compound:
    - a. Safe-Cure & Seal 20; ChemMasters.
    - b. High Seal; Conspec Marketing & Manufacturing Co., Inc.
    - c. Safe Cure and Seal; Dayton Superior Corporation.
    - d. Aqua Cure VOX; Euclid Chemical Co.
    - e. Kure-N-Seal WB; Sonneborn, Div. of ChemRex, Inc.

## 2.09 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.
- B. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy-Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
  - 1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Reglets: Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

## 2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.11 CONCRETE MIXES

- A. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:
  1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.
- C. Footings and Foundation Walls: Proportion normal-weight concrete mix as follows:
  1. Compressive Strength when tested in accordance with ASTM C 39/C 39M at 28 days: 3000 psi (24.1 MPa).
  2. Maximum Slump: 3 inches (100 mm).
  3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches (200 mm) after admixture is added to concrete with 2- to 4-inch (50- to 100-mm) slump.
  4. Maximum Water Cement Ratio: Maximum 40 percent by weight.
- D. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
  1. Compressive Strength (28 Days): 4000 psi (27.6 MPa).
  2. Minimum Cementitious Materials Content: 520 lb/cu. yd. (309 kg/cu. m).
  3. Maximum Water Cement Ratio: 0.45
  4. Maximum Slump: 4 inches (100 mm).
- E. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.
- F. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  1. Fly Ash: 25 percent.
  2. Combined Fly Ash and Pozzolan: 25 percent.
  3. Ground Granulated Blast-Furnace Slag: 50 percent.
  4. Combined Fly Ash or Pozzolan and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.
  5. Use of Fly Ash or Ground Granulated Blast-Furnace Slag is prohibited in Slab-on-Grade.
- G. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:



1. Air Content: 5.5 percent for 1-1/2-inch- (38-mm-) nominal maximum aggregate size.
  2. Air Content: 6 percent for 1-inch- (25-mm-) nominal maximum aggregate size.
  3. Air Content: 6 percent for 3/4-inch- (19-mm-) nominal maximum aggregate size.
- H. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.
- I. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.
- J. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
  2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
  4. Use corrosion-inhibiting admixture in concrete mixes where indicated.

## 2.12 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.13 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch ticket information.
1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- B. On Project Site: Mix in drum type batch mixer, complying with ASTM C 685. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- C. Transit Mixers: Comply with ASTM C 94/C 94M

## PART 3 - EXECUTION

### 3.01 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
1. Class B, 1/4 inch (6 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.

- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
  - 1. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

### 3.02 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 1. Install anchor bolts, accurately located, to elevations required.
  - 2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

### 3.03 REMOVING AND REUSING FORMS

- A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.04 VAPOR RETARDERS

- A. Vapor Retarder: Place, protect, and repair vapor-retarder sheets according to ASTM E 1643 and manufacturer's written instructions.
- B. Fine-Graded Granular Material: Cover vapor retarder with fine-graded granular material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).
- C. Granular Fill: Cover vapor retarder with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).
  - 1. Place and compact a 1/2-inch- (13-mm-) thick layer of fine-graded granular material over granular fill.

### 3.05 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

### 3.06 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form from preformed galvanized steel, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction (Control) Joints in Slabs-on-Grade: Construct contraction joints in slabs-on-grade to form panels of patterns as specified and shown on approved joint layout submittal. Use saw cuts 1/4 inch (6 mm) wide by 3/4 inch (19 mm) of slab depth or depth equal to the largest coarse aggregate size, whichever is greater:
1. Saw control joints with Sof-Cut Model GS-1000 (800) 776-3328 saw, immediately after final troweling with cutting completed within 2 hours after final pass of trowel. Vacuum saw cut concrete spoils from floor surface immediately behind the saw cutting operations.
    - a. Saw shall be designed for early entry, dry cutting with mechanical depth control sensor and skid plate to prevent raveling of the edges of the saw cut.
  2. Contraction joints shall be placed in accordance with approved Shop Drawings, with a maximum panel area as specified below. The panel shall be as nearly square as possible. If panel cannot be square, do not exceed panel length to panel width ratio of 1 to 1-1/2. Conform to bay spacing wherever possible (at column centerlines, half bays, third bays, one quarter bays, or equal division to meet the specified spacing requirements).
  3. Saw cut slabs on grade in accordance with the following maximum spacing:
    - a. 4 to 6 inches thick: 20 feet., maximum area with control joints 400 square feet.
    - b. 6 ¼ to 7 inches thick: 20 feet.
    - c. 7 ¼ to 8 inches thick: 20 feet.
  4. Joint fillers and sealants are specified in Section 07900 – Joint Sealants.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
  3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

### 3.07 CONCRETE PLACEMENT

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- D. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.
- E. Before placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mix.
- F. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
- G. Deposit concrete in forms in horizontal layers no deeper than **24 inches (600 mm)** and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
  - 1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
  - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least **6 inches (150 mm)** into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.
- H. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- I. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- J. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.08 FINISHING FORMED SURFACES

- A. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.
1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
  2. Do not apply rubbed finish to smooth-formed finish.
- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

### 3.09 FINISHING FLOORS AND SLABS

- A. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
1. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
  2. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:

- a. Specified overall values of flatness, F(F) 25; and levelness, F(L) 20; with minimum local values of flatness, F(F) 17; and levelness, F(L) 15.
  - b. Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.
  - c. Specified overall values of flatness, F(F) 30; and levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and levelness, F(L) 15; for suspended slabs.
  - d. Specified overall values of flatness, F(F) 45; and levelness, F(L) 35; with minimum local values of flatness, F(F) 30; and levelness, F(L) 24.
3. Finish and measure surface so gap at any point between concrete surface and an unlevelled freestanding 10-foot- (3.05-m-) long straightedge, resting on two high spots and placed anywhere on the surface, does not exceed the following:
- a. 1/4 inch (6.4 mm).
  - b. 3/16 inch (4.8 mm).
  - c. 1/8 inch (3.2 mm).

### 3.10 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

### 3.11 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with **12-inch (300-mm)** lap over adjacent absorptive covers.
  2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least **12 inches (300 mm)**, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
    - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer recommends for use with floor coverings.
  3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.12 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  2. Do not apply to concrete that is less than seven days old.
  3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
- B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

### 3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.



- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid epoxy joint filler full depth in saw-cut joints and at least **2 inches (50 mm)** deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

### 3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a **No. 16 (1.2-mm)** sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than **1/2 inch (13 mm)** in any dimension in solid concrete but not less than **1 inch (25 mm)** in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of **0.01 inch (0.25 mm)** wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.
  - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
  - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of **1/4 inch (6 mm)** to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes **1 inch (25 mm)** or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least **3/4 inch (19 mm)** clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
  7. Repair random cracks and single holes **1 inch (25 mm)** or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.15 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding **5 cu. yd. (4 cu. m)**, but less than **25 cu. yd. (19 cu. m)**, plus one set for each additional **50 cu. yd. (38 cu. m)** or fraction thereof.
  2. Testing Frequency: Obtain at least one composite sample for each **100 cu. yd. (76 cu. m)** or fraction thereof of each concrete mix placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mix, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  3. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
  4. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
  5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is **40 deg F (4.4 deg C)** and below and when **80 deg F (27 deg C)** and above, and one test for each composite sample.

6. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
7. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
  - a. Cast and field cure one set of four standard cylinder specimens for each composite sample.
8. Compressive-Strength Tests: ASTM C 39; test two laboratory-cured specimens at 7 days and two at 28 days.
  - a. Test two field-cured specimens at 7 days and two at 28 days.
  - b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.
- C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
- D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
- E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

**END OF SECTION 03300**

## **SECTION 04 2000 - UNIT MASONRY**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Concrete Block.
- B. Mortar and Grout.
- E. Reinforcement and Anchorage.
- F. Flashings.
- G. Lintels.
- H. Accessories.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 5000 - Metal Fabrications: Loose steel lintels.
- B. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.
- C. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.
- E. Section 07 9005 - Joint Sealers: Backing rod and sealant at control and expansion joints.

#### **1.03 REFERENCE STANDARDS**

- A. ACI 530/ASCE 5/TMS 402 - Building Code Requirements for Masonry Structures; American Concrete Institute International; 2005.
- B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2005.
- C. ASTM A 82/A 82M - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- D. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- E. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2007.
- F. ASTM A 641/A 641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009.
- G. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units; 2006b.
- H. ASTM C 91 - Standard Specification for Masonry Cement; 2005.
- I. ASTM C 129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2006.
- J. ASTM C 140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2007a.
- K. ASTM C 144 - Standard Specification for Aggregate for Masonry Mortar; 2004.
- L. ASTM C 150 - Standard Specification for Portland Cement; 2007.
- M. ASTM C 207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006.
- N. ASTM C 216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2007a.
- O. ASTM C 270 - Standard Specification for Mortar for Unit Masonry; 2007a.

- P. ASTM C 404 - Standard Specification for Aggregates for Masonry Grout; 2007.
- R. ASTM C 476 - Standard Specification for Grout for Masonry; 2008.
- S. ASTM C 744 - Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units; 2005.
- T. ASTM C 780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2008a.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.

#### 1.05 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/ASCE 5/TMS 402 and ACI 530.1/ASCE 6/TMS 602, except where exceeded by requirements of the contract documents.
- B. Fire Performance Characteristics: Where indicated on the drawings, provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E119 by Underwriter's Laboratories.
- C. Single-Source Responsibility for Masonry Units: Obtain concrete masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each surface or visually related surfaces.
- D. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- E. All masonry units shall be sound, free of cracks or other defects that may interfere with the proper placing of the unit or impair the strength of construction.
- F. Where units are to be used in exposed wall construction, the exposed masonry faces shall not show chips or cracks, or imperfections when viewed from a distance of not less than 20 feet (6.1 m) under diffused lighting.
- G. Use of damaged items is prohibited except by specific authorization of the Sandia Delegated Representative (SDR).
- H. Testing: Sandia National Laboratories (SNL) may obtain a qualified independent testing laboratory to perform the following testing indicated for source and field quality control.
  - 1. Testing Frequency: Tests and evaluations listed in this article may be performed during construction for each 5000 sq. ft (465 m<sup>2</sup>) of wall area, or as otherwise directed by the SDR.

2. Concrete Masonry Unit Tests: For each different concrete masonry unit indicated, units will be tested for strength, absorption, and moisture content per ASTM C140.
3. Prism Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E447, Method B. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

#### 1.06 PROJECT CONDITIONS

- A. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Extend cover a minimum of 24 inches (610 mm) down both sides and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that come in contact with such masonry.
  1. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
  2. Protect sills, ledges, and projections from mortar droppings.
  3. Protect surfaces of windows and door frames, as well as similar products with painted and integral finishes from mortar droppings.
- D. Cold-Weather Construction: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent. Comply with the following when ambient temperature falls below 40° F (4.4° C).
  1. General: Remove masonry damaged by freezing conditions. Do not lay masonry units having temperature below 20° F (-6.7° C). Remove visible ice on masonry units before the unit is laid.
  2. Specific requirements for various temperature ranges are as follows:
    - a. Aggregates and mixing water shall be heated to produce mortar and grout temperatures between 40° F (4.4° C) and 120° F (48.9° C) at the time of mixing.
    - b. Maintain mortar temperature on mortar boards above freezing until used on masonry.
    - c. When ambient temperature is between 20° F (-6.7° C) and 25° F (-3.9° C), provide heat sources on both sides of walls under construction and install wind breaks when wind velocity exceeds 15 miles per hour (24 km per hour).
    - d. When ambient temperature is below 20° F (-6.7° C), provide enclosures and heat sources to maintain the temperatures above 32° F (0° C) within the enclosure.

3. Protection

- a. When mean daily temperature is between 40° F (4.4° C) and 32° F (0° C), protect completed masonry from rain or snow by covering with weather-resistive membrane for 24 hours after construction.
  - b. When mean daily temperature is between 32° F (0° C) and 25° F (-3.9° C), completely cover completed masonry with weather-resistive membrane for 24 hours after construction.
  - c. When mean daily temperature is between 25° F (-3.9° C) and 20° F (-6.7° C), completely cover completed masonry with insulating blankets or equal protection for 24 hours after construction.
  - d. When mean daily temperature is below 20° F (-6.7° C), maintain masonry temperature above 32° F (0° C) for 24 hours after construction by enclosure with supplementary heat, by electric heating blankets, by infrared heat lamps, or by other acceptable methods.
- E. Hot-Weather Construction: Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent. Protect masonry construction from direct exposure to wind and sun when erected in ambient temperature of 90° F (32° C) or greater in the shade, with a relative humidity less than 50%.
1. Do not spread mortar beds more than 4 feet (1.2 m) ahead of masonry. Set masonry units within one minute of spreading mortar. Dampen, but do not saturate masonry units immediately before installation.
  2. Mortar can be re-tempered with cool water only once to maintain consistency.
  3. Protection: When the mean daily temperature exceeds 100° F (38° C) or exceeds 90° F (32° C) with a wind velocity greater than 8 mph, fog spray all newly constructed masonry until damp, at least three times a day until the masonry is three days old.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
- B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air-dried condition.
- C. Store cementitious materials off the ground, under cover, and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided. Store different aggregates separately.
- E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.
- F. Protect reinforcement, ties, and metal accessories from permanent distortion and store them off the ground.

## PART 2 - PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
1. Size: Standard units with nominal face dimensions of 16 x 8 inches (400 x 200 mm) and nominal depth as indicated on the drawings.
  2. Special Shapes: Provide non-standard blocks configured for corners.
  3. Load-Bearing Units: ASTM C 90, normal weight.
    - a. Hollow block, as indicated.
    - b. Exposed faces: Manufacturer's standard color and texture where indicated.
  4. Non-Loadbearing Units: ASTM C 129.
    - a. Hollow block, as indicated.

### 2.03 MORTAR AND GROUT MATERIALS

- A. Masonry Cement: ASTM C 91, Type N.
  1. Colored mortar: Premixed cement as required to match Architect's color sample.
- B. Portland Cement: ASTM C 150, Type I; color as required to produce approved color sample.
  1. Not more than 0.60 percent alkali.
- C. Hydrated Lime: ASTM C 207, Type S.
- D. Mortar Aggregate: ASTM C 144.
- E. Grout Aggregate: ASTM C 404.

### 2.04 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers of Joint Reinforcement and Anchors:
  1. Dur-O-Wal: [www.dur-o-wal.com](http://www.dur-o-wal.com).
  2. Hohmann & Barnard, Inc: [www.h-b.com](http://www.h-b.com).
  3. Masonry Reinforcing Corporation of America: [www.wirebond.com](http://www.wirebond.com).
  4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Reinforcing Steel: ASTM A 615/A 615M **Grade 60 (420)** deformed billet bars; galvanized.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: Truss type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
- E. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
- F. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in (406 mm) on center and fabricated with moisture drip; ASTM A 82/A 82M steel wire, hot dip galvanized after fabrication to ASTM A 153/153M, Class B; 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm) wire; width of components as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from each masonry face.
  1. Vertical adjustment: Not less than 2 inches (50 mm).
- G. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in (32 mm) width, 0.105 in (2.7 mm) thick, lengths as required to provide not more than 1 inch (25 mm)



and not less than 1/2 inch (13 mm) of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.

- H. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.
  - 1. Concrete frame: Dovetail anchors of bent steel strap, nominal 1 inch (25 mm) width x 0.024 in (0.61 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 2. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch (6.3 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
- I. Wall Ties: Corrugated formed sheet metal, 7/8 inch (22 mm) wide by 0.05 inch (1.22 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1 inch (25 mm) of mortar coverage from masonry face.
- J. Two-Piece Wall Ties: Formed steel wire, 0.1875 inch (4.8 mm) thick, adjustable, eye and pintle type, hot dip galvanized to ASTM A 153/A 153M, Class B, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face and to allow vertical adjustment of up to 1-1/4 in (32 mm).

## 2.05 FLASHINGS

- A. Copper/Fabric Flashing: copper permanently coated and bonded between two layers of asphalt-saturated glass fabric; copper sheet to conform to ASTM B 370 (110 Alloy). Provide Hohmann & Barnard, Inc. H&B C-Fab Flashing or Approved equal.

## 2.06 ACCESSORIES

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  - 1. Manufacturers:
    - a. Dur-O-Wal; Product: Rubber Control Joint, sizes as required for specific walls
    - b. Hohmann & Barnard, Inc; Product: RS Series – Rubber Control Joint
    - c. Masonry Reinforcing Corporation of America: [www.wirebond.com](http://www.wirebond.com).
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; maximum lengths available.
  - 1. Manufacturers:
    - a. Dur-O-Wal
    - b. Hohmann & Barnard, Inc
    - c. Masonry Reinforcing Corporation of America
    - d. Substitutions: See Section 01 6000 - Product Requirements.
- C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
- D. Building Paper: ASTM D 226, Type I ("No.15") asphalt felt.
- E. Nailing Strips: Softwood lumber, preservative treated; as specified in Section 06 1000.
- F. Weeps: Polyethylene tubing.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc; Product #341 W/S: [www.h-b.com](http://www.h-b.com).
    - b. Dur-O-Wal; [www.dur-o-wal.com](http://www.dur-o-wal.com).
    - c. Masonry Reinforcing Corporation of America; [www.wirebond.com](http://www.wirebond.com).
    - d. Substitutions: See Section 01 6000 - Product Requirements.

- G. Cavity Vents: Polyester mesh.
  - 1. Manufacturers:
    - a. CavClear/Archovations, Inc: [www.cavclear.com](http://www.cavclear.com).
    - b. Mortar Net USA, Ltd; [www.mortarnet.com](http://www.mortarnet.com).
    - c. Substitutions: See Section 01 6000 - Product Requirements.
- H. Waterproofing: Provide Prime-a-Pell 200 water repellent by Chemprobe Corp. on all exterior exposed CMU or paint according to requirements in Section 09900 Painting.

## 2.07 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2-cup or 118 mL dry measure) and laundry detergent (1/2-cup or 118 mL dry measure) dissolved in one gallon (3.78 L) of water.
- B. Job-Mixed Muriatic Solution: Solution of 1 part muriatic acid and 10 parts clean water, mixed in a nonmetallic container with acid added to water.
- C. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry surfaces of type indicated below without discoloring or damaging masonry surfaces; expressly approved for intended use by manufacturer of masonry units being cleaned.
  - 1. For masonry not subject to metallic oxidation stains, use formulation consisting of a concentrated blend of surface-acting acids, chelating, and wetting agents.
  - 2. For dark colored masonry not subject to metallic oxidation stains, use formulation consisting of a liquid blend of surface-acting acids and special inhibitors.
  - 3. For masonry subject to metallic oxidation stains, use formulation consisting of a liquid blend of organic and inorganic acids and special inhibitors.
  - 4. Available Products: Subject to compliance with requirements, a product that may be used to clean unit masonry surfaces includes, but is not limited to, the following:

"Sure Klean No. 600 Detergent," ProSoCo, Inc.  
"Sure Klean No. 101 Lime Solvent," ProSoCo, Inc.  
"Sure Klean Vana Trol," ProSoCo, Inc.

## 2.08 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C 270, using the Proportion Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.
  - 3. Exterior, non-loadbearing masonry: Type N.
  - 4. Interior, loadbearing masonry: Type N.
  - 5. Interior, non-loadbearing masonry: Type O.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C 476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of ACI 530.1/ASCE 6/TMS 602 or applicable building code, whichever is more stringent.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
  - 3. Mortar Joints: Concave.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.
- K. Lay clay tile flue linings vertically, bedded in concrete block units. Extend above chimney cladding 8 inches (200 mm) . Trowel mortar smooth over chimney cladding and slope for positive drainage.

### 3.06 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.
- B. Install cavity vents in veneer and cavity walls at 32 inches (800 mm) on center horizontally below shelf angles and lintels, and near top of walls.

### 3.07 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar control panels continuously throughout full height of exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.
- D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### 3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

### 3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY

- A. Install horizontal joint reinforcement 8 inches (200 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.

### 3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).

- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches (400 mm) on center vertically and 36 inches (900 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches (400 mm) on center vertically and 24 inches (600 mm) on center horizontally. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.
- G. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.
- H. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.

### **3.11 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of openings.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches (600 mm) horizontally and 16 inches (400 mm) vertically.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.

### **3.12 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

- A. Install horizontal joint reinforcement 16 inches (400 mm) on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches (150 mm).
- E. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
- F. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches (600 mm) horizontally and 16 inches (400 mm) vertically.
- G. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches (400 mm) on center.

### **3.13 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
- B. Extend plastic, laminated, and EPDM flashings to within 1/4 inch (6 mm) of exterior face of masonry.
- C. Lap end joints of flashings at least 4 inches (100 mm) and seal watertight with mastic or elastic sealant.

### 3.14 LINTELS

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.

### 3.15 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints.
- B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

### 3.16 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.
- D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft (3 mm/m).
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

### 3.17 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000.
- B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C 67 requirements, sampling 5 randomly chosen units for each 50,000 installed.
- C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C 140 for conformance to requirements of this specification.
- D. Mortar Tests: Test each type of mortar in accordance with ASTM C 780, testing with same frequency as masonry samples.

### 3.18 CLEANING

- A. Clean soiled surfaces with cleaning solution.

### 3.19 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

## SECTION 05 12 00 – STRUCTURAL STEEL

### PART 1 GENERAL

#### 1.01 RELATED DOCUMENTS

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

#### 1.02 DESCRIPTION OF WORK:

- A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.
- B. Structural steel is that work defined in AISC “Code of Standard Practice” and as otherwise shown on drawings.

#### 1.03 RELATED WORK

- 1. Section 05 20 00 – Open Web Steel Joists
- 2. Section 05 30 00 – Metal Deck
- 3. Section 05 50 00 - Metal Fabrications

#### 1.04 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with latest provisions of the following, except as otherwise indicated:
  - 1. AISC “Code of Standard Practice for Steel Buildings and Bridges”, Latest Edition.
    - a. Exclude the word “structural” in reference to the “Design Drawings” in section 3.1 of the Code.
  - 2. AISC “Specification for Structural Steel Buildings”, including “Commentary” and Supplements issued thereto.
  - 3. AISC “*Specifications for Structural Joints using ASTM A 325 or A 490 Bolts*” approved by the Research Council on Structural Connections of the Engineering Foundation.
  - 4. AISC 341, “Seismic Provisions for Steel Buildings”.

5. AWS D1.1 - "Structural Welding Code" - Steel.
  6. AWS D1.3 - "Structural Welding Code" - Sheet Steel.
  7. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
  8. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."
1. Provide certification that welders to be employed in work have satisfactorily passed AWS D1.1 qualification tests and maintained a current certification. Current certification and/or continuity log shall be submitted and be available in the field.
  2. If re-certification of welders is required, retesting will be the Contractor's responsibility.
- C. Fabricator Qualifications: Fabricator must be a member of the American Institute of Steel Construction (AISC), be certified for SBD – Conventional Steel Building Structures, STD – Standard for Steel Building Structures. Fabricator shall be certified at time of bidding and for duration of project.

## **1.05 SUBMITTALS**

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. INCOMPLETE SUBMITTALS WILL NOT BE REVIEWED.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.



- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.
- H. Electronic Submittals:
1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
  2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
  3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
  4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
  5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.
- I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
1. Structural steel certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.
  2. High-strength bolts (each type), including nuts and washers.
  3. Structural steel primer paint (where applicable).
  4. Structural steel top coat paint (where applicable). (Refer to Section 09 90 00.)
  5. AWS D1.1 Welder certifications.

6. Expansion/Adhesive Anchors (coordinate with section 03 30 00).
- J. Fabricator's Quality Control Procedures: Fabricator shall submit their written procedural and quality control manuals, and evidence of periodic auditing of fabrication practices by an approved inspection Agency.
- K. Fabricator's Certificate of Compliance: At completion of fabrication, fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the construction documents.
- L. Shop Drawings:
  1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review.
    - a. Review of the shop drawings will be made for the size and arrangement of the members and strength of the connections. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
    - b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings indicating all members, braced frames, moment frames and connections. Incomplete submittals will not be reviewed.
  2. Connection Design: Submit design calculations prepared and stamped by a Professional Engineer registered in the State of Maine for all beam and column connections not tabulated in the AISC "Manual of Steel Construction" (ASD or LRFD). Submit design for all building braced frames and moment frames where applicable, as indicated on design drawings. Connection designs shall be submitted prior to or with the Shop Drawing Submittal.
    - a. Fabricator and Erector are responsible to provide connections that meet the requirements of AISC standards. All shop and field welds, bolts, plates and miscellaneous components required to provide complete connection assemblies shall be provided.
    - b. Unless indicated otherwise, simple shear connections shall be provided for the full uniform load capacity of the beam for non-composite construction. All connections shall have a minimum of 2 bolts rows in the line of force, and no connection capacity shall be less than 10 kips (unfactored). A tabulation of the simple shear connections shall be provided with the connection submittal.
    - c. Braced frame and Moment connections: A force has been provided on the drawings. Building is designed using R=3.0 methodology and therefore no further increases are necessary.

- d. Braced frame connections shall be designed utilizing the Uniform Force Method, with a connection geometry that does not induce a moment on the connected beam or column.
  - e. To the greatest extent possible and where required herewithin, welds shall be designed and detailed to be installed downhand.
3. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of test conducted and test results.

**1.06 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place, in ample time to not delay work.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Steel materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

**PART 2 PRODUCTS**

**2.01 MATERIALS:**

- A. Structural Steel Shapes, Plates and Bars (U.N.O): ASTM A 36 minimum, higher strength steel is acceptable.
- B. Structural Steel Hot Rolled Wide Flange Shapes: ASTM A 992 Grade 50 (ASTM A572 Grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997)
- C. Steel Tube: ASTM A 500, Grade B,  $F_y = 46$  ksi.
- D. Steel Pipe: ASTM A 53, Grade B.
- E. Anchor Bolts: ASTM F1554, Grade 36 weldable steel, unless noted otherwise on drawings. Anchor rods that are to be exposed to weather, located in unheated enclosures, or in contact with pressure treated lumber shall be hot dipped galvanized. All anchor bolts shall be headed or double nutted. "J" or "L" type anchor bolts are not permitted. Unless otherwise noted, specified embedment it to top face of head or nut.
- F. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.
- G. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:

1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325 or ASTM A490. Refer to drawings for diameter.
  2. Direct tension indicator washers or bolts may be used at Contractor's option.
- H. Electrodes for Welding:
1. Minimum 70 ksi electrodes. Filler material shall meet the grouping requirements per AWS D1.1 Table 3.1 for matching strength of connected materials.
  2. All filler metal used welding shall meet the following Charpy V-Notch (CVN) requirements.
    - a. 20 ft-lb at 0 degrees Fahrenheit unless noted otherwise.
    - b. 20 ft-lb at -20 degrees Fahrenheit and 40 ft-lb at 70 degrees Fahrenheit at all complete joint penetration (CJP) groove welds.
- I. Structural Steel Coatings shall be as specified in the Structural Steel Coatings section of this specification, and as specified in Division 9.
- J. Non Shrink Cement-Based Grout: See Section 03 30 00
- K. Drilled Anchors: Expansion and adhesive by HILTI, SIMPSON or POWERS/RAWL as indicated on the drawings.

## **2.02 FABRICATION:**

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
  2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
1. Provide field bolted connections, except where welded connections or other connections are indicated.
  2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
- C. High-Strength Bolted Connection: Install high-strength threaded fasteners in accordance with AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts". Unless otherwise indicated, all bolted connections are to be tightened to the snug tight condition as defined by AISC.

- D. Welded Construction: Comply with AWS Codes for procedures, appearance and quality of welds, and methods used in correcting welding work.
- E. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
- F. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- G. Fabricator, Erector and General Contractor shall coordinate safety requirements for the project, in accordance with OSHA Part 1926. Provide all necessary pieces and fabrications as required to safely erect and access the structure for the duration of project construction.
- H. Camber, if any, is indicated on the drawings. Camber indicated is the required camber at time of erection. Contractor shall survey camber prior to placing metal deck.

### **2.03 STRUCTURAL STEEL COATINGS**

- A. Coordinate coating requirements with the Architect, and with Division 9 of the specifications.
- B. To the greatest extent possible, structural steel coatings shall be shop applied.
- C. Galvanizing, priming and painting for structural steel permanently exposed to view shall meet the requirements of Section 10 of the Code of Standard Practice, "Architecturally Exposed Structural Steel".
- D. Follow manufacturer's installation and safety instructions when applying coatings. Adhere to recoat time recommendations set forth by manufacturer.
- E. General: Shop priming of structural steel is not required for heated, interior steel not exposed to view unless noted otherwise.
- F. Steel which is to receive spray-on fireproofing shall not to be primed or painted, unless specified by the Architect.
- G. Coatings: All exterior steel and/or steel permanently exposed to view shall receive a coating. Unless noted otherwise, refer to Division 9 specifications for products and surface preparation requirements.

- H. Unheated structural steel to be enclosed with architectural finishes, including but not by limitation, canopy members and/or roof pop-up members shall be primed with rust inhibitive alkyd primer, Tnemec Series 10 unless noted otherwise. Follow manufacturer's instructions for surface preparation and application. Substitution shall be equal to the above specified products, and shall be submitted for review.
- I. Steel Embedded in Concrete/Below Grade: Steel which is embedded in concrete, below grade/slab level, or as otherwise indicated on the drawings, shall be field painted with cold-applied asphalt emulsion complying with ASTM D 1187. Paint embedded areas only. Do not paint surfaces which are to be welded until welding is complete.
- J. Field Touch-up: Touch-up all paint and galvanizing damage, including but not by limitation, damage caused during shipping, erection, construction damage, and field welded steel. See Division 9 specifications for additional requirements.

### **PART 3 EXECUTION**

#### **3.01 ERECTION:**

- A. General: Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
- B. Erection Procedures: Comply with "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- C. Surveys: Employ a Registered Land Surveyor to verify elevations of concrete bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect and Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been approved by Structural Engineer of Record. Additional surveys required to verify out-of-alignment work and/or corrective work shall be performed at the contractor's expense.
- D. Temporary Shoring and Bracing: This is the sole responsibility of the Contractor. Provide temporary shoring and bracing members with connections of sufficient strength to support imposed loads. Remove temporary members and connections when all permanent members are in place, and all final connections are made, including the floor and roof diaphragms. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Comply with OSHA Standard referenced previous. Retain the services of a Specialty Structural Engineer (Not the Engineer of Record) to design specialty shoring and bracing.
- E. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
  - 1. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
  - 2. Welding to anchor bolts for corrective measures is strictly prohibited without prior written approval from the Engineer.

- F. Setting Plates and Base Plates:
1. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations. Refer to division 3 of the project Specifications for anchor bolt installation requirements in concrete.
  2. Clean concrete bearing surfaces of bond-reducing materials. Clean bottom surface of setting and bearing plates.
  3. Set loose and attached base plates for structural members on wedges or other adjusting devices.
  4. Pack non-shrink grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure. For proprietary grout materials, comply with manufacturer's instructions.
- G. Concrete slabs that are part of elevated floors framing systems shall achieve 28-day design strength prior to the application of any superimposed loads such as curtain walls, masonry veneer, mechanical equipment and stairs. Additional testing beyond that specified in division 3 required to verify the concrete strength prior to application of superimposed loads shall be done at the Contractor's expense.
- H. When installing expansion bolts or adhesive anchors, the contractor shall take measures to avoid drilling or cutting any existing reinforcement or damaging adjacent concrete. Holes shall be blown clean with compressed air and/or cleaned per manufacturer's recommendations prior to the installation of anchors.
- I. Field Assembly:
1. Set structural frames accurately to lines and elevations indicated.
  2. Align, adjust, level and plumb members of complete frame in to the tolerances indicated in the AISC Code of Standard Practice and in accordance with OSHA regulations.
  3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
  4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  5. Splice members only where indicated and accepted on shop drawings.
  6. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- J. Coat columns, base plates, and brace elements encased in concrete and/or below grade with cold-applied asphalt emulsion. Coordinate coating with concrete work.
- K. Erection bolts: Remove erection bolts. On exposed welded construction and at all braced frame members fill holes with plug welds and grind smooth at exposed surface.

- L. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as accepted by the Engineer of Record. Finish gas-cut sections equal to a sheared appearance when permitted.
- M. Coating Damage: Touch up shop applied paint or galvanizing whenever damaged or bare. See "Coatings" sections for additional requirements.
- N. Field Cut Beam Web Penetrations:
  - 1. Field cut beam web penetrations are not permitted without written approval from the Structural Engineer.
  - 2. Gas cutting torches are not permissible for cutting beam web penetrations without written approval from the Structural Engineer.
  - 3. Beams with field cut beam web penetrations may require reinforcement, subject to the evaluation by the Structural Engineer.
  - 4. The evaluation of field cut web penetrations by the Structural Engineers for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be compensated by the General Contractor or Design-Build Subcontractor.
  - 5. The cost of executing field cut web penetrations and the associated beam reinforcement for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be paid for by the General Contractor or Design-Build Subcontractor.
  - 6. Field cut beam web penetrations may not be permitted in certain locations, subject to the evaluation by the Structural Engineer.
- O. Welders shall have current evidence of passing and maintaining the AWS D1.1 Qualifications test available in the field.
- P. Welding electrodes, welding process, minimum preheat and interpass temperatures shall be in accordance with AISC and AWS specifications. Any structural steel damaged in welding shall be replaced.
- Q. Field Welded Moment Connections:
  - 1. Backing materials for top and bottom flanges for field welded moment connections shall be removed, backgouge the weld root, and apply a reinforcing fillet weld.
  - 2. Where top flange steel backing materials are utilized, the backing may be left in place. In this case, the backing material shall be welded with a reinforcing fillet weld.

### **3.02 QUALITY CONTROL:**

- A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.



1. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.
- B. Testing: Owner shall engage an Independent Testing Agency to inspect all high-strength bolted and welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.
1. Testing agency shall conduct tests and state in each report which specific connections were examined or tested, whether the connections comply with requirements, and specifically state any deviations therefrom.
  2. Contractor shall provide access for testing agency to places where structural steel work is being fabricated, produced or erected so that required inspection and testing can be accomplished. Testing agency may inspect structural steel at plant before shipment. The Engineer, however, reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.
- C. Inspection Requirements (to be performed by the Independent Testing Agency):
1. Bolted Connections: Inspect all bolted connections in accordance with procedures outlined in the AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts.
  2. Snug Tight Bolted Connections:
    - a. The inspector shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
    - b. If the inspector does not monitor the installation of bolts, he shall visually inspect the connection to determine that all plies of connected material have been drawn together and conduct tests on a sampling connection bolts to determine if they have been tightened to the snug tight condition. The test sample shall consist of 10% of the bolts in the connection, but not less than two bolts, selected at random. If more than 10% of the tested bolts fail the initial inspection, the engineer reserves the right to increase the number of bolts tested.
  3. Slip Critical Bolted Connections:
    - a. The inspector shall monitor the calibration of torquing equipment and the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
    - b. If the inspector does not monitor the calibration or installation procedures, he shall test all bolts in the affected connection using a manual torque wrench to assure that the required pretension has been reached.

4. Field Welded Connections: inspect and test during fabrication of structural steel assemblies, and during erection of structural steel all welded connections in accordance with procedures outline in AWS D1.1. Record types and location of defects found in work. Record work required and performed to correct deficiencies.
  - a. Certify welders and conduct inspections and tests as required. Submit welder certifications to Engineer of Record. Perform visual inspection of all welds. Primary and secondary welds, including fillet welds, full penetration welds, and deck puddle welds, applied in the field and/or shop, shall be visually inspected.
  - b. Welds deemed questionable by visual inspection shall receive non-destructive testing. In addition, all partial and full penetration welds, and any other welds indicated on the drawings are to receive non-destructive testing. Non-destructive testing methods include the following:
    1. Radiographic Inspection (RT): ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
    2. Ultrasonic Inspection (UT): ASTM E 164.
    3. Magnetic Particle (MT) inspection procedures may be utilized at the inspectors discretion in addition to RT or UT inspection. MT procedures shall not replace RT or UT procedures without permission from the Structural Engineer.
  - c. All welds deemed unacceptable shall be repaired and retested at the Contractor's expense.
- D. Testing and inspection reports shall be submitted to the Owner, Architect and Engineer within 48 hours of completion of each test or inspection.
- E. Nonconforming Work: Contractor shall be responsible for correcting deficiencies in structural steel work which inspections laboratory test reports have indicated to be not in compliance with requirements. Additional tests and/or surveys shall be performed, at the Contractor's expense, as may be necessary to show compliance of corrected work. Any costs associated with the Engineer's review and disposition of faulty works shall be borne by the Contractor.

**END OF SECTION**

**SECTION 05 20 00 – OPEN WEB STEEL JOIST**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS:**

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this section whether or not such work is specifically mentioned in this section.
- C. Coordinate work with that of all trades affecting or affected by work of this section. Cooperate with such trades to assure the steady progress of all work under the Contract.

**1.02 DESCRIPTION OF WORK:**

- A. Extent of steel joists is shown on drawings, including basic layout and type of joists required.
- B. Related work specified elsewhere:
  - 1. Section 05 12 00 - Structural Steel
  - 2. Section 05 30 00 - Metal Decking
  - 3. Section 05 50 00 - Metal Fabrications

**1.03 QUALITY ASSURANCE:**

- A. Codes and Standards:
  - 1. Steel Joist Institute (SJI) Standard Specifications, Load Tables and Weight Tables- latest revisions-for:
    - a. K-Series Open Web Steel Joists as designated on the Contract Drawings.
    - b. LH Series Open Web Long Span Steel Joists as designated on the Contract Drawings.
  - 2. Steel Joist Institute (SJI) Recommended Code of Standard Practice for Steel Joists and Joist Girders, latest revision.
  - 3. AWS D1.1 "Structural Welding Code" – Steel
  - 4. AWS D1.3 "Structural Welding Code" - Sheet Steel

5. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Qualification for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure".
  1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.
  2. If recertification of welders is required, retesting will be the Contractor's responsibility.

**1.04 SUBMITTALS:**

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. Incomplete submittals will not be reviewed.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.
- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.
- H. Electronic Submittals:
  1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.

2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
  3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
  4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
  5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.
- I. Product Data: Submit manufacturer's specifications and installation instructions for each type of joist and accessories. Include manufacturer's certification that joists comply with SJI Standard Specifications. Product data shall include:
1. Joist steel component certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.
  2. Steel joist primer paint.
  3. Welder certifications
- J. Shop Drawings:
1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review.
    - a. Review of the shop drawings will be made for the size and arrangement of the members and strength of the connections. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

- b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings indicating all joist members, bridging, connections and accessories. Incomplete submittals will not be reviewed.
2. Design
    - a. Unless noted otherwise, steel joists shall be designed to support the uniformly distributed loads per the "Standard Load Tables" by the Steel Joist Institute. An allowance for MEP equipment and architectural component loads has been included in the uniformly distributed design loads. The joist design shall allow a 150 pound concentrated hanger load be applied at any location along either the top or bottom chord of the joists that is part of the MEP equipment and architectural component allowance, without additional reinforcement.
  3. Evidence of in-plant inspections: Per SJI requirements, each manufacturer shall verify his ability to manufacturer steel joists through periodic in-plant inspections. Inspections shall be performed by an independent testing agency. Submit evidence of participation in SJI in-plant inspections program.
  4. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of test conducted and test results.

#### **1.05 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- C. Deliver, store and handle steel joists as recommended in SJI Standard Specifications and SJI Technical Digest #9 "Handling and Erection of Steel Joists and Joist Girders". Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses. Protect joist members and packaged materials from corrosion and deterioration.

#### **PART 2 PRODUCTS**

##### **2.01 MATERIALS:**

- A. Steel: Comply with SJI Standard Specifications.
- B. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel
- C. High-Strength Bolts and Nuts: ASTM A325, Type I, heavy hex structural bolts, heavy hex nuts and hardened steel washers.

- D. Steel Primer Paint: Manufacturer's standard shop paint conforming to Steel Structures Painting Council Specification: SSPC-Paint 15 "Steel Joist Shop Primer", or a shop paint which meets the minimum performance requirements of SSPC-Paint 15.

**2.02 FABRICATION:**

- A. General: Fabricate steel joists in accordance with SJI Standard Specifications.
- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; deduct area of holes from the area of chord when calculating strength of member.
- C. Openings in Web: Coordinate openings in joist and joist girder webs to allow through passage of HVAC, sprinklers, etc. in locations shown on the drawings.
- D. Extended Ends: Provide extended ends on joists where shown and where deck extends beyond supports, complying with manufacturer's standards and requirements of applicable SJI Standard Specifications and Load Tables. Unless noted otherwise, "R" type extended ends shall be utilized.
- E. Uplift: Roof joists shall be designed for a net uplift of 15 psf.
- F. Camber: Camber in accordance with SJI Standard Specifications. Joists shall not be manufactured with negative camber.
- G. Bridging:
  - 1. Provide horizontal or diagonal type bridging for "open web" joists, complying with SJI Standard Specifications and any additional requirements shown on Contract Drawings. Bridging layout shall be clearly indicated on the shop drawings.
  - 2. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
  - 3. Provide bottom chord bridging for uplift, in accordance with SJI Standard Specifications, and SJI Technical Digest #6 "Structural Design of Steel Roof Joists to Resist Uplift Loads".
- H. End Anchorage: Provide end anchorages to secure joists to adjacent construction, complying with SJI Standard Specifications, unless otherwise indicated. Roof joists shall be anchored to resist the above noted uplift force.
  - 1. Minimum final connection each side of joist seat, unless noted otherwise, shall be as follows:
    - a. "K" Joists: 2 inches, 1/8" fillet weld or (2) 1/2" diameter A307 Bolts
    - b. "LH" Joists: 2 inches, 1/4" fillet weld, or (2) 3/4" diameter A325 Bolts (slip critical)

- I. Shop Painting:
  1. Remove loose scale, heavy rust and other foreign materials from fabricated joists and accessories before application of shop paint in accordance with SSPC-SP 1 and SSPC-SP 2.
  2. Apply one shop coat of primer paint, SSPC-Paint 15, or better, to steel joists 2.0 to 3.0 mils DFT (dry film thickness) measurement in accordance with SSPC-PA 2.

### **PART 3 EXECUTION**

#### **3.01 ERECTION:**

- A. General: Place and secure steel joists in accordance with SJI Standard Specifications, final shop drawings, and as herein specified. Comply with "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Placing Joists:
  1. Do not start placement of steel joists until supporting work is in place and secured.
  2. Place joists on supporting work, adjust and align in accurate location and spacing before permanently fastening.
  3. Provide temporary bridging, connections and anchors to ensure lateral stability during construction.
- C. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at walls or beams.
- D. Fastening:
  1. Joist at column lines shall be bolted with a minimum (2) 3/4" diameter A325 bolts in a slip critical type connection. Stabilizer plates welded to the columns shall be provided at the bottom chord angles at all column lines. Do not weld bottom chord angles to stabilizer plate unless noted otherwise.
  2. Field weld joists to supporting steel framework in accordance with SJI Standard Specifications for type of joists used. Coordinate welding sequence and procedure with placing of joists.
  3. Bolt joists to supporting steel framework in accordance with SJI Standard Specifications for type of joists used.



- E. Reinforcement for Concentrated Loads: Reinforcing angles shall be applied for concentrated loads in excess of 150 pounds applied to joists. The reinforcing angles shall transfer the concentrated loads to a joist panel point. Unless noted otherwise, hung elements shall be attached to the joist top chords. Hangers and hanger accessories shall be designed by a Specialty Structural Engineer Registered in the State of Maine (Not the Engineer of Record).
- F. Touch-up painting: Clean field welds, bolted connections, and abraded areas, and apply same type of primer paint as used in shop.

**3.02 QUALITY CONTROL:**

- A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.
- B. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.
- C. Testing: Owner shall engage an Independent Testing Agency to inspect all puddle welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.
- D. Joist Inspection Requirements (to be performed by the Independent Testing Agency):
- E. Testing:
  - 1. Joist connections, bringing connections and field splices shall be tested as indicated in specification section 05120. Work found to be defective will be removed and replaced at the Contractor's expense.
  - 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests. If re-certification of welders is required, re-testing will be the Contractor's responsibility.

**END OF SECTION**

**SECTION 05 30 00 – METAL DECKING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

**1.02 DESCRIPTION OF WORK**

- A. Extent of metal floor and roof deck is shown on the drawings and includes type roof deck, cell closures, end plates, welding washers and sump plates or pans.

**1.03 RELATED WORK**

- 1. Section 05 12 00 - Structural Steel
- 2. Section 05 20 00 – Open Web Steel Joists
- 3. Section 05 50 00 - Metal Fabrications

**1.04 QUALITY STANDARDS**

- A. Codes and Standards: Comply with provisions of the following codes and standards, except where more stringent requirements are indicated or specified:
  - 1. AISI "Specification for the Design of Cold Formed Steel Structural Members".
  - 2. AWS D1.1 "Structural Welding Code" - Steel
  - 3. AWS D1.3 "Structural Welding Code" - Sheet Steel
  - 4. Steel Deck Institute (SDI) " Design Manual for Floor Decks and Roof Decks".
  - 5. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Qualification of field welding: Qualify welding process and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."

**1.05 SUBMITTALS**

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. Incomplete submittals will not be reviewed.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.
- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.
- H. Electronic Submittals:
  - 1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
  - 2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
  - 3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Adobe Acrobat Professional version 7.0 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
  - 4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.

5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.
- I. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.
- J. Shop Drawings:
  1. Shop Drawing Review: Electronic files of structural drawings **will not** be provided to the contractor for preparation of shop drawings.
    - a. Submit detailed drawings showing layout and types of deck panels, galvanizing, shop paint, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing, and all other accessories. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
    - b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings. Incomplete submittals will not be reviewed.

#### **1.06 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Store materials to permit easy access for inspection and identification. Keep deck sheets off ground, using pallets, platforms, or other supports. Protect deck sheets and packaged materials from corrosion and deterioration.
- C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL:**

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
  1. United Steel Deck

2. Wheeling Corrugating Co.
  3. Epic Metals Corporation
  4. Vulcraft
- B. Materials:
1. Steel for Metal Deck Units:
    - a. Roof Deck Units: ASTM A1008, Grade C, D, or E, or ASTM 653, Structural Quality, grade 33 or higher.
    2. Miscellaneous Steel Shapes: ASTM A36 minimum.
    3. Sheet metal Accessories: ASTM A526, commercial quality, galvanized.
  - C. Galvanizing: Conform to ASTM 924-94 with minimum coating class of G60 (Z180) as defined in ASTM A653-94.
  - D. Paint: Manufacturer's baked on, rust inhibitive paint, for application to metal surfaces which have been chemically cleaned and phosphate chemical treated.
  - E. Flexible closure Strips: Manufacturer standard vulcanized, closed-cell, synthetic rubber.

**2.02 FABRICATION:**

- A. General: Form deck units in lengths to span 3 or more supports, unless otherwise noted on the drawings, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated. For roof deck units, provide deck configurations complying with SDI "Roof Deck Specifications," of metal thickness, depth and width as shown.
- B. Metal Closure Strips: Fabricate metal closure strips, cell closures, "Z" closures, column closures, pour stops, girder fillers and openings between decking and other construction, of not less than 0.045" min. (18 gage) sheet steel or as indicated on the drawings. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking.
- C. Roof Sump Pans: Fabricate from a single piece of 0.071" min. (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to the drains, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3" wide. Recess pans not less than 1 1/2" below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.
- D. Provide all pour stops and accessories necessary to contain concrete for poured concrete surfaces.

### PART 3 EXECUTION

#### 3.01 INSTALLATION:

- A. Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before permanently fastened. Deck shall be in full contact with members parallel to ribs and attached as indicated. Do not stretch or contact side lap interlocks.
- C. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
- E. Coordinate and cooperate with the structural steel erector in locating decking bundles to prevent overloading of structural members.
- F. Do not use decking units for storage or working platforms until permanently installed.

#### 3.02 FASTENING:

- A. Roof Deck: Each deck is to be fastened with a minimum of 5/8" diameter puddle welds spaced in a 36/7 pattern with a minimum of 2 welds per unit at each support if incomplete sheet is utilized. Where support is parallel to support, at edge of building, at brace lines, at edge of opening or deck discontinuity provide puddle welds at 6" o.c. Secure deck to each supporting member in ribs where sidelaps occur. Deck units shall bear over the ends of supports by a minimum of 1.5". Sidelaps: #10 Tek screws, 6 per span for B deck.
- B. Welding: Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- C. Uplift loading: Floor deck units are not required to resist uplift loads. Decking units used at the roof level shall be designed for a net uplift of 15 psf.
- D. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.
- E. Reinforcement at openings: Provide additional metal reinforcement and closures pieces as required for strength, continuity of decking and support of other work shown.
  - 1. Deck penetrations affecting no more than (1) deck rib need not be reinforced.

2. For deck penetration affecting more than (1) deck rib, but less than 10", reinforce the opening with a 0.057" thick plate spanning between unaffected ribs, unless otherwise shown on the Design Drawings or supporting a piece of mechanical equipment (see item 3).
  3. Reinforce deck penetrations larger than 10" with the structural frame described in the Design Drawings.
- F. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.
- G. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" on center with at least 1 weld in each corner. Cut opening in roof sump bottom to accommodate drain size indicated.
- H. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking, and in voids between decking and other construction. Weld into position to provide a complete decking installation.
- I. Touch-Up Painting:
1. Painted Deck: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
    - a. Touch up painted surfaces with same type paint used on adjacent surfaces.
    - b. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

### **3.03 QUALITY CONTROL:**

- A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.
- B. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.
- C. Testing: Owner shall engage an Independent Testing Agency to inspect all puddle welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.
- D. Deck Testing Requirements (to be performed by the Independent Testing Agency):
1. Deck and accessory welding and/or attachments subject to inspection and testing. Work found to be defective will be removed and replaced at the Contractor's expense.

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2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests. If re-certification of welders is required, re-testing will be the Contractor's responsibility.

**END OF SECTION**



## SECTION 054000 - COLD-FORMED METAL FRAMING

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern, except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

#### 1.02 STRUCTURAL PERFORMANCE:

- A. Engineer, fabricate, and erect cold-formed metal framing with the following minimum physical and structural properties:
  - 1. Physical and Structural Properties: As indicated.
- B. Design framing systems to withstand design loads without deflection including wind load.
  - 1. Limit deflection as required for the condition where the building is located.
  - 2. AISI Specifications: Calculate structural characteristics of cold-formed metal framing according to AISI's Specification for the Design of Cold-Formed Steel Structural Members and the following:
    - a. Center for Cold-Formed Steel Structures (CCFSS) Technical Bulletin, Vol. 2, No. 1, February 1993 AISI Specification Provisions for Screw Connections.
- C. Submittals:
  - 1. Product data for each type of cold-formed metal framing, accessory, and product specified; material mill certificates or qualified independent testing agency test reports; welder certificates; and the following:
    - a. Shop drawings showing layout, spacing, sizes, thicknesses, and types of cold-formed metal framing, fabrication, fastening and anchorage details, including mechanical fasteners, and installation details.
    - b. Structural analysis data sealed and signed by a qualified Professional Engineer, in the State in which the project is located, who is responsible for their preparation for cold-formed metal framing indicated to comply with design loadings.
- D. Welding Standards: Comply with applicable provisions of AWS D1.1 Structural Welding Code Steel and AWS D1.3 Structural Welding Code Sheet Steel.
- E. Fire-Test-Response Characteristics:
  - 1. Fire-Resistance Ratings: As indicated by design \designations listed in UL Fire Resistance Directory, or by Warnock Hersey or another testing and inspecting agency acceptable to authorities having jurisdiction.

- F. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS:**

- A. Galvanized-Steel Sheet: ASTM A 446 (ASTM A 446M), zinc coated according to ASTM A 525 (ASTM A 525M); G 60 (Z 180); Grade C, 40,000 psi (275 MPa) minimum yield strength.
- B. Steel Studs and Track: Manufacturer's standard steel studs and tracks, of web depths indicated, complying with the following: Design Uncoated-Steel Thickness: As required for the condition. Flange Width: 1-5/8 inches (41 mm) for studs; standard flange for track.
- C. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi.
- D. Steel Shapes and Clips: ASTM A 36 (ASTM A 36M), zinc coated by the hot-dip process according to ASTM A 123.
- E. Cast-in-Place Anchor Bolts and Studs: ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); carbon-steel hex-head bolts and studs; carbon-steel nuts; and flat, unhardened-steel washers. Zinc coated by the hot-dip process according to ASTM A 153.
- F. Mechanical Fasteners: Corrosion-resistant coated, self-drilling, self-threading steel drill screws with low-profile heads beneath sheathing; manufacturer's standard elsewhere.
- G. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035, with dry film containing a minimum of 94 percent zinc dust by weight.
- H. Nonmetallic, Nonshrink Grout: ASTM C 1107.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION:**

- A. Install cold-formed metal framing and accessories plumb, square, true to line, and with connections securely fastened, according to manufacturer's recommendations and the requirements of this Section. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Install cold-formed metal framing to a maximum allowable tolerance variation from plumb, level, and true to line of 1/8 inch in 10 feet (1:960).

**END OF SECTION 054000**

## SECTION 05 5000 - METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

#### 1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 09 9000 - Painting and Coating: Paint finish.

#### 1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; American Architectural Manufacturers Association; 1998.
- B. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2002.
- C. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- D. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.
- E. ASTM A 123/A 123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2002.
- F. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2005.
- G. ASTM A 283/A 283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2003 (Reapproved 2007).
- H. ASTM A 325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2009.
- I. ASTM A 325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric); 2009.
- J. ASTM A 500/A 500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2007.
- K. ASTM B 26/B 26M - Standard Specification for Aluminum-Alloy Sand Castings; 2005.
- L. ASTM B 85 - Standard Specification for Aluminum-Alloy Die Castings; 2003.
- M. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- N. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- O. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2004.
- P. ASTM B 210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes (Metric); 2005.

- Q. ASTM B 211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire; 2003.
- R. ASTM B 211M - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire (Metric); 2003.
- S. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2008.
- T. ASTM B 221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric]; 2007.
- U. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2008.
- V. AWS D1.2/D1.2M - Structural Welding Code - Aluminum; American Welding Society; 2003, and Errata 2004.
- W. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- X. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- Y. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings; 1982 (Ed. 2004).

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A 36/A 36M.
- B. Steel Tubing: ASTM A 500, Grade B cold-formed structural tubing.
- C. Plates: ASTM A 283.
- D. Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A 653, Grade 33.
- F. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

#### 2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B 221 (ASTM B 221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B 209 (ASTM B 209M), 5052 alloy, H32 or H22 temper.

- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B 210 (ASTM B 210M), 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B 211 (ASTM B 211M), 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B 26.
- F. Aluminum-Alloy Die Castings: ASTM B 85.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

### 2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### 2.04 FABRICATED ITEMS

- A. Ladders: Steel; in compliance with ANSI A14.3; with mounting brackets and attachments; prime paint finish.
  - 1. Side Rails: 3/8 x 2 inches (9 x 50 mm) members spaced at 20 inches (500 mm).
  - 2. Rungs: one inch (25 mm) diameter solid round bar spaced 12 inches (300 mm) on center.
  - 3. Space rungs 7 inches (175 mm) from wall surface.
- B. Bumper Posts and Guard Rails: As detailed; prime paint finish.
- C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- D. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- E. Lintels: As detailed; prime paint finish.
- F. Door Frames for Overhead Door Openings, Wall Openings, and other: Channel sections; prime paint finish.
- G. Toilet Partition Suspension Members: Steel channel sections; prime paint finish.

### 2.05 FINISHES - STEEL

- A. Prime paint all steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete or masonry.
  - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A 123/A 123M requirements.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A 123/A 123M requirements.

## 2.06 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils (0.018 mm) thick.

## 2.07 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).
- C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).
- D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).
- E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

### 3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

### 3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch (6 mm).
- C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

## **SECTION 06 1000 - ROUGH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Sheathing.
- B. Roofing nailers.
- C. Preservative treated wood materials.
- D. Fire retardant treated wood materials.
- E. Concealed wood blocking, nailers, and supports.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.
- B. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- C. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.
- D. Section 07 7200 - Roof Accessories: Prefabricated roof curbs.
- E. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM D 2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2007.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Protection Association; 2007.
- D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

### **PART 2 - PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Species: Douglas Fir-Larch, unless otherwise indicated.
2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

## 2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

## 2.03 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
  1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D 2898.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Do not use treated wood in direct contact with the ground.
  2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E 84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft (4.0 kg/cu m) retention.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with roofing, flashing, or waterproofing.
    - d. Treat lumber in contact with masonry or concrete.



- e. Treat lumber less than 18 inches (450 mm) above grade.
2. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft (4.0 kg/cu m) retention.
  - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
  - b. Treat plywood in contact with roofing, flashing, or waterproofing.
  - c. Treat plywood in contact with masonry or concrete.
  - d. Treat plywood less than 18 inches (450 mm) above grade.
  - e. Treat plywood in other locations as indicated.
3. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Use Category UC4A, Commodity Specification A using waterborne preservative to 0.4 lb/cu ft (6.4 kg/cu m) retention.
  - a. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
  - b. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION**

#### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

#### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Specifically, provide the following non-structural framing and blocking:
  1. Cabinets and shelf supports.
  2. Wall brackets.
  3. Handrails.
  4. Grab bars.
  5. Towel and bath accessories.
  6. Wall-mounted door stops.
  7. Chalkboards and marker boards.
  8. Wall paneling and trim.
  9. Joints of rigid wall coverings that occur between studs.

#### **3.04 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### 3.05 TOLERANCES

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### 3.06 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01 7419.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

## SECTION 06 16 43 - GYPSUM SHEATHING

### PART 1 GENERAL

#### 1.01 SUMMARY

- A. Section Includes: Fiberglass-mat faced, moisture resistant gypsum sheathing.
- B. Related Sections:
  - 1. Section 05 40 00 Cold-Formed Metal Framing.
  - 2. Section 06 10 00 Rough Carpentry.
  - 3. Section 09 21 16 Gypsum Board Assemblies.

#### 1.02 REFERENCES

- A. ASTM International (ASTM):
  - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - 4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - 5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
  - 6. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
  - 7. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

#### 1.03 SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

#### 1.04 WARRANTY

- A. Manufacturer's Warranty:
  - 1. Five years against manufacturing defects.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Georgia-Pacific Gypsum LLC:
  - 1. Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Gold.

#### 2.02 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:
  - 1. Thickness: 5/8 inch.
  - 2. Width: 4 feet.
  - 3. Length: 8 feet.
  - 4. Weight: 1.9 pounds per square foot.

5. Edges: Square.
6. Surfacing: Coated fiberglass mat on face, back, and long edges.
7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.
8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
9. Humidified Deflection (ASTM C1177): Not more than 1/4 inch.
10. Permeance (ASTM E96): 23 perms.
11. R-Value (ASTM C518): 0.56.
12. Acceptable Products:
  - a. 5/8 inch DensGlass Gold, Georgia-Pacific Gypsum.

### **2.03 ACCESSORIES**

- A. Screws: ASTM C1002, corrosion resistant treated.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions:
  1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

### **3.02 INSTALLATION**

- A. General: In accordance with ASTM C1280 and the manufacturer's recommendations.
  1. Manufacturer's Recommendations:
    - a. Current "Product Catalog", Georgia-Pacific Gypsum.

### **3.03 PROTECTION**

- A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.

**END OF SECTION 06 16 43**

**SECTION 064020 - INTERIOR ARCHITECTURAL WOODWORK**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS:**

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern, except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

**1.02 SUMMARY:**

- A. Extent of each type of architectural woodwork is shown on drawings.
- B. Types of cabinetry including base and wall cabinets, countertops, vanities with base cabinets, counters, shelf and rod, display board and platform, and other woodwork types and related items as indicated.

**1.03 SUBMITTALS:**

- A. Product Data: Submit manufacturer's product data for each product and process specified as work of this Section and incorporated into items of architectural woodwork during fabrication, finishing, and installation.
- B. Quality Certification: Submit woodwork manufacturer's (Fabricator's) certification, stating that fabricated woodwork complies with quality grades and other requirements indicated.
- C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components and modified existing cabinetry or millwork.
- D. Samples: Submit the following samples:
  - 1. Plastic laminate, 8" x 10" for each type, color, pattern and surface finish.
  - 2. Exposed cabinet hardware, one unit of each type and finish.
  - 3. Wood Trim: 12" long mockup of each type of fabricated wood trim with transparent finish applied.
  - 4. Miscellaneous items as specified herein.

**1.04 QUALITY ASSURANCE:**

- A. Single-Source Manufacturing and Installation Responsibility: Engage a qualified Manufacturer to assume undivided responsibility for woodwork specified in this section, including fabrication, finishing, and installation.
- B. AWI Quality Standard: Comply with Applicable requirements of "Architectural Woodwork Quality Standards", 6th Edition, Version 1.1, 1994, published by the Architectural woodwork Institute (AWI), except as otherwise indicated.
- C. Coordinate any and all concealed blocking requirements with appropriate sub-contractors in a timely manner to provide any additional support blocking.

**1.05 DELIVERY, STORAGE, AND HANDLING:**

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, spoilage, and deterioration.
- B. Do not deliver woodwork until painting, wet work, grinding, and similar operations that could damage, soil, or deteriorate woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas store only in areas whose environmental conditions meet requirements specified in "Project Conditions".
- C. Environmental Conditions: Obtain and comply with Woodwork Manufacturer's and Installer's coordinated advice for optimum temperature and humidity conditions for woodwork during its storage and installation. Do not install woodwork until these conditions have been attained and stabilized so that woodwork is within plus or minus 1.0 percent of optimum moisture content from date of installation through remainder of construction period.
- D. Field Measurements: Where woodwork is indicated to be fitted to other construction, check actual dimensions of other construction by accurate field measurements before manufacturing woodwork; show recorded measurements on final shop drawings. Coordinate manufacturing schedule with construction progress to avoid delay of Work.

**PART 2 - PRODUCTS**

**2.01 HIGH PRESSURE LAMINATE MANUFACTURERS:**

- A. Manufacturer: Subject to compliance with requirements, provide high pressure decorative laminates of manufacturer, color, and texture as indicated in the "Materials and Colors Selection Appendix."

**2.02 MATERIALS:**

- A. General: Provide materials that comply with requirements of the AWI woodworking standard for each type of woodwork and quality grade indicated and, where the following products are part of woodwork, with requirements of the referenced product standards, that apply to produce characteristics indicated:
  - 1. Hardboard: ANSI/AMA A 135.4.
  - 2. High Pressure Laminate: NEMA LD 3. Low pressure where specified.
  - 3. Particle Board: ANSI A 208.1.
  - 4. Wood Trim: Clear birch.
  - 5. Framing Lumber: Select structural grade, No. 2 grade.
  - 6. Softwood Plywood: PS-1.
  - 7. 24 gage galvanized iron.
  - 8. Solid, non-porous homogeneously blend of polymers and high performance materials. Manufacturer, color, and finished as indicated on the "Materials and Colors Selection Appendix."
  - 9. Homosote Board: Thickness and type as indicated.

10. High density overlaid plywood.

### **2.03 CABINET HARDWARE AND ACCESSORY MATERIALS:**

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Finish Hardware".
- B. Hardware Standard: Comply with ANSI/BHMA A 156.9 "American National Standard for Cabinet Hardware" for items indicated by reference to BHMA numbers or referenced to this standard.
- C. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A 156.18 for BHMA code number indicated.
- D. Cabinet Hardware Schedule: Unless noted otherwise on the drawings, provide the following hardware:
  1. Provide number of hinges as recommended by manufacturer but not less than 2 for each door up to 36" and 3 for doors up to 60".
  2. Drawer and Door Pulls: Colonial wire type c. to c. spacing metal and finish as selected.
  3. Drawer Slides:
    - a. Box Drawer Slides: Accuride No. 3037 at full extension rated at 75 lb. load.
  4. Drawer and Cupboard Locks: Half mortise type, 5 pin tumbler and dead bolt, round cylinder only exposed, brass with plated finish. Provide where designated by Owner and keyed per Owner's direction.
  5. Casework Hinges: Grass 1006, 120 deg.
  6. Piano Hinges: Size as required and material as selected.
  7. Aluminum Extrusions: "Stylemark" or equal, and anodized.
  8. Touch Latch: Glynn Johnson A.A, US 26D.
  9. End Mounted Shelves: Knape and Vogt 239 clips, 255 standard, chrome finish.
  10. Bumpers: Clear plastic type.
  11. Shelf Standards and Brackets: Knape and Vogt 87-187 satin chrome.
  12. Closet Rod: Stainless steel.

### **2.04 FASTENERS AND ANCHORS:**

- A. Screws: Select material, type, size and finish required for each use. Comply with FS FF-S-111 for applicable requirements.
- B. Nails: Select material, type, size, and finish required for each use. Comply with FS FF-N-105 for applicable requirements.

- C. Anchors: Select material, type, size, and finish required by each substrate for secure anchorage. Provide nonferrous metal or hot-dip galvanized anchors, angle clips, and inserts. Provide toothed steel or lead expansion bolt devices for drilled-in plate anchors.
- D. Adhesives: As recommended by the manufacturer for type of materials to be bonded.

**2.05 FABRICATION, GENERAL:**

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for moisture content of lumber in relation to relative humidity conditions existing during time of fabrication and in installation areas.
- B. Complete fabrication, including assembly, finishing, and hardware application, before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.
- C. Factory-cut openings, to maximum extent possible, to receive hardware, plumbing fixtures, electrical work, medical equipment and similar items. Locate openings accurately and use templates or rough-in diagrams to produce accurately sized and shaped openings. Smooth edges of cutouts and, where located in countertops and similar exposures, seal edges of cutouts with water resistant coating.
- D. Fabricate millwork to dimensions, profiles and of details indicated. Return ends shall be mitered.

**2.06 LAMINATE CLAD CABINETS:**

- A. Quality Standard: Comply with AWI Section 400 and its Division 400B "Laminate Class Cabinets", flush overlay construction, Custom Grade.
- B. Provide selections made by Architect from laminate manufacturer's full range of standard colors and finishes.
- C. Laminate Grade for Exposed Surfaces: Provide laminate cladding complying with the following requirements for type of surface and NEMA grade.
  - 1. Horizontal surfaces: GP-50 (0.50 inch nominal thickness).
    - a. Vertical Surfaces: PF-30 (0.50 inch nominal thickness).
    - b. Edges: Countertop edge faced with half round oak trim.
  - 2. Semi-Exposed Surfaces and Shelves:
    - a. Horizontal: PF-30.
    - b. Vertical: PF-30.
- D. Fabricate cabinets with opening for built-in appliances, provided by others. Coordinate size and location of required openings. Line cabinet interiors, drawers, shelves and counter with plastic laminate. Fabricate vanities with backsplashes and baffles for securing plumbing as indicated.
- E. Comply with Schedule 400B-S-4 as listed in the latest edition of the AWI Quality Standards Guide Specifications, for the thickness of materials for laminate clad cabinet components.
  - 1. Refer to 400G-5 for shelf deflection guidelines for weight considerations in regard to shelf thickness.



- F. Shelving:
  - 1. Unless otherwise noted, provide plastic laminate faces adjustable shelving for various locations as noted of 3/4" thick particle board.
    - a. Wall Cabinets: Adjustable, width as indicated.
    - b. Base Cabinets: Adjustable, width as indicated.
    - c. Shelving Below Counter with Galvanized Top: Fix shelves full depth of counter.
- G. Brackets: Counter top faced with plastic laminate and mounted on the partition required brackets of type selected.

## 2.07 ARCHITECTURAL CABINET TOPS (COUNTERTOPS):

- A. Quality Standard: Comply with AWI Section 400 and its Division 400 C.
- B. Type of Top:
  - 1. High pressure plastic laminate complying with the following:
    - a. Laminate Cladding for Horizontal Surface: High pressure laminate as follows:
      - 1.) Provide selections made by Architect from manufacture's full range of standard solid colors and finishes indicated on drawings.
    - b. Grade: GP-50 (0.50 inch).
  - 2. Particle Board Thickness: 3/4" thick.
  - 3. Face edges with matching plastic laminate.
  - 4. Fabricate countertops with matching backsplashes.
  - 5. Face all tops with laminate backer sheets.
- C. Stainless Steel Counter Top and Edges:
  - 1. Countertop Base Material: Particle board 1-1/4" thick with eased edges.
  - 2. Return stainless steel edges on bottom side.

## 2.08 WINDOW STOOLS:

- A. Fabricate from particle board with all exposed surfaces faced with plastic laminate in color selected.

## PART 3 - EXECUTION

### 3.01 PREPARATION:

- A. Condition woodwork to average prevailing humidity conditions in installation areas before installing.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required.

### 3.02 Installation

- A. Quality Standard: Install woodwork to comply with AWI Section 1700 for same grade specified in Part 2 of this Section for type of woodwork involved.
- B. Install woodwork plumb, level, true, and straight with no distortions. Shim as required with concealed shims. Install to a tolerance of 1/8 inch to 8'-0" for plumb and level (including tops) and with no variations in flushness of adjoining surfaces.
- C. Scribe and cut woodwork to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Coordinate blocking for wall supported cabinets and trim mounted on the wall.
- E. Cabinets: Install without distortion so that doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items and indicated.
- F. Tops: Conceal anchor securely to base units and support brackets. Provide openings for sinks as well as Owner's equipment.
- G. Hardware: Adjust hardware for proper function.
- H. Anchor woodwork to blocking built in or directly attached to substrates, secure to blocking, grounds, or studs with countersunk concealed fasteners. Conceal fastener for a complete installation.
- I. Secure wood trim with finishing nails, set and plugged.
- J. Locate locks on cabinets where directed by Owner.

### 3.03 ADJUSTMENT AND CLEANING:

- A. Repair damaged and defective woodwork where possible to eliminate defects functionally and visually; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces. Touch up factory -applied finishes to restore damaged or soiled areas.

### 3.04 PROTECTION:

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, that ensures that woodwork is being without damage or deterioration at time of Substantial Completion.

**END OF SECTION 064020**

## **SECTION 07 2100 - THERMAL INSULATION**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Board insulation at perimeter foundation wall, underside of floor slabs.
- B. Batt insulation and vapor retarder in exterior wall construction.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Supporting construction for batt insulation.
- B. Section 06 1000 - Rough Carpentry: Supporting construction for batt insulation.
- C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2007.
- B. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2004.
- C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.
- D. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2006.
- E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- F. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2004.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

#### **1.05 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

### **PART 2 - PRODUCTS**

#### **2.01 APPLICATIONS**

- A. Insulation Under Concrete Slabs: Extruded polystyrene board.
- B. Insulation at Perimeter of Foundation: Expanded polystyrene board.
- C. Insulation in Metal Framed Walls: Batt insulation with separate vapor retarder.

## 2.02 FOAM BOARD INSULATION MATERIALS

- A. Expanded Polystyrene Board Insulation: ASTM C 578; with the following characteristics:
1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
  3. Board Size: 48 x 96 inch (1220 x 2440 mm).
  4. Board Thickness: 2 inches (50 mm).
  5. Board Edges: Square.
  6. Water Absorption: 4 percent by volume, maximum, when tested in accordance with ASTM D 2842.
  7. Board Density: 0.7 lb/cu ft (12 kg/cu m).
  8. Compressive Resistance: 5 psi (35 kPa).
  9. Thermal Conductivity (k factor) at 25 degrees F (-3.9 degrees C): 0.28 (0.48).
- B. Extruded Polystyrene Board Insulation: ASTM C 578, Type X; Extruded polystyrene board with either natural skin or cut cell surfaces; with the following characteristics:
1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
  3. Board Size: 48 x 96 inch (1220 x 2440 mm).
  4. Board Thickness: 2 inches (50 mm).
  5. Board Edges: Square.
  6. Thermal Conductivity (k factor) at 25 degrees F (-3.9 degrees C): 0.18 (0.31).
  7. Compressive Resistance: 15 psi (104 kPa).
  8. Board Density: 1.3 lb/cu ft (21 kg/cu m).
  9. Water Absorption, maximum: 0.3 percent, volume.

## 2.03 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
  2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
  3. Combustibility: Non-combustible, when tested in accordance with ASTM E 136, except for facing, if any.
  4. Facing: Aluminum foil, one side.
  5. Manufacturers:
    - a. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
    - b. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
    - c. Knauf Insulation GmbH: [www.knaufinsulation.us](http://www.knaufinsulation.us).
    - d. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  6. Substitutions: See Section 01 6000 - Product Requirements.
- C. Mineral Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E 84.
1. Where indicated, provide foil facing on one side; with flame spread index of 25 or less, when tested in accordance with ASTM E 84.
  2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E 84.
  3. Thermal Resistance: R of \_\_\_\_ (\_\_\_\_).
  4. Thickness: \_\_ inch (\_\_ mm).
  5. Manufacturers:
    - a. Thermafiber, Inc: [www.thermafiber.com](http://www.thermafiber.com).
    - b. Substitutions: See Section 01 6000 - Product Requirements.

## 2.04 ACCESSORIES

- A. Sheet Vapor Retarder: Specified in Section 07 2500.

- B. Tape: Bright aluminum self-adhering type, mesh reinforced, 2 inch (50 mm) wide.
- C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
- D. Nails or Staples: Steel wire; electroplated, or galvanized; type and size to suit application.
- E. Wire Mesh: Galvanized steel, hexagonal wire mesh.
- F. Protection Board for Below Grade Insulation: Cementitious, 1/4 inch (6 mm) thick.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

### **3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER**

- A. Install boards horizontally on foundation perimeter.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

### **3.03 BOARD INSTALLATION AT EXTERIOR WALLS**

- A. Adhere a 6 inch (150 mm) wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
  - 1. Tape seal joints between sheets.
  - 2. Extend sheet full height of joint.
- B. Install boards horizontally on walls.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Place 6 inch (150 mm) wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window and door frames. Tape seal in place to ensure continuity of vapor retarder and air seal.

### **3.04 BOARD INSTALLATION UNDER CONCRETE SLABS**

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

### **3.05 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple or nail facing flanges in place at maximum 6 inches (150 mm) on center.

- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

### **3.06 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

## SECTION 07 25 00 - WEATHER BARRIERS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Weather barrier membrane
- B. Seam Tape
- C. Flashing
- D. Fasteners

#### 1.2 REFERENCES

- A. ASTM International
  - 1. ASTM C 920; Standard Specification for Elastomeric Joint Sealants
  - 2. ASTM C 1193; Standard Guide for Use of Joint Sealants
  - 3. ASTM D 882; Test Method for Tensile Properties of Thin Plastic Sheeting
  - 4. ASTM D 1117; Standard Guide for Evaluating Non-woven Fabrics
  - 5. ASTM E 84; Test Method for Surface Burning Characteristics of Building Materials
  - 6. ASTM E 96; Test Method for Water Vapor Transmission of Materials
  - 7. ASTM E 1677; Specification for Air Retarder Material or System for Framed Building Walls
  - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
  - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- B. AATCC – American Association of Textile Chemists & Colorists
  - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test
- C. TAPPI
  - 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
  - 2. Test Method T-460; Air Resistance of Paper (Gurley Hill Method)

#### 1.3 SUBMITTALS

- A. Product Data: Submit manufacturer current technical literature for each component.
- B. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- C. Quality Assurance Submittals
  - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
  - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.

3. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

#### 1.4 QUALITY ASSURANCE

##### A. Qualifications

1. Installer shall have experience with installation of DuPont™ Tyvek® weather barrier assemblies under similar conditions.
2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Store weather barrier materials as recommended by weather barrier manufacturer.

#### 1.6 SCHEDULING

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of weather barrier materials and exterior cladding within nine months of weather barrier assembly installation.

#### 1.7 WARRANTY

##### A. Special Warranty

1. Weather barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of purchase.
2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty is required prior to assembly installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURER

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



## 2.2 MATERIALS

- A. Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® D and related assembly components.
- B. Performance Characteristics:
  - 1. Air Penetration: 0.001 cfm/ft<sup>2</sup> at 75 Pa when tested in accordance with ASTM E2178. Type 1 when tested in accordance with ASTM E 1677. ≤0.04 cfm/ft @ 75 Pa when tested in accordance with ASTM E2357.
  - 2. Water Vapor Transmission: 30 perms, when tested in accordance with ASTM E 96, Method B.
  - 3. Water Penetration Resistance: 235 cm when tested in accordance with AATCC Test Method 127.
  - 4. Basis Weight: 2.4 oz/yd<sup>2</sup>, when tested in accordance with TAPPI Test Method T-410.
  - 5. Air Infiltration Resistance: Air infiltration at >750 seconds, when tested in accordance with TAPPI Test Method T-460.
  - 6. Tensile Strength: 33/41 lbs/in., when tested in accordance with ASTM D 822 , Method A.
  - 7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84 . Flame Spread: 15, Smoke Developed: 25.

## 2.3 ACCESSORIES

- A. Seam Tape: 3" DuPont™ Tyvek® Tape as distributed by DuPont.
- B. Fasteners:
  - 1. Steel Frame Construction: DuPont™ Tyvek® Wrap Cap Screws,: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.
  - 2. Masonry Construction: Masonry tap-con fasteners with DuPont™ Tyvek® Wrap Caps: 2-inch diameter plastic cap fasteners.
- C. Sealants
  - 1. Refer to Section 07 9005 Joint Sealants.
  - 2. Provide sealants that comply with ASTM C 920, elastomeric polymer sealant to maintain watertight conditions.
  - 3. Products:
    - a. DuPont™ Commercial Sealant.
    - b. Sealants recommended by the weather barrier manufacturer.
- D. Adhesives:
  - 1. Provide adhesive recommended by weather barrier manufacturer.
  - 2. Products:
    - a. Liquid Nails® LN-109
    - b. Denso Butyl Liquid
    - c. 3M High Strength 90
    - d. Adhesives recommend by the weather barrier manufacturer.

E. Primers:

1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
2. Products:
  - a. 3M High Strength 90
  - b. Denso Butyl Spray
  - c. Permagrip 105
  - d. Primers recommended by the flashing manufacturer

F. Flashing

1. DuPont™ FlexWrap™: Flexible membrane flashing materials for window openings and penetrations.
2. DuPont™ StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
3. DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
4. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

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

### 3.2 INSTALLATION - WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.

- G. Overlap weather barrier
  - 1. Exterior corners: minimum 12 inches.
  - 2. Seams: minimum 6 inches.
- H. Weather Barrier Attachment:
  - 1. Steel Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 6 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
  - 2. Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommend fasteners, space 6-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.
- I. Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

### 3.3 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.

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

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

### 3.5 FLASHING (for use with non-flanged windows – all cladding types)

- A. Cut 7-inch wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening.
- B. Cover horizontal sill by aligning DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
- C. Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanically fastening DuPont™ FlexWrap™ NF is not required.
- D. Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start StraightFlash™ at head of opening and lap sill flashing down to the sill.
- E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
- F. Install DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

- G. Coordinate flashing with window installation.
- H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.
- I. Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

### 3.6 OPENING PREPARATION (for use with flanged windows)

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

### 3.7 FLASHING (for use with flanged windows)

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

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

### **3.8 THRU-WALL FLASHING INSTALLATION**

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

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

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

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

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

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

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

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

**3.12 FIELD QUALITY CONTROL**

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

**3.13 PROTECTION**

- A. Protect installed weather barrier from damage.

**END OF SECTION**

**SECTION 07 4200 - ALUMINUM COMPOSITE MATERIAL (ACM) PANELS**

**PART 1 - GENERAL**

**1.01 SCOPE**

- A. The extent of panel system work is indicated on the drawings.
- B. Panel system requirements include the following components: Aluminum faced composite panels with mounting system. Panel mounting system including an approved vapor permeable air and water barrier, anchorages, shims, furring, fasteners, gaskets and sealants, related flashing adapters, and masking (as required) for a complete installation.

**1.02 QUALITY ASSURANCE**

- A. Aluminum Composite Material (ACM) Manufacturer shall have a minimum of 10 years experience in the manufacturing of this product.
- B. ACM Manufacturer must be approved to participate in this program.
- C. ACM Manufacturer shall be solely responsible for panel manufacture and application of the finish.
- D. Fabricator and Installer shall be acceptable to the composite panel manufacturer.
- E. A Project Manager shall be assigned by the Fabricator/Installer to the project and provide continuous management of all submittals, engineering, shop drawings, material procurement, fabrication, jobsite coordination and installation.
- F. Project schedules shall be provided by the Fabricator/Installer at the time contract is awarded. This schedule is to be updated through-out the construction process.
- G. A jobsite Superintendent shall be assigned by the Fabricator/Installer to the project and will make jobsite visits to insure General Contractor is installing substrate and sheathing correctly. It is imperative that the substrate is plumb, level and string-line straight. Superintendent shall also verify that the substrate dimensions match the metal wall panel engineered shop drawings.
- H. Field measurements shall be taken prior to the completion of shop fabrication. Fabricator/Installer shall coordinate fabrication schedule with construction progress, as directed by the Contractor, to avoid delay of work. Field fabrication may be allowed to ensure proper fit; however, field fabrication shall be kept to an absolute minimum with the majority of the fabrication being done under controlled shop conditions.
- I. Flatness Criteria of the installed panel system: maximum of 1/4" in 20'-0" on panel in any direction.
- J. Panel fabricator/installer shall assume undivided responsibility for all components of the exterior panel system including, but not limited, to the vapor-permeable air and water barrier, attachment to sub-construction, panel to panel joinery, panel to dissimilar material joinery, and joint seal associated with the panel system.
- K. Prior to installation of panel system, the fabricator/installer shall apply an approved vapor-permeable air and water barrier over the building sheathing, as well as verify the type of sheathing to determine compatibility of panel system fasteners. It is the responsibility of the fabricator/installer to coordinate this with the General Contractor.
- L. ACM Installer is also responsible to provide a building wrap to protect the exposed substrate from the field measure visit till the panel installation day.

**1.03 RELATED SECTIONS**

Related Sections include the following:

- A. Section 05 4000 "Cold-Formed Metal Framing" for secondary support framing supporting metal wall panels.
- B. Section 07 2500 Weather Barriers
- B. Section 07 6200 "Flashings" for perimeter openings related to metal wall panels.
- C. Section 07 9005 "Sealants" for perimeter and non-exposed system sealants.

#### 1.04 SUBMITTALS

- A. SAMPLES
  - 1. Two samples of each color or finish selected, 76mm (3") x 102mm (4") minimum.
  - 2. Two samples of vapor-permeable air and water barrier
- B. SHOP DRAWINGS  
Submit shop drawings showing project layout and elevations; fastening and anchoring methods; detail and location of joints, sealants, and gaskets, including joints necessary to accommodate thermal movement; trim; flashing; and accessories.
- C. WARRANTIES—Special warranty specific to this program, see 3.04.
- D. TWO COPIES OF MANUFACTURER'S LITERATURE FOR PANEL MATERIAL.
- E. CODE COMPLIANCE  
Documents showing product compliance with the national and local building code shall be submitted prior to the bid.
- F. TEST REPORTS: Submit certified test reports which meet or exceed the requirements as described in the Testing Section 2.04. The test report shall include the following,
  - 1. Name and location of the certified independent testing laboratory with the contact phone numbers.
  - 2. Unit description and system name of the panel system tested. Include the test drawings with elevations with details showing the tested panel joinery.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect finish and edges in accordance with panel manufacturer's recommendations.
- B. Store material in accordance with panel manufacturer's recommendations.

### PART 2 - PRODUCTS

#### 2.01 PANELS

- A. COMPOSITION:  
Two sheets of aluminum, sandwiching a solid core of extruded thermoplastic material, formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

Approved Program Manufacturers – NO SUBSTITUTIONS:

Alcoa Architectural Products – Reynobond, (800-841-7774)

Mitsubishi Chemical FP America– Alpollic (800-422-7270)

- B. THICKNESS:4MM (0.157")



C. PRODUCT PERFORMANCE

1. Bond Integrity

When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following minimum values:

Peel Strength: 100 N·mm/mm (22.5 in·lb/in) as manufactured

100 N·mm/mm (22.5 in·lb/in) after 8 hours in water at 200°F (93°C)

100 N·mm/mm (22.5 in·lb/in) after 21 days soaking in water at 70°F (21°C)

D. FINISHES

1. Toyota Silver, Toyota Red and Toyota Black shall be coil coated FEVE, PVDF resin; Duragloss paint system or equivalent to provide a ten (10) year warranty as detailed in section 3.04 in this specification. Toyota Red and Black to be a 2 coat minimum system and the Toyota Silver to be a 3 coat minimum system. All Toyota Red and Black panels to be Delta E Hunter 1.0 or less when compared to the original signed standard approved by a designee of Toyota. All Toyota Silver panels to be Delta E Hunter of 2.5 or less when compared to the original signed standard approved by a designee of Toyota. Toyota Black to have a minimum of 15% gloss. All manufactured paint samples or paint system changes shall be submitted for approval and signed off by a designee of Toyota prior to manufacture.

a. Coating Thickness:

2 coat finish: .2-.4 primer, .7-.9 color, total 1.0 mil ( $\pm 0.1$  mil), 25.4  $\mu\text{m}$  ( $\pm 2.5$   $\mu\text{m}$ )

3 coat finish: .2-.4 primer, .7-.9 color, .5 clear, total 1.5 mil ( $\pm 0.15$  mil), 38.1  $\mu\text{m}$  ( $\pm 3.8$   $\mu\text{m}$ )

b. Hardness: ASTM D 3363; HB minimum using Eagle Turquoise Pencil.

c. Impact:

1) Test method: ASTM D 2794; Gardner Variable Impact Tester with 5/8" (15.9mm) mandrel.

2) Coating shall withstand reverse impact of 1.5 in·lb per mil substrate thickness (0.681 m·kg per mm substrate).

3) Coating shall adhere tightly to metal when subjected to #600 Scotch Tape pick-off test. Slight minute cracking permissible. No removal of film to substrate.

d. Adhesion:

1) Test Method: ASTM D 3359.

2) Coating shall not pick off when subjected to a grid of 11 cuts x 11 cuts, 1/16" apart, and taped with #600 Scotch Tape.

e. Humidity Resistance:

1) Test Method: Expose the sample in a controlled heat and humidity cabinet for 4000 hours at 38 degrees C (100 degrees F) and 100% RH with the cabinet operated in accordance with ASTM D 2247.

2) No formation of blisters to extent greater than "Few" blisters Size No.8 as shown in Figure 4, ASTM D 714.

f. Salt Spray Resistance:

1) Test Method: ASTM B 117; Expose coating system to 4000 hours, using 5% NaCl solution.

2) Corrosion creepage from scribe line: 1/16" max. (1.6mm).

3) Minimum blister rating of 8 within the test specimen field.

g. Weather Exposure:

1) Outdoor:

a. In accordance with the parameters of the South Florida Testing, ten-year exposure at 45° angle facing south Florida exposure.

b. Maximum color change of 5 Delta E units as calculated in accordance with ASTM D 2244.

c. Maximum chalk rating of 8 in accordance with ASTM D 4214.

## 2.02 SYSTEM DESCRIPTION

- A. Provide a Rout and Return Dry Joint panel system, as detailed on the Architect of Record's drawings. Any panel system utilizing a continuous field applied joint sealant is unacceptable. Exposed sealant in the 4-way joints is unacceptable.
- B. The panel system, as detailed, shall consist of perimeter extrusions, extruded stiffeners, fasteners and may consist of related flashings (where architectural drawings indicate they are to be furnished under this specification section), sealants between jamb panels and previously installed adjacent construction, and other miscellaneous accessories required for a complete watertight installation. Assembly shall meet the air and water infiltration requirements in section 2.04 of this specification.
- C. Commercial grade vapor-permeable air and water barrier shall be installed by the Fabricator / Installer per manufacture specification refer to Section 07 2500. All edges must be sealed to adjacent perimeter conditions for an airtight fit.

### Approved Program Manufacturers

- 1. TYVEK Commercial Wrap
- 2. VAPRO SHIELD
- 3. Or approved equal

## 2.03 COMPOSITE PANEL SYSTEM

- A. Certified Fabricator/Installers - NO SUBSTITUTIONS
  - 1. CEI Composite Materials, Jeff Henry, (734) 212-3006 [jeff.henry@ceicomposites.com](mailto:jeff.henry@ceicomposites.com)
  - 2. Innovative Building Concepts, Brent Kangas, (952) 885-0262 [brentkangas@ibcmn.com](mailto:brentkangas@ibcmn.com)
  - 3. Metal Design Systems, Inc, Sandy Birchard, (319) 362-7454  
[sandy.birchard@crmdsi.com](mailto:sandy.birchard@crmdsi.com)
  - 4. Shaffner Heaney Associates, INC, Justin Klatt, (574) 232-7470  
[JustinKlatt@shaffnerheaney.com](mailto:JustinKlatt@shaffnerheaney.com)
  - 5. Sobotec Ltd., Ulisses Nunes, (905) 578-1278 [Ulisses@Sobotec.com](mailto:Ulisses@Sobotec.com)
  - 6. For current approved certified fabricator/installers contact HGI Consulting at:  
Phone: 402-963-2761  
Fax: 402-963-2776  
Email: [sleytham@hgi-consulting.com](mailto:sleytham@hgi-consulting.com)
- B. Panel System: The panel system shall consist of ACM provided by one of the approved program vendors and a system of custom aluminum extrusions of size and shape indicated on the Architect of Record's drawings and as specified herein. The panel system shall conform to all of the following,
  - 1. Perimeter Extrusions: Mill extruded aluminum, as detailed on drawings, so as to provide the following essential features,
    - a. Rout and return the ACM panels on all perimeters. "Continuous Edge Grip" (CEG) is not acceptable.
    - b. Maximum overall panel thickness, including the attachment shim space, shall not exceed 2 1/2".
  - 2. Stiffeners: Extruded aluminum sections secured to edge trim and bonded to rear face of ACM panels with silicone, and of sufficient size and strength to maintain flatness of the panel within the specified tolerances.
  - 3. Reveals at Panel: Joint size between the faces of the perimeter extrusions shall be 3/4" nominal, painted to match adjoining panels.
  - 4. Flatness Criteria: Maximum 1/8" in 5'-0" on panel in any direction for assembled units (non-accumulative) and 1/4" in 20'-0" (accumulative).

- C. Code Performance Requirements: Work of the section shall conform to all applicable codes and regulations.
1. Thermal Design Criteria:
    - a. Make allowances for free and noiseless vertical and horizontal thermal movement due to the contraction and expansion of component parts, for an ambient temperature range from -20 degrees F to +180 degrees F. Buckling of panels, separation/opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement of component parts will not be permitted. Fabrication, assembly and erection procedure shall take into account the ambient temperature range at the time of the respective operation.
  2. Wind Loads:
    - a. Assemblies herein specified shall be designed for flexural, shear and torsional stresses for the following positive and negative wind pressures acting normal to the plane of the assemblies. Loading design shall; be based on latest applicable Building Code but in no case less than 20 pounds per square foot with 25 pounds per square foot corner pressure.
  3. Material Stress and Deflection:
    - a. Normal to the plane of the wall between structural supports, deflection of the attached perimeter-framing members shall not exceed L/175 of span length or 3/4", whichever is less.
    - b. At connection points of framing members to anchors, anchor deflection in any direction shall not exceed 1/16". Where connection points are not clearly defined, maximum anchor deflection shall not exceed 1/16".
    - c. Stresses must take into account interaction and in no case shall allowable values exceed the yield stress.
    - d. At 1.5 times design pressure, permanent deflections of framing members must not exceed L/100 of the span length, and components must not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".

## 2.04 TESTING

- A. Wall System Performance: Panel system furnished under this section shall have been tested. If comparable tests are not available, mockups shall be constructed and tests performed. In either case, an independent laboratory approved by the Architect of Record shall conduct the tests. Test results shall meet or exceed the following.
1. Air Infiltration:
    - a. When tested in accordance with ASTM E283, the air infiltration at 6.24 psf must not exceed 0.06 cfm per square foot of wall area.
  2. Static Water Infiltration:
    - a. When tested at a differential static pressure of 12.0 psf for 15 minutes, in accordance with ASTM E331, any uncontrolled water passing into the room-side beyond the interior barrier of the wall system shall not be permitted. The panel system shall be designed to provide controlled drainage to the exterior face of the wall for any leakage of water occurring at joints and/or condensation taking place within the wall system.
  3. Structural Performance:
    - a. Shall be tested in accordance with ASTM E330 at design pressure. Deflection limitations are listed previously. After initial test, test at 150% of design pressure; no permanent deformation exceeding L/100 or failure to structural members allowed.
- B. Bond Integrity Test for ACM: In accordance with ASTM D 1781-76 for bond integrity, simulating resistance to delaminating (No other test procedure is acceptable):
1. Peel strength: 22.5 in lb/in (min)

## **PART 3 - EXECUTION**

### **3.0 INSTALLERS' EXAMINATION—Fabricator/Installer**

- A. Examine substrates, areas and conditions for compliance with requirements for installation tolerances, metal wall panel supports, approved vapor-permeable air and water barrier and other conditions affecting performance of work.
  - 1. Examine solid wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
  - 2. Verify approved vapor-permeable air and water barrier is installed correctly prior to installation of ACM system.
  - 3. For the record, prepare written report, endorsed by Fabricator/Installer, listing conditions detrimental to performance of work.
- B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.01 METAL –FACED COMPOSITE WALL PANEL INSTALLATION**

- A. General: Install attachment system required to support wall panels and to provide a complete weathertight wall system, including approved vapor-permeable air and water barrier, 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. Do not begin installation until approved vapor-permeable air and water barrier and flashings that will be concealed by composite panels are installed.
  - 3. Panels shall be erected in accordance with an approved set of shop drawings.
  - 4. Anchor panels, securely per engineering recommendations and in accordance with approved shop drawings to all for necessary thermal movement and structural support.
  - 5. Conform to panel fabricator's instruction for installation of concealed fasteners.
  - 6. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members.
  - 7. Do not cut, trim, weld or braze component parts during erection in a manner which would damage the finish, decrease strength, or result in visual imperfection or a failure in performance. Return component parts which require alteration to shop for refabrication, if possible, or for replacement with new parts.

### **3.02 ACCESSORY INSTALLATION**

- A. General: 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 metal wall panel assembly including approved vapor-permeable air and water barrier, trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- B. 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 will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, bucking 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. Fabricate flashing materials from .040 minimum thickness aluminum sheet painted to match the adjacent curtain wall/panel system where exposed.
3. Expansion Provisions: provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3meters) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant or waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

### **3.03 CLEANING AND PROTECTION**

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

### **3.04 SPECIAL MANUFACTURER WARRANTY**

- A. To be provided by Manufacturer as part of the close-out documents.

**REYNOBOND ALUMINUM COMPOSITE MATERIAL 10-YEAR WARRANTY**

**Project Name and Location:** \_\_\_\_\_

\_\_\_\_\_ (“Manufacturer”), extends this special warranty (“Warranty”) to the property owner, Toyota Dealership location (the “Owner”) with corporate offices located at (actual location, city and state). The Warranty applies only to the Dealership Projects engineered, fabricated and installed by \_\_\_\_\_ (Fabricator / Installer Name). Subject to the terms and conditions set forth in this Warranty, Manufacturer warrants that the \_\_\_\_\_ Aluminum Composite Materials (“Materials”), furnished by Manufacturer for fabrication and installation in the system on the property commonly described as the Toyota Dealership (the “Property”) will not: (i) exhibit any visually observable deformation as a result of delamination of the aluminum skin from the core material due to manufacturing defects, or (ii) fail to comply with specification for manufacturing paints as set forth in Exhibit A hereto.

In addition thereto, Manufacturer warrants to Owner that the coating applied or to be applied to the aluminum Materials purchased by Owner will not chalk in excess of a numerical rating of eight (8) measured in accordance with the standard procedures as outlined by the “Standard Methods of Evaluating Degree of Chalking of Exterior Paint”, ASTM D4214-89, and that such Materials will not fade or change in color in excess of five (5) color difference units, using ASTM D2244-89. The product will not experience a loss of gloss that exceeds 40% when measured on vertical exposed surfaces that have been cleaned of external deposits and chalk and compared to the corresponding values measured on unexposed original coated surfaces. The gloss shall be measured at an angle of 60 degrees and in accordance with standard procedures as defined by ASTM D523-89.

This Warranty will remain in effect for a period of ten (10) years for Toyota Silver, Toyota Black and Toyota Red from the date the Materials are installed on the Property. In the event any part or portion of the Materials fails to conform to this Warranty, Manufacturer will be responsible for the reasonable cost of repair to like-new condition including, but not limited to, repairing the panels, or replacement, including removal and reinstallation of panels, at its sole option, of the defective part or portion of the Materials without charge to the Owner.

The remedies set forth in this Warranty shall constitute the Owner’s exclusive remedies and Manufacturer’s sole liabilities for breach of the Warranty set forth above. Manufacturer shall not be liable or responsible for any special, indirect, incidental, punitive or consequential damages in connection with the purchase or use of the Materials. Other than Manufacturer’s standard coating warranty for the Materials, if any, Manufacturer makes no other warranties as to the Materials, written or oral, express or implied, including but not limited to any warranty of merchantability or fitness for any particular purpose, and no modification or change of this Warranty shall be effective unless it is made in a written document signed by an officer of Manufacturer.

The Warranty period for any repaired or replaced Materials shall be for the remaining unexpired portion of the original Warranty period for the Materials.

As color variances may occur between replacement Materials in comparison to the originally installed Materials, due to normal weathering and aging of the originally installed Materials, the parties expressly agree that this will not be indicative of a defect in either the replacement Materials or the originally installed Materials.

This Warranty covers only the particular defects described above and only if they arise during normal use and service. It does not cover any delamination attributable to causes or occurrences beyond Manufacturer’s control, including but not limited to improper fabrication or installation of the Materials, exposures to corrosive atmospheres (such as those contaminated with acid rain, harmful chemicals or vapors), unreasonable use, misuse, physical abuse, accidental damage, vandalism, use of incompatible accessories, fire, flood, earthquake, lightning, ice, windstorms, other acts of God, wind-borne objects, building settlement, or structural failures (including walls and foundations), or the use of harmful cleaning compounds. The Owner and Manufacturer must agree to any exceptions to this Warranty in writing prior to acceptance of the Purchase Order.

This Warranty is transferable and may extend to a purchaser of the original Owner of the premises for the balance of the term of the Warranty agreement.

All notice given, pursuant to this Warranty, shall be in writing, in English, and sent by registered or certified mail, return receipt requested, postage prepaid, to:

Manufacturer: \_\_\_\_\_  
Attn: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## **SECTION 07 4213 - METAL WALL PANELS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Manufactured metal panels for walls, with related flashings, and accessory components.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing.
- B. Section 06 1000 - Rough Carpentry.
- C. Section 07 2500 - Weather Barriers.
- D. Section 07 9005 - Joint Sealers.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.

#### **1.04 DESIGN REQUIREMENTS**

- A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as calculated in accordance with local code. Design pressure of 25 lb/sq ft per ASCE 7-05.
- B. Maximum Allowable Deflection of Panel: 1/90 of span.
- C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
- D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
- E. Products: Provide continuity of thermal barrier at building enclosure elements.
- F. Provide continuity of air barrier and vapor retarder seal at building enclosure elements in conjunction with materials specified in Section 07 2500.

#### **1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate dimensions, layout, joints, construction details and methods of anchorage.
- C. Samples: Submit two samples of wall panel, 12 inch by 12 inch in size illustrating finish color, sheen, and texture.

## 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.

## 1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- C. Correct defective Work within a five year period after Substantial Completion, including defects in water tightness and integrity of seals.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Provide Manufacturer and Product that match existing metal wall panels.

### 2.02 MANUFACTURED METAL PANELS

- A. Wall Panel System: Preformed and prefinished metal panel system to match existing wall panel profile; site assembled.
- B. Exterior Panel:
  - 1. Minimum 22 gage (0.8 mm) thick precoated steel sheet.
  - 2. Profile to match existing.
  - 3. Interlocking edges, fitted with continuous gaskets.
  - 4. Color: To match existing.
- C. Metal Furring Channels:
  - 1. Profile as indicated on the drawings; to attach panel system to building.
- D. Internal and External Corners: Same material, thickness, and finish as exterior sheets; profile to suit system; shop cut and factory mitered to required angles. Mitered internal corners to be back braced with precoated sheet stock to maintain continuity of profile.
- E. Expansion Joints: Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed type, of profile to suit system.
- F. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- G. Anchors: Galvanized steel.

### 2.03 MATERIALS

- A. Precoated Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M Structural Steel (SS) or Forming Steel (FS), with G90/Z275 coating; continuous coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.



- B. Exterior Finish Coating: Panel manufacturer's standard polyvinylidene fluoride (PVF) top coat, over epoxy primer.
- C. Panel Back Coating: Panel manufacturer's standard polyester wash coat.
- D. Non-precoated Aluminum Sheet: ASTM B 209 (ASTM B 209M), 3105 alloy, O temper, smooth surface, mill finish.

#### **2.04 ACCESSORIES**

- A. Gaskets: Manufacturer's standard type suitable for use with system, permanently resilient; ultraviolet and ozone resistant.
- B. Sealants: Specified in Section 07 9005. Manufacturer's standard type suitable for use with installation of system; non-staining; color as selected.
- C. Fasteners: Manufacturer's standard type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel.
- D. Field Touch-up Paint: As recommended by panel manufacturer.
- E. Bituminous Paint: Asphalt base.

#### **2.05 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practicable lengths.
- C. Form panels for standing seams.
- D. Fabricate corners in one continuous piece with minimum 18 inch (450 mm) returns.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that building framing members are ready to receive panels.
- B. Verify that weather barrier has been installed over substrate completely and correctly.

#### **3.02 PREPARATION**

- A. Install metal furring channels (see drawings) perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated.

#### **3.03 INSTALLATION**

- A. Install panels on walls and soffits in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Locate joints over supports. Lap panel ends minimum 2 inches (50 mm).
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners unless otherwise approved by Architect.
- G. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

### **3.04 TOLERANCES**

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch (1.6 mm).
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch (6 mm).

### **3.05 CLEANING**

- A. Remove site cuttings from finish surfaces.
- B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

**END OF SECTION**

## **SECTION 07 5300 - MEMBRANE ROOFING**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. EPDM roofing membrane, adhered conventional application.
- B. Insulation.
- C. Flashings.
- D. Roofing stack boots, roofing expansion joints, and walkway pads.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Wood nailers and curbs.
- B. Section 07 6200 - Sheet Metal Flashing and Trim
- C. Section 07 7200 - Roof Accessories.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2007.
- B. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension; 2006a.
- C. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1998 (Reapproved 2005).
- D. ASTM D 624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers; 2000 (Reapproved 2007).
- E. ASTM D 746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact; 2007.
- F. ASTM D 2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005.
- G. ASTM D 4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2004.
- H. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- I. NRCA ML104 - The NRCA Roofing and Waterproofing Manual; National Roofing Contractors Association; Fifth Edition, with interim updates.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- D. Samples for Verification: Submit two samples 4x4 inches in size illustrating insulation.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

- G. Manufacturer's Field Reports: Indicate procedures followed, ambient temperatures, humidity, wind velocity during application, and supplementary instructions given.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience and approved by manufacturer.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original containers, dry, undamaged, with seals and labels intact.
- B. Store products in weather protected environment, clear of ground and moisture.
- C. Protect foam insulation from direct exposure to sunlight.

#### 1.07 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F (5 degrees C).
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

#### 1.08 WARRANTY

- A. Standard Roofing Manufacturer's Warranty: Submit a written warranty, without monetary limitation, signed by roofing manufacturer, agreeing to promptly repair leaks resulting from defects in materials and workmanship for the following warranty period.
  - 1. Warranty Period: (20) years from date of Substantial Completion.

### PART 2- PRODUCTS

#### 2.01 MANUFACTURERS

- A. EPDM Membrane Materials:
  - 1. Carlisle SynTec: [www.carlisle-syntec.com](http://www.carlisle-syntec.com).
  - 2. Firestone Building Products Co: [www.firestonebpc.com](http://www.firestonebpc.com).
  - 3. GenFlex Roofing Systems: [www.genflex.com](http://www.genflex.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Insulation:
  - 1. Atlas Roofing Corporation: [www.atlasroofing.com](http://www.atlasroofing.com).
  - 2. GAF Materials Corporation: [www.gaf.com](http://www.gaf.com).
  - 3. Dow Chemical Co: [www.dow.com](http://www.dow.com).
  - 4. Firestone Building Products Co: [www.firestonebpc.com](http://www.firestonebpc.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

- A. Membrane: Ethylene-propylene-diene-terpolymer (EPDM); non-reinforced; complying with minimum properties of ASTM D 4637.
  - 1. Thickness: .060"
  - 2. Sheet Width: factory-fabricate into largest sheets possible.
  - 3. Color: Black.
  - 4. Tensile Strength: 1305 psi (9.0 MPa), measured in accordance with ASTM D 412.
  - 5. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
  - 6. Tear Strength: 150 lbf/in (26.3 kN/m), measured in accordance with ASTM D 624.
  - 8. Water Absorption: +8, -2 percent increase in weight, maximum, measured in accordance with ASTM D 471
  - 9. Water Vapor Permeability: 2.0 perm inch, measured in accordance with ASTM E 96/E 96M.
  - 10. Brittleness Temperature: -49 deg F. (-45 deg C), measured in accordance with ASTM D 746
  - 11. Puncture Resistance: 66 min lbf, measured in accordance with ASTM E 154.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Flexible Flashing Material: Same material as membrane; conforming to the roofing manufactures specification and details:

## 2.03 INSULATION

- A. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C 1289, Type I, aluminum foil both faces; Class 1, non-reinforced foam core and with the following characteristics:
  - 1. Compressive Strength: 16 psi (110 kPa)
  - 2. Board Size: 48 x 96 inch (1220 x 2440 mm).
  - 3. Board Thickness: 1-1/2 inch (37.5 mm).
  - 4. Thermal Resistance: R-value of 20.
  - 5. Board Edges: Square.
  - 6. Manufacturers:
    - a. Atlas Roofing Corporation: [www.atlasroofing.com](http://www.atlasroofing.com).
    - b. Dow Chemical Co: [www.dow.com](http://www.dow.com).
    - c. GAF Materials Corporation: [www.gaf.com](http://www.gaf.com).
  - 7. Substitutions: See Section 01 6000 - Product Requirements.

## 2.04 ACCESSORIES

- A. Prefabricated Roofing Expansion Joint Flashing: As specified in Section 07 7200.
- B. Stack Boots: Prefabricated flexible boot and collar for pipe stacks through membrane; same material as membrane.
- C. Membrane Adhesive: As recommended by membrane manufacturer.
- D. Walkway Pads: Manufacturer Standard.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.

- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.02 MEMBRANE APPLICATION**

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches (75 mm). Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- D. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 4 inches (100 mm) onto vertical surfaces.
  - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- E. Around roof penetrations, seal flanges and flashings with flexible flashing.
- F. Install roofing expansion joints where indicated. Make joints watertight.
  - 1. Install prefabricated joint components in accordance with manufacturer's instructions.
- G. Coordinate installation of roof drains and sumps and related flashings.

**END OF SECTION**

## **SECTION 07 6200 - SHEET METAL FLASHING AND TRIM**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings, counter flashings, expansion joint cover and other items indicated in Schedule.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 06 1000 - Rough Carpentry: Wood nailers.
- B. Section 07 9005 - Joint Sealers.
- E. Section 09 9000 - Painting and Coating: Field painting.

#### **1.03 REFERENCE STANDARDS**

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- D. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007.
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples illustrating material of typical standing seam.

#### **1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of documented experience.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

### **PART 2 - PRODUCTS**

#### **2.01 SHEET MATERIALS**

- A. Pre-Finished Aluminum: ASTM B 209 (ASTM B 209M); 0.032 inch (0.8 mm) thick; plain finish shop pre coated with fluoropolymer coating of color as selected.
  - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as scheduled.
- B. Insulated Roof Expansion Joint Cover: Expand-O-Flash INS by Johns Manville or approved

equal. Expand-O-Flash INS is factory prefabricated, insulated expansion joint cover. It is formed using a standard Expand-O-Flash cover and Johns Manville Microlite "L" specialty fiber glass insulation integrally attached with a rugged, high quality vapor retarder system. It provides both thermal insulation and sound absorption (NRC = 0.75). Style EJ-INS see also drawings.

## 2.02 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Protective Backing Paint: Zinc molybdate alkyd.
- D. Sealant: Type specified in Section 07 9005.
- E. Plastic Cement: ASTM D 4586, Type I.

## 2.03 FABRICATION

- A. General Metal Fabrication: Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the above work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

## 2.04 FABRICATED UNITS:

- A. Cap Flashing: Two-piece type including part for insertion in wall, with interlocking seam for vertical leg, drip edge, and bent to spring back.
- B. Joint Covers: 6" wide matching finish profile and engaging drip edges.
- C. Cleats: Continuous, 20 gauge galvanized for use with gravel stops.
- D. Underlayment: Where metal is to be installed directly on wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- E. Splash Blocks: Precast concrete having a 5000 psi with top sloped minimum thickness 2".

## PART 3 - EXECUTION



### 3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

### 3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

### 3.03 INSTALLATION

- A. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- D. Seal metal joints watertight.

**END OF SECTION**

## **SECTION 07 7200 - ROOF ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Manufactured curbs, equipment rails, and pedestals.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 3100 - Steel Decking.
- B. Section 07 6200 - Sheet Metal Flashing and Trim: Roof accessory items fabricated from sheet metal.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used.
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store products under cover and elevated above grade.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURED CURBS**

- A. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies:
  - 1. AES Manufacturing Inc.: [www.aescurb.com](http://www.aescurb.com).
  - 2. The Pate Company: [www.patecurbs.com](http://www.patecurbs.com).
  - 3. RPS Accessories: [www.rpscurobs.com](http://www.rpscurobs.com).
- B. Manufactured Curbs, Equipment Rails, and Other Roof Mounting Assemblies: Factory-assembled hollow sheet metal construction with fully mitered and welded corners, integral counter flashing, internal reinforcing, and top side and edges formed to shed water.
  - 1. Sheet Metal: Hot-dip zinc coated steel sheet complying with ASTM A 653/A 653M, SS Grade 33 (230); G60 (Z180) coating designation; 18 gage, 0.048 inch (1.21 mm) thick.
  - 2. Roofing Cants: Provide integral sheet metal roofing cants dimensioned to begin slope at top of roofing insulation; 1:1 slope; minimum cant height 4 inches (200 mm).
  - 3. Manufacture curb bottom and mounting flanges for installation directly on roof deck, not on insulation; match slope and configuration of roof deck.
  - 4. Provide the layouts and configurations shown on the drawings.
- C. Curbs Adjacent to Roof Openings: Provide curb on all sides of opening, with top of curb horizontal for equipment mounting.
  - 1. Provide preservative treated wood nailers along top of curb.
  - 2. Insulate inside curbs with 1-1/2 inch (38 mm) thick fiberglass insulation.
  - 3. Height Above Finished Roof Surface: 6 inches (152 mm), minimum.
  - 4. Height Above Roof Deck: 14 inches (356 mm), minimum.
- D. Pipe, Duct, and Conduit Mounting Pedestals: Vertical posts, minimum 8 inches (400 mm)

square unless otherwise indicated.

1. Provide sliding channel welded along top edge with adjustable height steel bracket, manufactured to fit item supported.
2. Height Above Finished Roof Surface: 6 inches (152 mm), minimum.
3. Height Above Roof Deck: 14 inches (356 mm), minimum.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, in manner that maintains roofing weather integrity.

#### **3.04 CLEANING**

- A. Clean installed work to like-new condition.

#### **3.05 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

**SECTION 079005 - JOINT SEALANTS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS:**

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern except that all Federal, Local, and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

**1.02 SUMMARY:**

- A. This Section includes joint sealants for the following locations:
  - 1. Exterior joints in wall surfaces as indicated below:
    - a. Control joints in masonry.
    - b. Joints between aluminum and steel and masonry.
    - c. Expansion joints in sidewalks and paving.
    - d. Joints between metals, joints in custom wall panels specified elsewhere.
    - e. Other exterior joints where indicated.
  - 2. Interior joints surfaces as indicated below:
    - a. Perimeter of metal frames and masonry and gypsum wallboard.
    - b. Joints between windows and stools.
    - c. Control joints.
    - d. Between steel and masonry.
    - e. Other joints as indicated.
    - f. Joints in tile work.
  - 3. Interior joints in horizontal traffic surfaces as indicated below:
    - a. Joints in cast-in-place concrete slabs.
    - b. Joints in tile work.
    - c. Other joints as indicated.

**1.03 SYSTEM PERFORMANCE REQUIREMENTS:**

- A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

**1.04 SUBMITTALS:**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
  - 1. Product data from manufacturers for each joint sealant product required.
  - 2. Certification by joint sealant manufacturer that sealants plus the primers and

cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

3. Samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of colors available, for each product exposed to view.
4. Certificates from manufacturers of joint sealant attesting that their products comply with specification requirements and are suitable for the use indicated.
5. Product test reports for each type of joint sealants indicated, evidencing compliance with requirements specified.
6. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

**1.05 QUALITY ASSURANCE:**

- A. Installer Qualifications: Engage an experienced installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single manufacturer for each different product required.
- C. Preconstruction Joint Sealant-Substrate Tests: Submit substrate materials representative of actual joint surfaces to joint sealant manufacturer for laboratory testing of joint sealants for adhesion to primed and unprimed substrates and for compatibility with joint substrates and other joint-related materials.

**1.06 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 period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

**1.07 PRODUCT CONDITIONS:**

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions.
- B. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 degrees F. (4.4 degrees C).
- C. When joint substrates are wet.
- D. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than allowed by joint sealant manufacturer for application indicated.
- E. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

**PART 2 - PRODUCTS**

**2.01 MATERIALS, GENERAL:**

A. Latex Joint Sealants:

1. Acrylic-Emulsion Sealant: Manufacturer's standard one part, non-sag, mildew-resistant, acrylic-emulsion sealant complying with ASTM C 834, formulated to be paintable and recommended for exposed applications on interior.
2. Products: Subject to compliance with requirements, provide one of the following:
  - a. AC-20; Pecora Corporation.
  - b. Sonolac; Sonneborn Building Products Division.
  - c. Tremco Acrylic Latex 834, Tremco Inc.
3. Use for exposed interior wall joints.

B. Elastomeric Sealants:

1. Silicone Sealant:
  - a. One part silicone sealant complying with ASTM C 290, Type S, Grade NS, Class 25. Use M, G, A, O.
  - b. Subject to compliance with requirements, provide one of the following:
    - 1.) Dow Corning 790.
    - 2.) General Electric Ultraglaze 4200.
  - c. Use for joints between aluminum and masonry and metal.
2. Low modulus high performance polyurethane sealant:
  - a. Uses NT, M, G, O.
  - b. Provide subject to compliance with the requirements:
    - 1.) Sonolastic SL2; Sonneborn Building Products Division.
    - 2.) Dynatrol II; Pecora Corporation.
    - 3.) Permapol II; Products Research & Chemical Corporation.
    - 4.) Dymeric; Tremco, Inc.
  - c. Use for joints between masonry and masonry, and masonry and steel.
3. Multi-Part Non-Sag Urethane Sealant for Use T: Type M, Grade NS< Class 25; Uses T, M, G, A, and, as applicable to joint substrates indicated, O.
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1.) Vulken 922; Mameco Corporation.
    - 2.) Dynatred, Pecora Corporation.
    - 3.) Permapol RC-270; Products Research & Chemical Corporation.
    - 4.) Silkaflex 2C NS; Sika Corporation.
    - 5.) Sonolastic NP2; Sonneborn Building Products Division.

- b. User for flooring joints subject to traffic.
- 4. One part silicone sealant for use around non porous surfaces in toilets where high humidity and temperature conditions exist: Type S, Grade NS, Class 25, Use NT, G, A, O.
  - a. Products: Subject to compliance with requirements provide one of the following:
    - 1.) 786 Mildew Resistant Silicone Sealant; Dow Corning.
    - 2.) Sanitary 1700; GE Silicones.
  - b. Use for joints in tile work, toilet fixtures, and tile or masonry.

## 2.02 JOINT SEALANT BACKING:

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Plastic Foam Joint Fillers: Preformed, compressible, resilient, nonstaining, non-waxing,, non-extruding strips of flexible plastic foam of material indicated below and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Proprietary, reticulated, closed-cell polymeric foam, non-outgassing, with a density of 2.5 pcf and tensile strength of 35 psi per ASTM D 1623, and with water absorption less than 0.02 gms/cc per ASTM C 1083.
- D. Elastomeric Tubing Joint Fillers: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to 26 degrees F (-32 degrees C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.
- E. Bond-Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## 2.03 MISCELLANEOUS MATERIALS:

- A. Primer: Material recommended by joint sealant manufacture 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 in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.01 EXAMINATION:

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation and other tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.
- B. Latex Sealant Installation Standard: Comply with requirements of ASTM C 90 for use of latex sealants.
- C. Install joint fillers of type indicated to provide support of sealants during application and at position required to produce the 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 joint fillers.
  - 2. Do not stretch, twist, puncture, or tear joint fillers.
  - 3. Install bond breaker tape between sealants where backer rods are not used between sealants and joint fillers or back of joints.
  - 4. Install precompressed joint seal with face in line with face of masonry and installed in accordance with manufacturer's written instructions.
- D. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.
- E. Tooling of Non-Sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealant or adjacent surfaces or are not approved by sealant manufacturer.
  - 1. Provide recessed joint configuration, per Figure 5C in ASTM C 962, of recess depth and at locations indicated.

### 3.02 PREPARATION:

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealant to comply with recommendations of joint sealant manufacturer 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 masonry and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or



blowing out joints with oil-free compressed air.

3. Remove laitance and form release agents from concrete.
- B. Joint Priming: Prime joint substrates where indicated or where recommended by joint sealant manufacture based on preconstruction joint sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacture's recommendations. 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 with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealants smears. Remove tape immediately after tooling without disturbing joint seal.

### **3.03 INSTALLATION OF JOINT SEALANTS:**

- A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Elastomeric Sealant Installation Standard: Comply with recommendations of ASTM C 962 for use of joint sealant as applicable to materials, applications, and conditions indicated.

### **3.04 CLEANING:**

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

### **3.05 PROTECTION:**

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

**END OF SECTION 07901**

## **SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Non-fire-rated steel doors and frames.
- B. Thermally insulated steel doors.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.
- B. Section 08 8000 - Glazing: Glass for doors and borrowed lights.
- C. Section 09 9000 - Painting and Coating: Field painting.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.
- C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).
- D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- E. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.
- F. ASTM E 413 - Classification for Rating Sound Insulation; 2004.
- G. ASTM E 1408 - Standard Test Method for Laboratory Measurement of the Sound Transmission Loss of Door Panels and Door Systems; 1991 (Reapproved 2000).
- H. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- I. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- J. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association; 2007.
- K. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; 1998.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Maintain at the project site a copy of all reference standards dealing with installation.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Steel Doors and Frames:
  - 1. Assa Abloy Ceco, Curries, or Fleming: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Steelcraft; [www.steelcraft.com](http://www.steelcraft.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
  - 1. Accessibility: Comply with ANSI/ICC A117.1.
  - 2. Door Top Closures: Flush with top of faces and edges.
  - 3. Door Edge Profile: Beveled on both edges.
  - 4. Door Texture: Smooth faces.
  - 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
  - 6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
  - 7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
  - 8. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### 2.03 STEEL DOORS

- A. Exterior Doors, Insulated:
  - 1. Grade: ANSI A250.8 Level 3, physical performance Level A, Model 2, seamless.
  - 2. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
- B. Interior Doors, Non-Fire-Rated:
  - 1. Grade: ANSI A250.8 Level 1, physical performance Level C, Model 1, full flush.
  - 2. Thickness: 1-3/4 inches (44 mm).
- C. Interior Doors, Fire-Rated:
  - 1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 1, full flush.
  - 2. Fire Rating: As indicated on Door and Frame Schedule, tested in accordance with UL 10C ("positive pressure").
    - a. Provide units listed and labeled by UL.
    - b. Attach fire rating label to each fire rated unit.

- D. Interior Doors, Sound-Rated:
  - 1. Grade: ANSI A250.8 Level 2, physical performance Level B, Model 2, seamless.
  - 2. STC Rating of Assembled Door, Frame, and Seals: 35, calculated in accordance with ASTM E 413, tested in accordance with ASTM E 90 or ASTM E 1408.
  - 3. Sound Seals: Integral, concealed in door or frame.

## 2.04 STEEL FRAMES

- A. General:
  - 1. Comply with the requirements of grade specified for corresponding door, except:
    - a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
    - b. Frames for Sound-Rated Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
  - 2. Finish: Same as for door.
- B. Exterior Door Frames: Face welded, seamless with joints filled.
  - 1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653/A 653M, with manufacturer's standard coating thickness.
  - 2. Weather stripping: Separate, see Section 08 7100.
- C. Interior Door Frames, Non-Fire-Rated: Knock-down type.
- D. Interior Door Frames, Fire-Rated: Knock-down type.
  - 1. Fire Rating: Same as door, labeled.
- E. Sound-Rated Door Frames: Knock-down type.
- F. Frames for Interior Glazing or Borrowed Lights: Construction and face dimensions to match door frames, and as indicated on drawings.

## 2.05 ACCESSORY MATERIALS

- A. Glazing: As specified in Section 08 8000, factory installed.
- B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

## 2.06 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

### 3.02 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Coordinate installation of hardware.
- E. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

### **3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.
- B. Adjust sound control doors so that seals are fully engaged when door is closed.

**END OF SECTION**

## SECTION 083050 - ACCESS DOORS

### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS:

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern except that all Federal, Local, and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

#### 1.02 SUMMARY:

- A. The extent of access doors is included on the drawings.

#### 1.03 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions, and directions for installation of anchorage devices.
- B. Shop Drawings: Submit shop drawings for fabrication and installation of access doors and frames, including details of frame, elevations of door design, anchorage, and accessory items.

#### 1.04 QUALITY ASSURANCE:

- A. Coordination: Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.
- B. The exterior access doors and frames must meet State of Florida wind load and windborne debris requirements stated in Structural Drawings.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS:

- A. Subject to compliance with requirements provide access doors by one of the following:
  - 1. Karp Associates, Inc.
  - 2. J. L. Industries.
  - 3. Approved Equal

#### 2.02 MATERIALS AND FABRICATIONS:

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
  - 1. Model and Manufacturer: As required for locations as indicated on drawings and size 24" x 24", and to meet the design pressures as indicated on the drawings.
- B. Frame: 14 gauge steel, galvanized at exterior locations.

- C. Door: 16 gauge with 1" flange, galvanized at exterior locations.
- D. Hinge: Concealed.
- E. Lock: Cylinder.
- F. Finish: Prime coat of rust inhibitive primer.

**PART 3 - EXECUTION**

**3.01 INSTALLATION:**

- A. Comply with manufacturer's instructions for installation of access doors.
- B. Coordinate installation with work of other trades.

**3.02 ADJUST AND CLEAN:**

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

**END OF SECTION 083050**

## **SECTION 083613 - SECTIONAL OVERHEAD DOORS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Overhead sectional doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 5000 - Metal Fabrications: Steel channel opening frame.
- B. Section 06 1000 - Rough Carpentry: Rough wood framing for door opening.
- C. Section 07 9005 - Joint Sealers: Perimeter sealant and backup materials.
- D. Section 08 7100 - Door Hardware: Lock cylinders.
- E. Section 08 8000 - Glazing: Glazing for door lights.
- F. Section 09 9000 - Painting and Coating: Finish painting.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- B. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2002.
- C. DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; Door & Access Systems Manufacturers' Association, International; 2004.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2008.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Samples: Submit two panel finish samples, 6x6 inch in size, illustrating color and finish.
- E. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.
- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.



**1.05 QUALITY ASSURANCE:**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum (3) years of experience.
- C. Conform to applicable code for motor and motor control requirements.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified.

**1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for electric motor and transmission.
- D. Provide five year manufacturer warranty for all materials and labor.

**PART 2 - PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS:**

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Clopay Overhead Door Company.
  - 3. Fimble Door Corporation.
  - 4. Wayne/Dalton Corporation

**2.02 STEEL SECTIONS:**

- A. Steel Doors: Flush steel, insulated; high lift operating style with track and hardware; complying with DASMA 102, Commercial application.
  - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E 330, using 10 second duration of maximum load.
  - 2. Door Nominal Thickness: 2 inches (50 mm) thick.
  - 3. Exterior Finish: Prime paint for finish specified in Section 09 9000.
  - 4. Interior Finish: Prime paint for finish specified in Section 09 9000.
  - 5. Glazed Lights: Full panel width, one row; set in place with resilient glazing channel.
- B. Door Panels: Flush steel construction; outer steel sheet of 0.058 inch (1.5 mm) thick, flat profile; inner steel sheet of 0.058 inch (1.5 mm) thick, flat profile; core reinforcement and sheet steel roll formed to channel shape, rabbeted weather joints at meeting rails; insulated.
- C. Reinforce sections with continuous horizontal and diagonal reinforcing, as required by door width and design wind loading. Provide galvanized steel bars, struts, trusses or strip steel, formed to depth, and bolted or welded in place.
- D. Insulate inner core of steel sections with manufacturer's standard polyurethane-foam type insulation. Enclose insulation with manufacturer's standard steel sheet secured to door panel.

- E. Finish Door Sections as Follows: Apply manufacturer's standard prime coat, applied to both door faces after forming.

### 2.03 VISION PANELS:

- A. Provide clear acrylic vision panels in arrangement shown for steel doors and throughout in aluminum doors. Set glass in rubber and neoprene channel glazing strips for metal framed doors. Provide removable stops of same material at door section frames.

### 2.04 TRACKS, SUPPORTS, AND ACCESSORIES:

- A. Tracks: Provide manufacturer's standard, galvanized-steel track system, sized for door size and weight, and designed for clearances shown. Provide high-lift track for maximum head room designated and vertical lift doors for vertical operation where designated. Provide complete track assembly including brackets, bracing and reinforcing for rigid support of all-bearing roller guides for required door type and size. Slope tracks at proper angle from vertical, or otherwise design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.

1. **Provide 3" tracks with continuous galvanized angle at all doors, regardless of size.**

- B. Track Reinforcement and Supports: Provide galvanized-steel track reinforcement and support members. Secure, reinforce and support tracks as required for size and weight of door to provide strength and rigidity without sag, sway, and vibration during opening and closing of doors. Support and attach tracks to opening jambs with continuous angle welded to tracks and attached to wall. Support horizontal (ceiling tracks) with continuous angle welded to track and supported by laterally braced attachments to overhead structural members at curve and end of tracks.

- C. Weather Seals: Provide continuous rubber, neoprene, or flexible vinyl adjustable weatherstrip gasket at tops and compressible astragal on bottoms of each overhead door. In addition, provide continuous flexible seals at door jamb edges for a fully weathertight installation.

- D. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

### 2.05 HARDWARE:

- A. General: Provide heavy-duty, rust-resistant hardware, with galvanized or cadmium-plated or stainless steel fasteners, to suit type of door.

- B. Hinges: Provide heavy steel hinges at each end stile and at each intermediate stile, per manufacturer's recommendations for size of door. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washer and nuts. Use rivets or self-taping fasteners where access to nuts is not possible. Provide double-end hinges, where required, for doors exceeding 16 feet in width, unless otherwise recommended by door manufacturer.

- C. Rollers: Provide heavy-duty rollers, with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide case hardened steel roller tires to suite size of track (3 inch diameter for 3 inch track; 2 inch diameter for 2 inch track).

- D. Pull Handles, Locks, and Latches: For manually operated doors, furnish lifting handles, locks, and locking devices as follows:
- E. Lifting Handles: Galvanized steel.
- F. Locking Bars: Single side, operable from inside only.
- G. Fabricate locking devices assembly with mortise lock, spring-loaded dad bolt, chromium-plated operating handle, cam plate, and adjustable locking bar to engage through slots in tracks. Lock cylinder is specified in another Division 8 Section.

#### **2.06 COUNTERBALANCING MECHANISM:**

- A. Counterbalance shall be oil tempered, helical wound, torsion springs mounted on a cross header shaft. Springs shall be engineered for industrial application and shall comply with durability properties specified under National Association of Door Manufacturers Specifications 101-1975.
- B. Torsion Spring: Operation by torsion-spring counterbalance mechanism, consisting of adjustable-tension, temperate-steel torsion springs mounted on a cross header tube or steel shaft. Connected to door with galvanized aircraft-type lift cables. **Provide springs calibrated for 100,000 cycles minimum.**
- C. Provide cast-aluminum or grey-iron casting cable drums, grooved to receive cable. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of shaft. Provide one additional midpoint bracket for shafts up to 16 feet long and two additional brackets at one-third points to support shafts over 16 feet long, unless closer spacing recommended by door manufacturer.
- D. Include a spring-loaded, steel or bronze cam mounted to bottom door roller assembly on each side, designed to automatically stop door if either cable breaks.
- E. Provide a spring bumper at each horizontal track to cushion door at end of opening operation.

#### **2.07 MANUAL DOOR OPERATION:**

- A. Push-UP: Provide lift handles and pull rope for vertical operating doors, for raising and lowering doors, operating wit not more than 25 lb. lift or pull.
- B. Reduction-Drive Chain Hoist: Side-mounted unit consisting of an endless steel hand chain, chain pocket wheel with at least 3:1 reduction unit, roller chain-and-sprocket drive, end-mounted on counterbalance shaft. Operate with not more than 35 lb. pull.

#### **2.08 ELECTRIC DOOR OPERATORS:**

- A. General: Furnish electric door-operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory-prewired motor controls, gear-reduction unit, solenoid-operated brake, clutch, remote-control stations and control devices.
- B. Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation. Include interlock device to automatically prevent motor from operating when emergency sprocket is engaged.

- C. Design operator so that motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.
- D. Door Operator Type: Provide the following:
  - 1. Electric Motors: Provide high-starting torque, reversible, constant-duty, Class A-insulated electric motors with overhead protection, sized to move door in either direction, from any position, at not less than 2/3 foot or more than 1 foot per second.
    - a. Jackshaft type, with clutch-disconnect release for manual operation, V-belt and roller chain drive connected to counterbalance shaft.
    - b. Coordinate wiring requirements and current characteristics of motors with building electrical system.
  - 2. Provide interior units type with reversing starts and heavy duty transformers for low voltage accessory capabilities. Belt reduced and heavy duty roller chain drive, rotary type driven limit switches, quick disconnect and full guard Nema Type I three-button station included.
- E. Control Station: Provide momentary-contact, three-button control station with push button controls labeled "Open", "Close", and "Stop". Locate locations as directed. Provide wiring connecting control station and door operator.
- F. Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch will immediately reverse downward door travel. Furnish manufacturer's standard take-up reel or self-coiling cable.
  - 1. Provide electrically actuated automatic bottom bar.
  - 2. Operate the door in response to control devices.
- G. Radio Controls: Provide wireless commercial controls, wall mounted 3-button transmitter: OPEN, CLOSE, STOP (see drawings) and Economy Receiver – 24VAC for doors as indicated on the drawings. Provide "Detroit Door & Hardware" Pulsar Commercial (318 Mhz) model 639 T and 831 RE or approved equal.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts hangers, and equipment supports according to shop drawings, manufacturer's instructions, and as specified.
- B. Fasten vertical track assembly to framing at not less than 24 inches o.c. Hang horizontal track from structural overhead framing with angle or channel hangers, welded and bolt-fastened in place. Provide sway bracing, diagonal bracing, and reinforcing as required for rigid installation of track and door-operating equipment.
- C. After completing installation, including work by other trades, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

**3.02 TOLERANCES**

- A. Maximum Variation from Plumb: 1/16 inch (1.5 mm).
- B. Maximum Variation from Level: 1/16 inch (1.5 mm).
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch (3 mm) from 10 ft (3 m) straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

**3.03 ADJUSTING**

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

**END OF SECTION 08360**

## **SECTION 083615 – VINYL ROLLING DOORS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Vinyl rolling doors, electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 5000 - Metal Fabrications: Steel channel opening frame.
- B. Section 06 1000 - Rough Carpentry: Rough wood framing for door opening.

#### **1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Samples: Submit two panel finish samples, 6x6 inch in size, illustrating color and finish.
- E. Manufacturer's Installation Instructions: Include any special procedures required by project conditions.
- F. Operation Data: Include normal operation, troubleshooting, and adjusting.
- G. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.05 QUALITY ASSURANCE:**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer: Company specializing in performing the work of this section with minimum (3) years of experience.
- C. Conform to applicable code for motor and motor control requirements.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified.

#### **1.06 WARRANTY**

- A. See Section 01 7800 - Closeout Submittals for warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for electric motor and transmission.
- D. Provide five year manufacturer warranty for all materials and labor.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  - 1. Rytec Corporation  
One Cedar Parkway  
Jackson, WI 53037-0403  
[www.rytecddoors.com](http://www.rytecddoors.com)

### 2.02 DOOR:

- A. Model: Rytec Clear-Shield
- B. Size: Standard Size 12 feet wide by 12 feet high.
- C. Door Panel: UV-protected, reinforced, wear-resistant PVC fabric. Provide (5) full-width vision panels.  
Solid Panels: Color to be selected by Architect.
- D. Side Frames: Reinforced composite, non-corrosive, pultruded fiberglass with electric photo eye.
- E. Bottom Bar: Soft, padded Break-Away bottom bar with self-repairing capability.
- F. Drive System: ¾ hp three-phase single speed unit with direct drive through integral gear box.
- G. Travel Speed: Open and Close at 32 inches per second.
- H. Electrical Controls: Integrated, door control logic.
- I. One set thru beam photo eyes – field installed.

## PART 3 - EXECUTION

### 3.01 INSTALLATION:

- A. General: Install door, track, and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts hangers, and equipment supports according to shop drawings, manufacturer's instructions, and as specified.
- B. After completing installation, including work by other trades, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

### 3.02 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch (1.5 mm).
- B. Maximum Variation from Level: 1/16 inch (1.5 mm).
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch (3 mm) from 10 ft (3 m) straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

**3.03 ADJUSTING**

- A. Adjust door assembly for smooth operation and full contact with weather-stripping.
- B. Have manufacturer's field representative present to confirm proper operation and identify adjustments to door assembly for specified operation.

**END OF SECTION 08360**



**SECTION 084110 – NANA WALL DOOR SYSTEM**

**PART 1 - GENERAL**

**1.01 SUMMARY:**

- A. Section Includes: Engineered sliding/folding aluminum and glass door system, including aluminum frame, threshold, panels, sliding/folding and locking hardware, weather stripping, glass and glazing; designed to provide an opening glass wall, with sizes and configurations as shown on drawings and specified herein, NanaWall SL70, Thermally Broken Aluminum Framed Folding System as supplied by NANA WALL SYSTEMS, INC. Prep door for panic hardware where applicable.

**1.02 REFERENCES:**

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611.98, Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603.02, Voluntary Specifications, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 1304, Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
- B. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1, Safety Performance Specifications and Methods of Test for Safety Glazing Material Used In Buildings.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM E 283, Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
  - 2. ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- D. ASTM E 547, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.4. ASTM E 331, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- E. Consumer Product Safety Commission (CPSC):
  - 1. CPSC 16CFR-1201, Safety Standard for Architectural Glazing Materials.
- F. National Fenestration Rating Council (NFRC):
  - 1. NFRC 100, Procedure for Determining Fenestration Product Thermal Materials.
  - 2. NFRC 200, Procedure for Determining Solar Heat Gain Coefficient.

**1.03 SUBMITTALS:**

- A. Detail Drawings: Indicate dimensioning, direction of swing, configuration, swing panels, typical head jamb, side jambs and sill details, type of glazing material, and handle height.
- B. Product Data: Manufacturer's literature including independently tested data listing performance criteria and Owner's Manual with installation instructions.

- C. Contract Closeout Submittal: Submit Owner's Manual from manufacturer. Identify with project name, location and completion date, type and size of unit installed.

**1.04 QUALITY ASSURANCE:**

- A. Manufacturer: Provide complete, precision built, engineered, pre-fitted unit by a single source manufacturer with at least 15 years experience in providing folding/sliding door systems for large openings in the North American market.
- B. Performance Requirements: Unit to comply with applicable manufacturer's independently certified testing results. Testing results include air infiltration in accordance with ASTM E 283, water penetration in accordance with ASTM E 547 and E 331, structural loading in accordance with ASTM E 330, and forced entry in accordance with AAMA 1304.
- C. Thermal Performance: Unit to comply with the U value, rated, certified and labeled or simulated in accordance with NFRC 100, shown in manufacturer's latest published data for the glazing and sill specified.
- D. Solar Heat Gain Coefficient: Unit to comply with the solar heat gain coefficient, simulated in accordance with NFRC 200, shown in manufacturer's latest published data for the glazing specified.
- E. Installer Qualifications: Installer shall be manufacturer's certified trained installer and experienced in the installation of manufacturer's products or other similar products for large openings. Installer to provide reference list of at least 3 projects of similar scale and complexity successfully completed in the last 3 years. Provide project names, locations, completion dates, names and telephone numbers of General Contractor and Owner's contact person.

**1.05 WARRANTY:**

- A. Provide manufacturer's standard warranty against defects in materials and workmanship.
- B. Warranty Period: Ten years for rollers and for seal failure of insulated glass supplied. For all other components, two year from date of delivery by manufacturer.

**1.06 SITE CONDITIONS, DELIVERY, STORAGE AND HANDLING:**

- A. In addition to general delivery, storage and handling requirements specified in Section 01600, comply with the following:
  - 1. Deliver materials to job site in sealed, unopened cartons or crates. Protect units from damage. Store material under cover, protected from weather and construction activities.

**PART 2 - PRODUCTS**

**2.01 SUPPLIER:**

<p>A. NANA WALL SYSTEMS, INC. 707 Redwood Hwy, Mill Valley, California 94941 Toll Free: (800) 873-5673 Telephone: (415) 383-3148 Fax: (415) 383-0132 Website: <a href="http://www.nanawall.com">www.nanawall.com</a> Email: <a href="mailto:info@nanawallsystems.com">info@nanawallsystems.com</a></p>	<p>Manufactures Representative The Eisen Group Andy Cook Telephone: 248-545-5609 570 E Nine Mile Road Ferndale, Mi 48220 Email: <a href="mailto:acook@eisengroup.com">acook@eisengroup.com</a></p>
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## 2.02 MATERIALS:

- A. Frame and Panels: From manufacturer's standard profiles, provide head jamb, side jambs, and panels with dimensions shown on drawings.
1. Provide panels with standard one lite
  2. Provide manufactures standard kick plate with height specified on drawings.
  3. Aluminum Extrusion: Extrusions with nominal thickness of .078" (2.0 mm). Alloy specified as AlMgSi0.5 with strength rated as 6063-T5 or F-22 (European standard). Anodized conforming to AAMA 611.98 or powder coated conforming to AAMA 2603.02.
  4. Thermally broken with a 3/4" to 15/16" wide Polyamide plastic reinforced with glass fibers. Polyamide plastic less than 3/4" wide or pour and de-bridge thermal break will not be accepted.
  5. Finish: Aluminum Clear Anodized – to match #14 Clear Anodized with a 5 year finish warranty.
- B. Glass: Match 1" insulated storefront from section 08 8000 glazing specification for glass type. All glass to comply with safety glazing requirements of ANSI Z97.1 and CPSC 16CFR 1201.
- C. Locking Hardware and Handles:
1. **On the main entry panel for Doors 102 and 108** for models with a swing panel, provide manufacturer's standard lever handles on the inside and outside, a Schlage compatible lock set with lockable latch, multi-point locking with dead bolt and rods at the top and bottom. Rods to be concealed and not edge mounted. Depression of handles withdraws latch. Lifting of handles engages rods and turn of key or thumb turn engages deadbolt and operates lock. Operation of lock set is by turn of key from the outside and with a thumbturn from the inside for an inward opening unit
  2. **On the main entry panel for Door 101** for models with a swing panel, no hardware or locking to be provided by the manufacture, but field installed panic device by others refer to section 08 7100.
  3. On all other secondary panels and pairs of folding panels, provide manufacturer's removable custodial handles and concealed two point locking hardware operated by 180 degree turn of handle between each pair. Face applied flush bolt locking will not be allowed.
  4. Powder coated flat handle finish: silver gray, RAL 9006 or closest match to panel finish. Nylon handle color: gray. Solid brass lever handle set finish: satin nickel.
  3. Aluminum locking rods capped by fiber glass reinforced polyamide at top and bottom tracks. Rods to have a stroke of 15/16" (24 mm).
  4. Provide handle height centered at 41 3/8" from bottom of panel.

- D. Sliding/Folding Hardware: Provide manufacturer's standard combination sliding and folding hardware with top, bottom tracks and threshold. All running carriages to be with sealed, self-lubrication, ball bearing multi-rollers. Surface mounted hinges and running carriages will not be allowed. Weight of panels to be borne by the bottom of the track will not be allowed.
1. For each pair of folding panels, for floor mounted system, provide upper guide carriage and lower running carriage with two vertical stainless steel wheels and two horizontal wheels. The vertical wheels to ride on Type 304 stainless steel guide track covers over the full length of sill track and lie above the water run-off level. Carrying capacity of lower running carriage to be 440 lbs.
  2. Threshold: Provide matching, thermally broken low profile saddle sill
  3. Provide on all four corners of panels, thermally broken, die cast zinc multi-functional corner fittings with carriage connectors, hinges and hinge pins as required. Finish: Powder coated, closest match to finish of frame and panels.
  4. Adjustment: Provide system capable of specified amount of adjustments without removing panels from tracks, 3/16" (5 mm) in width per side jamb hinge.
- E. Other Components:
1. Weather stripping: Provide manufacturer's standard double layer EPDM or brush seals with a two layer polyamide fin at both the inner and outer edge of door panels or on frame for sealing between panels and between panel and frame.
  2. Provide tapered pins or machine screws for connecting frame components.

### 2.03 FABRICATION:

- A. Use extruded aluminum frame and panel profiles with male-female interlocking, corner connectors and hinges, sliding and folding hardware, locking hardware and handles, glass and glazing and weather stripping as specified herein to make a folding glass wall. Factory pre-assembles as is standard for manufacturer and ship with all components and installation instructions.
- B. Sizes and Configurations: See drawings for selected number of panels and configuration.

## PART 3 - EXECUTION

### 3.01 ERECTION:

- A. Because of the large dimensions involved and the weight and movement of the panels, verify the structural integrity of the header such that the deflection with the live load is limited to the lesser of L/720 of the span and 1/4".
- B. Examine surfaces of openings and verify dimensions; verify rough openings are level, plumb, and square, with no unevenness, bowing, or bump on floor.
- C. Installation of units constitutes acceptance of existing conditions.

### 3.02 INSTALLATION:

- A. Install frame in accordance with manufacturer's recommendations and installation instructions. Properly flash and waterproof around the perimeter of the opening.

- B. Installer to provide appropriate anchorage devices and to securely and rigidly fit frame in place, absolutely level, straight, plumb and square. Install frame in proper elevation, plane and location, and in proper alignment with other work.
- C. If necessary, provide drain connections from lower track.
- D. Install panels, handles and lock set in accordance with manufacturer's recommendations and installation instructions.
- E. If necessary, adjust hardware for proper operation.

**END OF SECTION - 084110**

## SECTION 08 44 13 - GLAZED ALUMINUM CURTAIN WALLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Requirements including but not limited to:
1. Glazed aluminum curtain wall assemblies.
  2. Aluminum trim, snap in sealant stops, flashings, and similar items in conjunction with aluminum curtain wall assemblies.
  3. Internal steel and aluminum reinforcements.
  4. Internal and perimeter sealing, joint fillers, weeps, vents and gasketing systems.
  5. Anchors, embedments, shims, fasteners, inserts, expansion devices, accessories, support brackets, attachments, and grout.
  6. Glass and glazing.
  7. The responsibility for exterior wall air and water systems design and the on site control for alignment of exterior wall components inclusive of those under cladding subcontractor's responsibility.
- B. Related Sections:
1. Section 074143 - Aluminum Composite Materials Façade Cladding.
  2. Section 079200 - Sealants.
  3. Section 084113 - Aluminum Framed Entrances and Storefronts.
  4. Section 085000 - Interior Aluminum Framing
- C. The Owner reserves the right to engage an independent testing and inspection agency to verify the adequacy of the Contractor's quality control. Before concealing curtain wall work obtain required inspections from a representative of the Owner's independent testing and inspection agency.

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Provide glazed aluminum curtain wall systems meeting or exceeding performance requirements:
1. Structural Properties:
    - a. Wind Loads: Design, fabricate, and install glazed aluminum curtain wall work, including glass, to withstand the maximum inward and outward wind pressures required by applicable local building code.
      - 1) Basic Wind Speed: Refer to Structural Drawings.
      - 2) Exposure Category: Refer to Structural Drawings.
      - 3) Importance Factor: Refer to Structural Drawings.
    - b. Snow Loads for Sun Control Devices: As required by ASCE 7 for the geographic location of the building.

- c. Deflection Limitations:
- 1) Deflections: Base calculations for deflections upon the combination of maximum direct wind loads, building deflections, thermal stresses, and erection tolerances.
    - a) The deflection of the framing members for each unit of glass in a direction normal to the plane of the wall when subjected to the full code required wind loads indicated above not to exceed  $L/175$  of the glass edge length for spans up to 13'-6" and  $L/240+1/4"$  on spans over 13'-6".
    - b) Glass, sealants, and interior finishes shall not be included to contribute to framing member strength, stiffness, or lateral stability.
    - c) Cantilever Deflection: The deflection of a framing member overhanging an anchor point shall be limited to  $2L/175$  where L is the length of the cantilevered member.
    - d) In addition to the above deflections, stone supporting aluminum framing members shall be limited to  $1/600$  parallel and perpendicular to the wall plane, with rotation of continuous member on kerfed stone limited to a maximum of  $1/16$  inch (1.5 mm).
  - 2) 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.
- d. Dead Loads:
- 1) 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% of the design dimension, and shall not reduce edge clearance to less than 25% of design dimension or  $1/8$  inch (3 mm) whichever is greater.
  - 2) 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 (1.5 mm).
  - 3) 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.
- e. Uniform Structural Loads: Recent satisfactory uniform wind loading tests, acceptable to the Architect, of each glazed curtain wall assembly (each window, window wall, curtain wall, entrance and storefront) shall have been conducted in accordance with the requirements of ASTM E330.
- 1) 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.
  - 2) Satisfactory performance at loads shall mean no glass or component breakage, component disengagement, and no permanent deformation of

- main framing members in excess of the permanent deformation criteria specified above.
- 3) The qualification of recent test results is to limited glazed curtain wall assemblies to those tested within the past 7 years and under conditions similar to the project requirements.
  - 4) In the absence of satisfactory test results, a full scale laboratory mock up and testing program shall be required and conducted to the extent specified.
- f. Operational (Traffic) Loads: Design and fabricate 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 objectionable results of excessive flexibility. Provide weatherstripping at stiles, sill and head rails of door leaves, to minimize air, water and sound leaks.
- B. Air Leakage: Air leakage through each glazed aluminum curtain wall assembly shall not have exceeded 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested in accordance with ASTM E 283 at a static air pressure difference of 6.24 lbf/sq. ft. (300 Pa).
- C. 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 the wall.
  2. Provision shall be made to drain to the exterior face of the wall any water entering the system.
  3. No uncontrolled water penetration shall have occurred when each glazed aluminum curtain wall assembly (each window, window wall, curtain wall, entrance and storefront wall) was tested in accordance with the ASTM E331 for one 15 minute cycle at a static pressure difference of 12 lbf/sq. ft. (600 Pa) minimum.
- D. Thermal Movements: Fabricate the glazed aluminum curtain wall work to accommodate for such expansion and contraction of component materials, and supporting elements, as will be caused by surface temperatures ranging from -5 degrees F to +180 degrees F (-20.5 degrees C to +82 degrees C), without causing noise, 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 ( +21 degrees C). Fabrication and erection procedures shall take into account the ambient temperature range at the time of the respective operations.
- E. Building Frame Movement: Design, fabricate and install glazed aluminum curtain walls to withstand building movements including thermal movements, loading deflections, shrinkage, creep and similar movements without glass breakage, anchor failures, or structural damage. Thermal movements shall be as specified above. Building frame deflections, shrinkage, creep and other movements are available from the structural engineer.



- F. Condensation Resistance: Design, fabricate and install the curtain wall systems to prevent excessive condensation on the indoor exposure of the wall with the mechanical system functioning under the following operating conditions. Excessive condensation is defined as the accumulation of uncontrolled condensate flowing from the curtain wall at any location, or visible ice, frost, or water on more than 5% of the area of any module of the exterior wall.
1. Outdoor: Ambient temperature of -5 degrees F (-20.5 degrees C), 15 mph wind.
  2. Indoor: Ambient temperature of +70 degrees F (+21 degrees C), relative humidity of 30%.
- G. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of minimum 71 when tested according to AAMA 1503.1.
- H. Average Thermal Conductance: Provide glazed aluminum curtain wall systems with average U values of maximum 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) 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. Provide glass for the size openings shown in thickness for probability of breakage at the design Wind Load will not exceed 8 lites per 1000 lites (S.F. 2.5) based on a 3 second gust wind load duration, and reflectance and shading indicated. The glass manufacturer shall provide, on request, substantiating glass breakage data if data is not available as manufacturer's published data.
1. Minimum Glass Thickness: 6.0 mm (1/4").
  2. Assume exterior glass to be nonvented due to the use of interior sun screening devices such as shades and horizontal venetian blinds.
- J. Sound Transmission: Design, fabricate and install exterior windows, doors, and glazed wall sections with minimum outdoor-indoor transmission class (OITC) of 26 according to ASTM E 1332, determined by testing according to AAMA 1801.
- K. 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, nor shall such variations cause excessive stress, or deflections, to the building structural frame.
  3. Maintain general design concept without altering size of members, profiles and alignment.

### 1.3 SUBMITTALS

#### A. Combined Submittals:

1. The shop drawings for exterior wall work for the entire project shall be combined into a single submission. Shop drawings and program specific installation manuals to be developed by Kawneer Company.
2. Recycled Content: (For LEED projects only):
  - a. Indicate recycled content; indicate percentage of preconsumer and postconsumer recycled content per unit of product.
  - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
  - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
  - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
3. Local/Regional Materials: (For LEED projects only):
  - a. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.
  - b. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
  - c. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
  - d. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

#### B. Product Data: Technical data, manufacturer specifications, and installation instructions for each glazed aluminum curtain wall component specified.

#### C. Shop Drawings: Submit shop drawings showing scaled elevations, plans, and sections of glazed aluminum curtain wall work. Prepare and submit full scale sections for details of the assemblies that cannot be shown in the elevations or sections. Include with shop drawings metal thickness of metal components, glass thickness, metal finishes, and pertinent information necessary or requested by the Architect to indicate compliance with the Contract Documents.

1. Details of field connections, anchorage, and relationship to work of others shall be clearly indicated for the coordination of the work by other building trades.
2. Details of fastening and sealing methods and product joinery shall be shown to ensure proper performance of the field installation.
3. No work shall be fabricated until shop drawings for that work have been approved by Architect for fabrication.

- D. Samples: Submit samples before work is fabricated:
  - 1. Three paired sets of samples for each exposed metal finish required. Submit sample finishes on specified alloy, temper, and thickness of metal required for the work. Where finishes involve color and texture variations, include sample sets showing the full range of variations expected. Furnish samples in 12 inch (300mm) lengths of rails, or 12 inch (300mm) squares of sheet.
- E. Structural Calculations: Submit, for information only, copies of structural calculations indicating complete compliance with the specified performance requirements. Submit calculations prepared, signed, and sealed by a Professional Engineer registered in the state where the work is to be erected.
- F. Field Test Reports: Submit field testing reports.
- G. Product Test Reports: Submit certified product test reports based on tests performed by an AAMA Accredited Laboratory within the past 3 years clearly describing in written form, and in shop drawing form, compliance of each glazed aluminum curtain wall assembly (each window, window wall, curtain wall, entrance and storefront) with requirements indicated based on comprehensive testing.
- H. Maintenance Instructions: Submit copies of manufacturer's written instructions for adjustment, operation and maintenance of swinging and sliding doors.
- I. Preconstruction Sealant Compatibility and Adhesion Testing: Submit test results.
- J. Thermal Break Testing: Test results of thermal break construction are mandatory for thermally broken curtain wall extrusion designs prior to mock-up and testing.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Building Code: Comply with applicable requirements of local building authority for exterior walls.
  - 2. 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*.
- B. Manufacturer Qualifications: All framing components, drawings and specifications are based on Kawneer 1600 Curtain Wall System.
- C. Installer Qualifications: Approved by HGI Consulting, LLC. 402.963.2761 Installer must contact HGI Consulting, Inc. for pre-bid qualification
- D. Sole Source Responsibility: Manufacturer/fabricator of aluminum curtainwall and aluminum storefront and entrances [and aluminum (interior) partition framing and door system] shall be the same.

- E. Field Testing: Test the curtain wall in accordance with standard field test methods. Test 10% of the frames, if test fails, then test all the frames 100%. Conduct tests in the presence of the Architect and/or the General Contractor
  - 1. Field Test for Water Leakage:
    - a. Water Spray Test with Static Air Pressure Difference: ASTM E1105 and AAMA 501.2 conducted at a Uniform Static Test Pressure of 12 lbf/sq. ft. (600 Pa).
    - b. Correct deficiencies observed as a result of this test.
- F. Preconstruction Sealant Compatibility and Adhesion Testing: Test results confirming compatibility and adhesion are mandatory for concealed and exposed sealant materials in contact with exterior glazing, stone, precast, masonry, wood, metals, sealants, flashings, metal framing, and shims prior to full size sample installation construction. Refer to Section 079200 for testing requirements. Anticipate lead time necessary to perform testing.
- G. Preinstallation Conference: Conduct conference at Project site. Prior to the start of the curtain wall work, and at the Contractor's direction, meet at the site and review the construction schedule, availability of materials, installers personnel qualifications, equipment and facilities needed to make progress and avoid delays, installation procedures, testing, inspecting, and certification procedures, and coordination with work.
  - 1. Meeting shall include Contractor, Owner, curtain wall installer, sealant installer, as well as any other subcontractors or material technical service representatives whose work, or products, must be coordinated with the curtain wall work.

#### 1.5 IDENTIFICATION, DELIVERY, STORAGE, AND HANDLING

- A. Comply with applicable provisions of AAMA *Curtain Wall Manual #10* for the care and handling of curtain wall work from shop to site.
- B. Identify components of curtain wall work after fabrication by marks clearly indicating 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 curtain wall components in a location to avoid damage to components. Stack components to prevent bending, excessive pressure, abrasion or permanent damage of component and its finished surfaces.
  - 2. Store curtain wall components and materials in a clean, dry location, away from uncured concrete, masonry work, and construction activities. Cover with nonstaining 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.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of supporting structure by field measurements before fabrication so curtain wall work is accurately designed, fabricated, and fitted to structure. Indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work. Use Contractor's lines and benchmarks as basis for measurements.
1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating curtain wall work without field measurements. Coordinate supporting structure construction to ensure actual dimensions correspond to established dimensions.

## 1.7 WARRANTY

- A. See Special Manufacturer's Warranty at the end of this section.

## PART 2 - PRODUCTS

### 2.1

- A. MATERIALS-No substitutions are permitted
1. Manufacturer: Kawneer Company-1600 System
  2. Installer: To be approved by HGI Consulting (phone: 402.963.2761; email: [sleytham@hgi-consulting.com](mailto:sleytham@hgi-consulting.com)).
    - a. Architectural Doors & Windows, Pat Mahoney, 207-879-7800 [pmahoney@a-d-w.biz](mailto:pmahoney@a-d-w.biz)
    - b. Cumberland County Glass, Ken Boucher, 207-666-3700 [ken@cumberlandcountyglass.com](mailto:ken@cumberlandcountyglass.com)
    - c. Glass Solutions (formerly Glass Pro) David Christopher, 207-284-0099 [Dkt5307@yahoo.com](mailto:Dkt5307@yahoo.com)
    - d. New Hampshire Glass, Jill Kaichen, 603-436-0001 [jillk@nhglass.com](mailto:jillk@nhglass.com)
    - e. Robie Windows, Jon Robie, 978-356-9150 [jrobie@robiewindows.com](mailto:jrobie@robiewindows.com)
- B. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221 (ASTM B 221M).
  3. Extruded Structural Pipe and Tubes: ASTM B 429.
  4. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.
  5. Shapes and Thickness: Provide shapes as shown and as required to suit the performance requirements but with wall thickness of not less than the following:
    - a. Minimum Wall Thickness for Structural Extrusions: 1/8 inch (3 mm).
    - b. Minimum Wall Thickness for Non-Structural Extrusions: 1/16 inch (1.5 mm).

- C. Steel Reinforcement: With 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/A 36M.
  - 2. Cold Rolled Sheet and Strip: ASTM A 611.
  - 3. Hot Rolled Sheet and Strip: ASTM A 570/A 570M.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. 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. Use exposed fasteners with countersunk Phillips screw heads.
  - 4. Finish exposed portions to match framing system.
  - 5. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended by manufacturer.
- F. Anchors: Three way adjustable anchors that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
- G. Concealed Flashing: Corrosion resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- H. Exposed flashing at curtain wall openings, jambs and head. Factory painted to match curtain wall frames.
- I. Framing Gaskets: Recommended by manufacturer for joint type.
- J. Aluminum Entrance Doors and Frames: Refer to Section 084113.
- K. Sealant, Glass, and Glazing Materials:
  - 1. Concealed Sealing Materials: Provide silicone sealing materials for concealed applications within glazed aluminum curtain walls, compatible with and adherent to each material in contact, and recommended by the manufacturer to fulfill performance requirements.
  - 2. Exposed Sealing Materials: Equal to DOW Corning 791 – one component, medium modulus, neutral curing silicone sealant.
  - 3. Glass and Glazing Materials: Refer to Section 088000.

- L. Metal Panels, Copings, and Signage:
1. Supports: Custom fabricate metal panel, coping, and signage supports so panels, copings, and signs are an integral part of the framing for the glazed aluminum curtain wall system; are secure yet accommodate expansion and contraction; and that individual panels, copings and letters may be installed or removed with a minimum amount of disturbance to adjacent components.
  2. Fabrication:
    - a. Metal panels (Non-ACM) copings and signs shall be custom fabricated from minimum 1/8 inch (3.18 mm) thick, ASTM B209, aluminum sheet. Provide concealed anchorage devices and reinforcements as required to erect metal panels, copings and signs to the exterior wall framing systems and as required to maintain the specified flatness tolerances.
    - b. Edge Construction and Profiles: Provide edge construction necessary to secure metal panels, copings, and signs to the exterior wall framing systems and provide an air and water tight seal complying with the performance requirements. Weld metal panel, coping, and sign corners and grind smooth prior to final finishing. Metal panel, coping and sign profiles are indicated on the drawings.
    - c. Flatness Tolerances: Oil canning is not permitted; in addition anchorage devices, cover stiffeners (if any), and reinforcements shall not be visible in the finished (exposed) faces of metal panels, copings and signs.
  3. Finishing: After forming metal panels, copings, and signs but before finishing, remove abrasions, scratches, die markings, and dents.
  4. Apply sound deadening (dielectric separator) on the back side of metal panels.
- M. Condensate Gutters: Provide shop fabricated (preformed) extruded aluminum units of the type, size, and profiles required to form a complete and continuous waterproof and weatherproof gutter system complete with prefabricated corner units, expansion joints, and anchoring devices.
- N. Sheet Metal Partition Filler Panels: Form sheet metal filler panels from 0.05 inch thick aluminum sheet for closing ends of gypsum wallboard partitions.
1. Produce flat, flush surfaces without cracking and grain separation at bends. Incorporate reveals, trim, and concealed anchorages for attachment to adjacent surfaces.
  2. Adhesively attach vinyl foam sealant tape to filler panel edges which abut adjacent surfaces to form a continuous seal. Use vinyl foam sealant tape material set onto edge of filler panel.
  3. Size uncompressed tape thickness to fit 3/4 inch wide joint indicated with an additional thickness as required to provide a minimum 15% foam compression.
  4. Laminate layers of tape recommended by manufacturer to provide a single tape thickness for the joint indicated.
  5. Fill interior of panel with sound deadening mineral fiber insulation permanently attached to inside panel faces.
    - a. Vinyl Foam Sealant Tape: Closed cell, low density, self adhesive, PVC foam sealant tape of approximately 13 Shore 00 hardness (ASTM D2240) and a density of 6 pcf (ASTM D1667). Norseal V730; Norton Performance Plastics Corp.

- O. Thermal Isolators: Provide rigid plastic or nylon isolators of profile and hardness recommended by glazed aluminum curtain wall fabricator, and fabricated to a cross sectional profile to interlock with aluminum extrusions for thermal isolation of exterior window frame snap caps to interior window framing.
- P. Slip and Separator Gaskets:
  - 1. Bolted Slip Joints: Nonmetallic, low friction material bearing temperature and moisture resistances and low abrasion properties as required to suit performance requirements.

## 2.2 FABRICATION

- A. Fabricate glazed aluminum curtain walls to the designs, shapes, and sizes shown using materials specified and shown to produce assemblies meeting or exceeding performance requirements. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and work before shipment.
- B. Joints in Metal Work: Fit exposed work and match to produce continuity of line and design, with joints accurately fitted for hairline contact and rigidly secured. Where additional rigidity or strength is required to satisfy the performance requirements reinforce curtain wall components with aluminum or carbon steel shapes, bars, and plates.
- C. Shop Assembly: To the extent practicable, assemble fitting and assembly work in fabrication shop.
  - 1. Framing members attaching curtain wall components to building supports shall provide for 3 way adjustment to accommodate fabrication and construction tolerances, and allow for thermal and building movements.
  - 2. Provide vents, 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, and to avoid condensation at glass spandrel unit air spaces. Provide weep baffles secured to inside of frame behind vents and weepholes.
  - 3. Provide flush endcaps for mullion extension cap extrusions.
  - 4. Provide provisions for reglazing from interior for vision glass and exterior for spandrel glazing or panels.
- D. Exposed Fasteners: Not permitted.
- E. Protection of Metals: Wherever dissimilar metals are in contact, except in the case of aluminum in contact with galvanized steel, zinc, separate 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 or separate surfaces with coating of zinc rich primer, bituminous paint, or separation gaskets required by condition.
- F. Welding: Complete welding of exposed surfaces prior to finishing.
  - 1. Perform welding in accordance with recommendations of AWS and with electrodes and by methods recommended by suppliers of metal being welded. Fabricate welded aluminum assemblies so fraying surfaces are free rinsing and will not trap coating solutions.



2. Make welds behind finished surfaces to eliminate distortion and discoloration, on finished side. Plug, puddle, and spot welding are not permitted. Provide low heat filled welds using chill bar on finished side to eliminate dimpling, distortion, and discoloration on the finished side. If weld heads appear on the finished surface, grind weld head and polished to match and blend with the finish on adjacent parent metal. Weld spatter and welding oxides on finished surfaces shall be removed immediately.
  3. At joints where welding cannot be performed use concealed stainless steel fasteners to join assembly.
- G. Shop Painting of Carbon Steel: Thoroughly clean ungalvanized steel items cleaned of loose scale, filings, dirt, and foreign matter, in accordance with SSPC SP3 *Power Tool Clean*, and paint with coating specified for carbon steel surfaces.

### 2.3 FINISH

- A. Refer to Section 084113 [and 081200].
- B. Comply with NAAMM *Metal Finishes Manual for Architectural and Metal Products* for recommendations for applying and designating finishes.
- 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. **BASE BID:** Toyota Silver: AAMA 2605 with 20 year finish warranty
  1. Toyota Silver: Minimum 3 coat system. Submit manufactured paint samples or paint system changes for approval and sign off by **HGI Consulting** prior to manufacture.
  2. Coating Thickness: 1.2 mils
  3. Pre-Treatment: Multi-Stage Cleaning with Chrome Phosphate Conversion Coating 40mg/ft<sup>2</sup>-min.
  4. Abrasion Resistance: Falling Sand Test – 50L/mil
  5. Chemical Resistance: Muratic Acid/Mortar Resistance/Nitric Acid Fumes Test
  6. Color Retention: 10 Years South Florida (Max 5ΔE)
  7. Gloss Retention: Minimum 50% after 10 Years South Florida
  8. Corrosion Resistance: 4000 Hour Humidity Salt Spray
  9. Chalking Resistance: No more than #8 (#6 for Whites)
  10. Film Adhesion: Dry Adhesion/Wet Adhesion Boiling Water Adhesion
  11. Erosion Resistance: Less than 10% after 10 Years South Florida

#### **ALTERNATE BID:**

#14 Clear Anodized with a 5 year finish warranty

- E. Concealed Metal Surfaces: Provide protective coatings to metal surfaces concealed in 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 in contact with each other or in contact with dissimilar materials, 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, nonsagging, asphalt mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos. Apply in 2 coats for 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 substrates, adjoining construction, and conditions under which the work is installed. Proceed with installation after unsatisfactory conditions have been corrected.
  1. Before beginning installation of the glazed aluminum curtain wall work, examine building structural frame and cladding indicated to support the glazed aluminum curtain wall work. Notify Architect in writing of dimensions or conditions which prevent the proper execution of the glazed aluminum curtain wall work, including specified tolerances. Use offset lines and bench marks as basis of measurements.

#### 3.2 PREPARATION

- A. Coordinate glazed aluminum curtain wall work with adjacent work and provide items to be placed during the installation of other work at time to avoid delays in the work.
- B. Place items, including concealed overhead framing, accurately in relation to the final location of glazed aluminum curtain wall components.

#### 3.3 INSTALLATION

- A. Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall systems. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Remove loose particles present or resulting from fabrication or field cutting and drilling 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 lint free towels for wiping of surfaces. Wipe metal surfaces with IPA (isopropyl alcohol) or xylene unless otherwise required by compatibility and adhesion testing results. Seal joints watertight. Clean excess joint sealants from finished surfaces.
  1. Cut and trim component parts of the glazed aluminum curtain wall work during erection only with the approval of the manufacturer or fabricator, and in accordance with recommendations. Restore finish completely to protect material and remove 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 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 damaged and impair strength or appearance. Remove and replace members damaged in 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. Do not burn, cut into or field drill holes or slots in building framing member without written acceptance of the structural engineer.
- B. Glazed Aluminum Curtain Wall, Entrance and Storefront Framing: Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.
- C. Entrance Doors: Securely anchor doors 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. Field test weatherstripping contact and hardware movement and make final adjustment, and lubricate for proper operation and performance of doors.
- D. Metal Panels and Copings: Install components plumb and true in alignment with established lines and grades.
- E. Sheet Metal Partition Filler Panels: Locate and place partition filler panels plumb, level, and in alignment with adjacent construction, with uniform reveals as shown. Provide concealed foam tapes, and install as the installation progresses to make installations acoustically sealed and light tight. Do not penetrate window and curtain wall framing with any type of fastenings.
- F. Flashing: Install flashings fabricated from specified flashing material to the profiles shown. Furnish flashings in single piece lengths. Lap seam laps and joints where required by minimum of 4 inches (100 mm) with lap completely embedded in sealant. Use mechanical fasteners where necessary to maintain contact of overlapping elements. Spot heads of fasteners with sealant.
- G. Install glazing to comply with requirements of Section 088000.
- H. Install perimeter sealant to comply with requirements of Section 079200 and manufacturers installation manual
- I. Concealed Sealing Components: Apply sealant and gasket components integral to glazed aluminum curtain wall systems in strict accordance with the each component manufacturers printed instructions. Before applying components remove mortar, dust, dirt, moisture, and foreign matter which are deleterious to 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.

- J. Anchor glazed aluminum curtain wall work to the structure and surrounding cladding in accordance with the accepted shop drawings
- K. Weld with electrodes and by methods recommended by manufacturer of material being welded, and in accordance with AWS D1.1 for concealed steel members.
  - 1. Welds and adjacent metal areas shall be thoroughly cleaned and coated with a single coat of bituminous paint.

### 3.4 ERECTION TOLERANCES

- A. Fabricate and erect glazed aluminum curtain wall systems to accommodate dimensional tolerances of structural frame and surrounding cladding while providing installed tolerances.
  - 1. Variation from theoretical calculated position as located in plan or elevation in relation to established floors lines, column lines and fixed elements of the structure, including variations from plumb, level, straight and member size: +/- 1/4 inch max in any 20 feet (+/- 6 mm in any 6 m) run, column to column bay, or floor to floor height.
  - 2. Alignment: Where surfaces abut in line, and meet at corners, limit offset from true alignment to 1/32 inch (.75 mm).
  - 3. Variation from angle, or plumb, shown: +/- 1/8 inch max in any 10 feet (+/- 3 mm in any 3 m) run or story height, noncumulative.
  - 4. Variation from slope, or level, shown: +/- 1/8 inch max in any 20 feet (+/- 3 mm in any 6 m) run or column to column bay, noncumulative.
  - 5. Minimum caulk joint at perimeter is 1/2" for primary seal

### 3.5 REMOVAL OF DEBRIS

- A. Remove debris caused by, or incidental to, the erection of the glazed aluminum curtain wall work from the site and legally disposed or recycled.

### 3.6 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.

### 3.7 PROTECTION

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

## **SPECIAL PROGRAM WARRANTY**



### **TOYOTA SPECIAL PROJECTS LIMITED WARRANTY AND REMEDY**

**KAWNEER COMPANY, INC.** (“Kawneer”) extends the following limited warranties (collectively “Warranties”) to the owner of the **TOYOTA DEALERSHIP** (“Owner”) with an address of \_\_\_\_\_ (“Toyota Dealership”) for the Kawneer products (“Products”) supplied for the [Project Name/Number] (“Project”).

#### **I. Products Warranty.**

The Products will be free from material defects, in material and workmanship, and will comply with the specifications and performance criteria set forth in Kawneer’s proposal for the Project (“Product Warranty”).

The Product Warranty does not cover, and Kawneer hereby disclaims all liability for, the installation of Kawneer Products, any particular application or selection of the Product for any particular project or design, any parts, hardware, gaskets, glazing materials, components or sealants of other manufacturers used with Kawneer Products, or any lack of performance of Kawneer products attributable to such items. Laws and building and safety codes governing the design and use of glazed entrance, windows, and curtain wall products vary widely. Except for its Products’ compliance with the specifications and performance criteria set forth in Kawneer’s proposal for the Project, Kawneer does not control the selection of Product configurations, operating hardware, or glazing materials, and assumes no responsibility therefore.

Kawneer Products are detailed by Kawneer when required to show our understanding of the job requirements and are submitted for approval. Upon request, Kawneer will fabricate in accordance with dimensions shown on approved drawings and will take no responsibility for failure to check drawings against job site conditions. Special entrances cannot be scheduled for production until the approved details, with the dealer’s signature, have been received, and all special hardware is in our possession. Changes made after approval of details may involve additional charges on the order.

#### **II. Paint Finish Warranty.**

Kawneer also warrants that the 70% Fluoropolymer Paint Finish applied at its \_\_\_\_\_ plant to the aluminum material (“Metal”) (i) will not chalk more than that represented by a No. 8 rating for colors or No. 6 for whites, when measured in accordance with the standard procedures specified in ASTM D 4214, Test Method A (“Excessive Chalking”); (ii) will not change color more than five (5) Hunter  $\Delta E$  units as determined by ASTM D 2244 (“Excessive Color Change”); and (iii) will not crack, check or peel (“Paint Finish Warranty”).

The Paint Finish Warranty will not apply to or cover, and Kawneer disclaims all liability for, (a) damage to the finish occasioned by moisture or other contamination detrimental to the finish because of improper storage of the finished Metal prior to installation; (b) water damage due to condensation caused by improper re-

packaging of the finished Metal prior to installation; (c) damage including but not limited to scratches and abrasions to the finished Metal caused by use, handling, shipping and/or installation, or by utilization of the Metal with any parts, gaskets, glazing materials, components or sealants of other manufacturers used with Kawneer Products, or any lack of performance of Kawneer Products attributable to such items; (d) damage to finished Metal caused by exposure to caustic agents, acidic agents, or harmful fumes or other destructive foreign materials; (e) damage due to improper maintenance i.e. the use of chemical cleaning agents; (f) corrosion of finished Metal due to aggressive atmospheres including exposure to salt spray and/or salt mist; and (g) any particular application or selection of the finished Metal for any particular project or design.

In order for the Paint Finish Warranty to remain valid, a systematic maintenance program must be instituted by the purchaser or user to prevent the build-up of dirt and salt deposits on the painted surface. The surface must be cleaned at least annually in accordance with AAMA 609 & 610-02 so as to prevent the accumulation of harmful deposits. More frequent cleaning is required in heavy industrialized environments or coastal environments. Coastal environments where salt spray or salt fog is present can be very detrimental to metal especially where the paint coating has been scratched or damaged. In coastal environments where metal is exposed to salt spray or salt fog or in heavy industrial environments, the metal surface must be cleaned at least once quarterly to prevent the accumulation of harmful deposits. A FAILURE TO INSTITUTE A SYSTEMATIC MAINTENANCE PROGRAM AS DESCRIBED ABOVE WILL VOID THIS WARRANTY.

Kawneer is not responsible for chalking or for fading or color changes that are less than the Excessive Chalking or Excessive Color Change referenced and warranted above. Normal weathering, such as the damaging effects of sunlight and exposure to the elements, such as extremes of weather and atmosphere, may cause any colored surface to fade, chalk, or become soiled or stained. These changes may not be uniform if the surfaces are not equally exposed to the sun and elements. The degree to which normal weathering occurs will vary depending on the air quality, the building's location and other factors over which Kawneer has no control. Metallic/mica flake colors are not color measurable and are not applicable to the Excessive Color Change warranty.

This Paint Finish Warranty will apply only to Metal, which is finished in the \_\_\_\_\_ plant and used within the continental United States, unless Kawneer agrees otherwise in writing.

### **III. Limited Lifetime Warranty for Kawneer Doors Welded, Dual Moment Corner Construction.**

Subject to the limitations and terms and conditions set forth herein, Kawneer warrants that the welded corner construction of the doors shall be free from material defects in workmanship and material for the normal useful life of the door ("Welded Corner Warranty"). This limited lifetime warranty applies solely and exclusively to Kawneer doors with welded dual moment corner construction.

### **IV. Additional Terms and Conditions.**

The Products and Paint Finish Warranties will apply for a period of ten (10) years from the date of substantial completion of the Project, provided however, that under no circumstances will this Warranty begin later than six (6) months after the date of shipment of the products by Kawneer for the Project ("Warranty Period").

All Warranties set forth herein apply only if Kawneer's products are installed and maintained according to Kawneer's recommended practices and installation instructions for the Project, and with respect to the Products and Paint Finish Warranties, only to defects appearing within the Warranty Period, and with respect to all the Warranties, only if Kawneer is notified in writing within sixty (60) days after such defects either (i) appear or

(ii) should have been discovered after the exercise of reasonable diligence. Failure of the claiming party to notify Kawneer within such time frames will automatically relieve Kawneer of any and all responsibility and/or liability under these any of these Warranties.

These Warranties do not cover, and Kawneer hereby disclaims all liability for, any products which have been subject to abuse, alteration, neglect, misuse, abnormal use, accident, fire, war, flood, earthquakes, acts of God, or to which parts, not supplied by Kawneer have been added, or to defects caused by depreciation or normal wear and tear.

All decisions regarding the existence of defects in material and workmanship and the occurrence of any of the matters affecting these Warranties shall be made by Kawneer and shall be final and binding upon the parties.

KAWNEER DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The sole and exclusive remedy with respect to these Warranties or with respect to any other claim relating to defects or any other condition or use of the Products, finished Metal, and/or Kawneer Doors with Welded Dual moment Corner Construction supplied by Kawneer, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other theory is limited to, at Kawneer's sole option, repair, refinish (in the case of refinished Metal), replacement or repayment by Kawneer of the purchase price paid for it. If Kawneer elects to repair or replace such Products, Kawneer will provide the products, materials and labor to make such repair or replacement. Refinishing of the defective Metal shall be performed by using standard finishing practices and materials as selected by Kawneer. Kawneer reserves the right to approve any contract for refinishing of defective Metal. The products repaired, replaced, refinished or otherwise restored will be warranted to the same extent and to the expiration date from the original date of shipment, and this Warranty will not be deemed to have been extended from the date of such warranty work. At no time do these Warranties confer upon the claiming party or any other party the right to proceed with repair, replacement, refinishing or restoration, without written notice and agreement by an authorized officer of Kawneer. Any such work undertaken by the claiming party or any other party will be for the claiming party's own account and will result in these Warranties becoming null and void.

KAWNEER'S AGGREGATE TOTAL CUMULATIVE LIABILITY UNDER THESE WARRANTIES IS LIMITED TO THE DOLLAR AMOUNT OF THE PURCHASER'S ORIGINAL PAYMENT MADE TO KAWNEER FOR MATERIAL FURNISHED BY KAWNEER ONLY. IN CONSIDERATION OF THESE WARRANTIES, KAWNEER SHALL NOT BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO LOSS OF USE, LOSS OF PROFITS OR GOODWILL, DAMAGES FOR NEGLIGENCE IN THE MANUFACTURE, DESIGN, OR INSTALLATION OF THE PRODUCTS, OR OTHER COMMERCIAL LOSS OR INJURY.

These are the only Warranties made in the connection with the sale and distribution of the Kawneer Products, Paint Finish, and Kawneer Doors with Welded Dual Moment Corner Construction. No representative, dealer, or any other person is authorized to make or makes any warranty, representation, or promise with respect to the Kawneer products. No terms or conditions other than those stated in these Warranties, and no agreement or understanding, oral or written, in any way purporting to modify these Warranties will be binding on Kawneer unless made in writing and signed by Kawneer's authorized representative. This Warranty is transferable and may extend to a purchaser of the original Owner of the premises for the balance of the term of the Warranty.

Customer's agreement to and acceptance of these Warranties shall be indicated by signing and returning a copy of this document to Kawneer.

**Kawneer Company, Inc.**

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date signed: \_\_\_\_\_

**Accepted By:**

Customer

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date Signed: \_\_\_\_\_

END OF SECTION 08 44 13



SECTION 08 5113 - ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Requirements including but not limited to.
1. Aluminum swing entrance doors and framing, including hardware, weather stripping, and thresholds.
  2. Aluminum trim, flashings, and similar items in conjunction with aluminum entrance and storefronts.
  3. Accessories necessary for a complete installation.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Coordinate with Section 084400 for performance requirements, fabrication and erection standards; in addition provide the following:
1. 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.
- B. Provide aluminum entrance and storefront systems meeting or exceeding the following performance requirements:
1. Structural Properties:
    - a. Wind Loads: The aluminum entrance and storefront work, including glass, shall be designed, fabricated and installed to withstand the maximum inward and outward wind pressures as required by applicable local building code requirements and as indicated on Drawings.
      - 1) Basic Wind Speed: Indicated on structural Drawings.
      - 2) Exposure Category: Indicated on structural Drawings.
      - 3) Importance Factor: Indicated on structural Drawings.
    - b. Seismic Loads: As required by applicable local building code requirements and indicated on structural Drawings.

- c. 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. 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  $L/175$  of its clear span.
  - b) Deflection: Coordinate deflection at NanaWall opening refer to drawings for contact information and requirements.
  - c) Glass, sealants and interior finishes shall not be included to contribute to framing member strength, stiffness or lateral stability.
- 2) 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.
- d. Dead Loads:
- 1) 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% of the design dimension, and shall not reduce edge clearance to less than 25% of design dimension or 1/8 inch (3 mm) whichever is greater.
  - 2) 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 (1.5 mm).
  - 3) 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.
- e. Uniform Structural Loads: Satisfactory uniform wind loading tests of each aluminum entrance and storefront assembly (each swinging and sliding door) shall have been conducted in accordance with the requirements of ASTM E330.
- 1) Subject each assembly 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'.
  - 2) Satisfactory performance at these loads shall mean no glass or other component breakage, component disengagement, and no permanent deformation of main framing members in excess of the permanent deformation criteria specified above.
- f. 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.

- 1) 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 and storefront assembly shall not have exceeded 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of fixed wall area when tested in accordance with ASTM E 283 at a static air pressure difference of 6.24 lbf/sq. ft. (300 Pa).
- 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 the wall.
  2. Provision shall be made to drain to the exterior face of the wall any water entering the system.
  3. No uncontrolled water penetration shall have occurred when each entrance and storefront assembly (each entrance and storefront wall) was tested in accordance with the ASTM E331 for one 15 minute cycle at a static pressure difference of 12 lbf/sq. ft. (600 Pa) minimum.
- E. Thermal Movements: Fabricate the entrance and storefront work to accommodate for such expansion and contraction of component materials, and supporting elements, as will be caused by surface temperatures ranging from -5 degrees F to +180 degrees F (-20.5 degrees C to +82 degrees C), 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 (+21 degrees C). Fabrication and erection procedures include for ambient temperature range at the time of the respective operations.
- F. Building Frame Movement: Design, fabricate and install aluminum entrances and storefronts to withstand building movements including thermal movements, loading deflections, shrinkage, creep and similar movements. Thermal movements shall be as specified. Building frame deflections, shrinkage, creep and other movements are available from the structural engineer.
- G. Condensation Resistance: Provide storefront systems with condensation resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.1.
- H. Average Thermal Conductance: Provide storefront systems with average U-values of not more than 0.63 Btu/sq. ft. x h x deg F (3.57 W/sq. m x K) 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. Glass for the size openings shown will be provided in thickness so probability of breakage at the design Wind Load will not exceed 8 lites per 1000 lites (S.F. 2.5) based on a 60 second uniform wind load duration, and reflectance and shading indicated.

1. 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 SUBMITTALS

1. The shop drawings for exterior wall work for the entire project shall be combined into a single submission. Shop drawings and program specific installation manuals to be developed by Kawneer Company.
  2. Recycled Content (For LEED projects only):
    - a. Indicate recycled content; indicate percentage of preconsumer and postconsumer recycled content per unit of product.
    - b. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
    - c. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.
    - d. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- B. Shop Drawings: Submit shop drawings showing scaled elevations, plans, and sections of the aluminum entrance and storefront work.
1. Prepare full scale sections and submit for details of the assemblies that cannot be shown in the elevations or sections. Include with shop drawings metal thickness of metal components, glass thickness, metal finishes, and pertinent information as necessary or requested by the Architect to indicate compliance.
  2. Indicate details of field connections, anchorage, and relationship to work of others for coordination of work by other building trades.
  3. Show details of fastening and sealing methods and product joinery to ensure proper performance of the field installation.
  4. Do not fabricate work until shop drawings are approved by Architect for fabrication.
  5. All shop drawings to be developed by Kawneer Company
- C. Samples: Submit samples of the following before any work is fabricated:
1. Submit 3 paired sets of samples for each exposed metal finish required. Where finishes involve color and texture variations, include sample sets showing the full range of variations expected. Furnish samples in either 12 inch (300 mm) lengths of patch fittings, rails, or 12 inch (300 mm) squares of sheet.

- D. Structural Calculations: Submit sealed copies of structural calculations indicating complete compliance with the specified performance requirements. Submit calculations prepared, signed, and sealed by a Professional Engineer registered in the state where the project is located.
- E. 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 each aluminum entrance and storefront assembly (each swinging and sliding door) with requirements indicated based on comprehensive testing.
- F. Maintenance Instructions: Submit copies of manufacturer's written instructions for adjustment, operation and maintenance of doors.
- G. Preconstruction Sealant Compatibility and Adhesion Testing: Submit test results.

#### 1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
  - 1. Building Code: Applicable requirements of the local building authority for exterior cladding.
  - 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 2603 Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.*
    - d. *AAMA 2605 Specification for Superior Performing Organic Coatings on Architectural Extrusions and Panels.*
  - 3. American Institute of Steel Construction (AISC) *Steel Construction Manual.*
  - 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*, published in Code of Federal Regulations (CFR).
    - a. Comply with applicable requirements of authorities having jurisdiction, wherever requirements conflict the more stringent shall be required. Obtain approvals from authorities.
    - b. 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.*

- B. Manufacturer Qualifications: All framing components, drawings and specifications are based on Kawneer TriFab VG450/451T System and Kawneer Narrow, Medium and Wide Style doors.
- C. Installer Qualifications: Refer to Section 084413.
- D. Sole Source Responsibility: Manufacturer/fabricator of aluminum curtainwall and aluminum storefront and entrances [and aluminum (interior) partition framing and door system] shall be the same.
- E. Testing laboratories shall be specifically qualified to conduct laboratory and field performance tests required by these specifications and acceptable to the Architect.
- F. Preconstruction Sealant Compatibility and Adhesion Testing: Test results confirming compatibility and adhesion are mandatory for all concealed and exposed sealant materials in contact with exterior glazing, stone, precast, masonry, wood, metals, other sealants, flashings, metal framing, and shims prior to full size sample installation construction. Refer to Section 079200.
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements. Prior to the start of the aluminum entrance and storefront work, and at the Contractor's direction, meet at site and review the installation procedures and coordination with work.
  - 1. Meeting shall include Contractor, Owner, aluminum entrance and storefront installer, sealant installer, as well as any other subcontractors or material technical service representatives whose work, or products, must be coordinated with the aluminum entrance and storefront work.

#### **1.5 IDENTIFICATION, DELIVERY, STORAGE, AND HANDLING**

- A. Refer to Section 084413.
- B. Comply with the applicable provisions of AAMA *Curtain Wall Manual #10* for the care and handling of aluminum entrance and storefront work from shop to site.
- C. Identify components of aluminum entrance and storefront work after fabrication by marks clearly indicating their location in the building. Package components to protect the components from damage during shipping and handling.
- D. Storage on Site:
  - 1. Store aluminum entrance and storefront 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 permanent damage of the component and its finished surfaces.  
Store aluminum entrance and storefront 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 to permit circulation of air inside the covering.

- E. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of metals.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions of supporting structure by field measurements before fabrication so that the entrance and storefront 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.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating entrance and storefront work without field measurements. Coordinate supporting structure construction to ensure actual dimensions correspond to established dimensions.

## 1.7 WARRANTY

- A. See Special Manufacturer's Warranty at the end of this section.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Recycled Content of Steel and Aluminum Products: To the extent practical, provide products with an average recycled content of steel and aluminum products so postconsumer recycled content plus one/half of preconsumer recycled content is not less than 25 percent.
- B. MATERIALS: No substitutions are permitted
  - 1. Manufacturer: Kawneer TriFab VG450/451T, Narrow, Medium and Wide Style Doors
  - 2. Installer: To be approved by HGI Consulting (phone: 402.963.2761; email: [sleytham@hgi-consulting.com](mailto:sleytham@hgi-consulting.com)).
    - a. Architectural Doors & Windows, Pat Mahoney, 207-879-7800 [pmahoney@a-d-w.biz](mailto:pmahoney@a-d-w.biz)
    - b. Cumberland County Glass, Ken Boucher, 207-666-3700 [ken@cumberlandcountyglass.com](mailto:ken@cumberlandcountyglass.com)
    - c. Glass Solutions (formerly Glass Pro) David Christopher, 207-284-0099 [Dkt5307@yahoo.com](mailto:Dkt5307@yahoo.com)
    - d. New Hampshire Glass, Jill Kaichen, 603-436-0001 [jillk@nhglass.com](mailto:jillk@nhglass.com)
    - e. Robie Windows, Jon Robie, 978-356-9150 [jrobie@robiewindows.com](mailto:jrobie@robiewindows.com)
- C. 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, Profiles, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM B 308/B 308M.
  - 5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

- D. 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/A 36M for structural shapes, plates, and bars; ASTM A 1008/A 1008M for cold rolled sheet and strip; or ASTM A 1011/A 1011M for hot-rolled sheet and strip.
- E. Glass and Glazing Materials: Section 088000.
- F. Anchors and Fasteners:
  - 1. Material: Stainless steel.
  - 2. Anchor and Fastener Metal Alloy Types, Designations and Standards: Alloys as selected by fabricator to prevent corrosion resistance with the components fastened. Do not use self drilling, self tapping type fasteners.
  - 3. Do not use exposed anchors and fasteners, except for hardware application. For hardware application, use countersunk Phillips flat-head machine screws finished to match framing members or hardware being fastened, unless otherwise indicated.
  - 4. Where fasteners are subject to loosening or turn out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
  - 5. Recycled Content: Fabricated from remelted steel.
- G. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123 or ASTM A153 requirements.
- H. Concealed Flashing: Dead-soft, 0.018-inch- (0.457-mm-) thick stainless steel, complying with ASTM A 666, Type 304.
- I. 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.
  - 2. Sliding Weather Stripping: Wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing complying with AAMA 701 requirements.

## 2.2 GLAZING SYSTEMS

- A. Glazing: Refer to Section 088000.
- B. Glazing Gaskets: Compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal.
- C. Spacers and Setting Blocks: Elastomeric types.
- D. Bond Breaker Tape: TFE fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, recommended by manufacturer for joint type and as follows:



1. Structural Sealant: ASTM C 1184, neutral curing silicone formulation compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant, and approved by structural sealant manufacturer for use in aluminum-framed systems indicated.
  - a. Color: Selected by Architect.
2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; neutral curing silicone formulation compatible with structural sealant and system components with which it comes in contact; and recommended by structural and weatherseal sealant and aluminum framed system manufacturers for this use.
  - a. Color: Matching structural sealant.
3. Toxicity/IEQ: Low VOC products.

### **2.3 DOORS**

- A. Doors: Glazed doors for manual swing operation.
  1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch (3.2mm) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate concealed tie rods.
    - a. Thermal Construction: High performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
  2. Door Design: Wide stile; 5 inch (127mm) nominal width.
    - a. Accessible Doors: Smooth surfaced for width of door in area within 10 inches (255 mm) above floor or ground plane.
  3. Glazing Stops and Gaskets: Square, snap on, extruded aluminum stops and preformed gaskets.
    - a. Provide nonremovable glazing stops on outside of door.

### **2.4 HARDWARE**

- A. Provide hardware indicated and as scheduled. Finish exposed parts to match butt or pivot finish, unless otherwise indicated. Coordinate with Section 08710.
- B. Offset Pivots: Kawneer top, bottom, and intermediate pivots. Provide top, bottom, and intermediate pivots at each door leaf. Provide extended spindles. BHMA 626 satin chrome finish.
- C. Closers: Comply with manufacturer's recommendations for closer size, depending on door size, exposure to weather, and anticipated frequency of use.

1. Closing Cycle: Comply with requirements of authorities having jurisdiction or the Americans with Disabilities Act (ADA), *Accessibility Guidelines for Buildings and Facilities* (ADAAG), whichever are more stringent.
2. Opening Force: Comply with the following maximum opening-force requirements for locations indicated:
  - a. Exterior Doors: 15 lbf (67 N).
  - b. Interior Doors: 5 lbf (22.2 N).
- D. Concealed Overhead Closers: RTS 88 Series, End Loaded Arm; Dorma. Provide cover plate finished to match exposed portions of butts or pivots provided. Provide with top arm and pivot to suit conditions indicated.
  1. Hold Open: Automatic, at angle selected by Architect from available options.
- E. Surface Mounted Overhead Closers: 4110/4010; LCN Closers (LCN). Provide arms and metal cover with plated finish to match butt hinge or pivot.
  1. Hold Open: Automatic, at angle selected by Architect from manufacturer's standard options.
  2. Hold Open: None.
- F. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted door stop, as appropriate for door location indicated, with integral rubber bumper.
- G. Cylinders: Specified in Section 087111.
- H. Rim Cylinders: Rim cylinders for installation in exit devices complying with BHMA A156.5, Grade 1 requirements.
- I. Thumb Turns: Brass or bronze bodied, inside thumb-turn cylinders.
- J. Deadlock: Mortise deadlock with minimum 1 inch (25.4mm) long throw bolt and complying with BHMA A156.5, Grade 1 requirements.
  1. Two Point Locking: Provide bottom bolt and mechanism that automatically throws active leaf bottom bolt into threshold when deadlock engages inactive leaf and provides one stage unlocking.
- K. Flat Face Strikes: Manufacturer's standard stainless-steel, flat face strike with steel mounting plate and black-plastic dustbox.
- L. Manual Flush Bolts: BHMA A156.16, edge mortised, lever extension type flush bolts. Locate flush bolts at top and bottom of inactive leaf of pairs of doors.
- M. Exit Devices: 99 Series, function and trim as scheduled; Von Duprin (VD).
- N. Removable Mullions: Aluminum or aluminum clad steel removable mullion with mullion stabilizers located below latch strikes.

- O. Push/Pulls: Selected by Architect.
- P. Thresholds: Provide double bevel saddle threshold at each door opening with mitered returns and with cutouts coordinated for operating hardware, with anchors, and not more than 1/2-inch- (12.7-mm-) high, with beveled edges providing a floor level change with a slope of not more than 1:2, and in aluminum, mill finish.
- Q. Weather Sweeps: Weather sweep for application to interior side of exterior door bottoms and with concealed fasteners on mounting strips.
- R. Finger Guards: Collapsible neoprene or PVC gasket anchored to frame hinge jamb of center pivoted doors.

## **2.5 SEALING MATERIALS**

- A. Concealed Sealing Materials: Provide silicone sealant for concealed applications within entrances and storefronts, compatible with and adherent to each material it will be in contact with, recommended by the manufacturer to fulfill performance requirements.
- B. Exposed Sealing Materials: Equal to DOW Corning 791, one-component, medium modulus, neutral curing silicone sealant.

## **2.6 FABRICATION**

- A. Fabricate entrances and storefronts to the designs, shapes, and sizes shown using materials specified and shown to produce assemblies which meet or exceed the performance requirements. To the greatest extent possible complete fabrication, assembly, finishing, hardware applications and work before shipment to 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 (3 mm).
  - 2. Door Stile and Rail Dimensions:
    - a. Bottomrails: Provide minimum 10 inch (254mm) high one piece bottom rail unless otherwise indicated on the drawings.
    - b. Stiles and Top Rail Dimensions: Wide stile; over 4 inches (101.6 mm) wide.
    - c. Door Thickness: 1-3/4 inch (44.5 mm).
    - d. Preglaze door units to greatest extent possible, in coordination with installation and hardware requirements. Perform glazing, whether in factory or in field, in accordance with Section 088000.
    - e. Fabricate doors and frames to accommodate the swing direction shown.
  - 3. Provide extruded aluminum entrance door inserts at door frames designed with bosses sized to receive selected door gasket.

- B. Provide continuous interior glazing stops with concealed fasteners for doors and frames. Provide stops with hairline joints at corners. Provide stops with square, not beveled, shouldered profile unless otherwise shown.
- C. Doors and frames shall be cut, reinforced, drilled and tapped in strict accordance with printed door hardware manufacturers 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 storefront and entrance framing components are to receive wiring provide unobstructed clear paths free of burrs and sharp objects with pull strings to facilitate wiring.
- D. 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.
- E. 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.
- F. Exposed Fasteners: Not permitted.
- G. Protection of Metals: Wherever dissimilar metals are in contact, except in the case of aluminum in contact with galvanized steel, zinc, or 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 FINISHES

- A. Refer to Section 084400
- B. Comply with NAAMM *Metal Finishes Manual for Architectural and Metal Products* for recommendations relative to applying and designating finishes.
- 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. **BASE BID:** Toyota Silver: AAMA 2605 with 20 year finish warranty
1. Toyota Silver: Minimum 3 coat system. Submit manufactured paint samples or paint system changes for approval and sign off by **HGI Consulting** prior to manufacture.
  2. Coating Thickness: 1.2 mils
  3. Pre-Treatment: Multi-Stage Cleaning with Chrome Phosphate Conversion Coating 40mg/ft<sup>2</sup>-min.
  4. Abrasion Resistance: Falling Sand Test – 50L/mil
  5. Chemical Resistance: Muratic Acid/Mortar Resistance/Nitric Acid Fumes Test
  6. Color Retention: 10 Years South Florida (Max 5ΔE)
  7. Gloss Retention: Minimum 50% after 10 Years South Florida
  8. Corrosion Resistance: 4000 Hour Humidity Salt Spray
  9. Chalking Resistance: No more than #8 (#6 for Whites)
  10. Film Adhesion: Dry Adhesion/Wet Adhesion Boiling Water Adhesion
  11. Erosion Resistance: Less than 10% after 10 Years South Florida

**ALTERNATE BID OR BASE BID IF MATCHING EXISTING:**

#14 Clear Anodized with a 5 year finish warranty

- E. Concealed Metal Surface Coating: Apply protective coatings to surfaces of metals concealed in the construction:
1. Coating for Carbon Steel: Hot dip galvanized, complying with ASTM A123.
  2. Coating for Aluminum, Carbon Steel, and Bronze: 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 PREPARATION**

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

### 3.2 EXAMINATION

- A. Examine substrates, adjoining construction, and conditions under which the work is to be installed. Proceed with installation after unsatisfactory conditions have been corrected.
  - 1. Before beginning installation of the entrance and storefront work examine building structural frame and building cladding indicated to support the entrance and storefront work.
  - 2. Notify Contractor in writing, of any dimensions, or conditions, found which prevent proper execution of the entrance and storefront work, including specified tolerances. Use Contractor's offset lines and bench marks as basis of measurements.

### 3.3 INSTALLATION

- A. Refer to Section 084413.
- B. Comply with manufacturer's written instructions for protecting, handling, and installing entrance and storefront systems. 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 the entrance and storefront work 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 which are warped, deformed, bowed, dented, defaced, or 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.
- C. Entrance and Storefront Framing: Install framing components plumb and true in alignment with established lines and grades without warp or rack of framing members.

- 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.
  - 1. Door Hardware: Refer to Section 08710.
  - 2. Set sill members in a bed of polyurethane sealant to provide weathertight construction. Comply with requirements of Section 079200.
- E. Install glazing to comply with requirements of Section 088000 unless otherwise indicated.
- F. Install perimeter sealant to comply with requirements of Section 079200, unless otherwise indicated.
- G. Concealed Sealing Components: Apply sealant and gasket components which are integral to the entrance and storefront systems in strict accordance with the each component manufacturers printed instructions.
  - 1. Before applying components remove all mortar, dust, dirt, moisture, and foreign matter which 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.
- H. Anchorage: For entrance and storefront work to the structure and surrounding cladding, install in accordance with the accepted shop drawings.
- I. Welding: Weld with electrodes and by methods recommended by manufacturer of material being welded, and in accordance with AWS D1.1 for concealed steel members.
  - 1. Welds and adjacent metal areas shall be thoroughly cleaned and coated with a single coat of bituminous paint.

### 3.4 ERECTION TOLERANCES

- A. The entrance and storefront systems 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 fixed elements of the structure, including variations from plumb, level, straight and member size: +/- 1/4 inch max in any 20'0" (+/- 6 mm in any 6 m) 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 (.75 mm).
  - 3. Variation from angle, or plumb, shown: +/- 1/8 inch max in any 10'0" (+/- 3 mm in any 3 m) run or story height, non-cumulative.
  - 4. Variation from slope, or level, shown: +/- 1/8 inch max in any 20'0" (+/- 3 mm in any 6 m) run or column-to-column bay, non-cumulative.

**3.5 REMOVAL OF DEBRIS**

- A. Debris caused by, or incidental to, the erection of the entrance and storefront work shall be removed from the site and legally disposed or recycled.

**3.6 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.

**3.7 PROTECTION**

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



## SPECIAL PROGRAM WARRANTY



## TOYOTA SPECIAL PROJECTS LIMITED WARRANTY AND REMEDY

KAWNEER COMPANY, INC. (“Kawneer”) extends the following limited warranties (collectively “Warranties”) to the owner of the TOYOTA DEALERSHIP (“Owner”) with an address of \_\_\_\_\_ (“Toyota Dealership”) for the Kawneer products (“Products”) supplied for the [Project Name/Number] (“Project”).

### Products Warranty.

The Products will be free from material defects, in material and workmanship, and will comply with the specifications and performance criteria set forth in Kawneer’s proposal for the Project (“Product Warranty”).

The Product Warranty does not cover, and Kawneer hereby disclaims all liability for, the installation of Kawneer Products, any particular application or selection of the Product for any particular project or design, any parts, hardware, gaskets, glazing materials, components or sealants of other manufacturers used with Kawneer Products, or any lack of performance of Kawneer products attributable to such items. Laws and building and safety codes governing the design and use of glazed entrance, windows, and curtain wall products vary widely. Except for its Products’ compliance with the specifications and performance criteria set forth in Kawneer’s proposal for the Project, Kawneer does not control the selection of Product configurations, operating hardware, or glazing materials, and assumes no responsibility therefore.

Kawneer Products are detailed by Kawneer when required to show our understanding of the job requirements and are submitted for approval. Upon request, Kawneer will fabricate in accordance with dimensions shown on approved drawings and will take no responsibility for failure to check drawings against job site conditions. Special entrances cannot be scheduled for production until the approved details, with the dealer’s signature, have been received, and all special hardware is in our possession. Changes made after approval of details may involve additional charges on the order.

### Paint Finish Warranty.

Kawneer also warrants that the 70% Fluoropolymer Paint Finish applied at its \_\_\_\_\_ plant to the aluminum material (“Metal”) (i) will not chalk more than that represented by a No. 8 rating for colors or No. 6 for whites, when measured in accordance with the standard procedures specified in ASTM D 4214, Test Method A (“Excessive Chalking”); (ii) will not change color more than five (5) Hunter  $\Delta E$  units as determined by ASTM D 2244 (“Excessive Color Change”); and (iii) will not crack, check or peel (“Paint Finish Warranty”).

**PART 4 -**

The Paint Finish Warranty will not apply to or cover, and Kawneer disclaims all liability for, (a) damage to the finish occasioned by moisture or other contamination detrimental to the finish because of improper storage of the finished Metal prior to installation; (b) water damage due to condensation caused by improper repackaging of the finished Metal prior to installation; (c) damage including but not limited to scratches and abrasions to the finished Metal caused by use, handling, shipping and/or installation, or by utilization of the Metal with any parts, gaskets, glazing materials, components or sealants of other manufacturers used with Kawneer Products, or any lack of performance of Kawneer Products attributable to such items; (d) damage to finished Metal caused by exposure to caustic agents, acidic agents, or harmful fumes or other destructive foreign materials; (e) damage due to improper maintenance i.e. the use of chemical cleaning agents; (f) corrosion of finished Metal due to aggressive atmospheres including exposure to salt spray and/or salt mist; and (g) any particular application or selection of the finished Metal for any particular project or design.

In order for the Paint Finish Warranty to remain valid, a systematic maintenance program must be instituted by the purchaser or user to prevent the build-up of dirt and salt deposits on the painted surface. The surface must be cleaned at least annually in accordance with AAMA 609 & 610-02 so as to prevent the accumulation of harmful deposits. More frequent cleaning is required in heavy industrialized environments or coastal environments. Coastal environments where salt spray or salt fog is present can be very detrimental to metal especially where the paint coating has been scratched or damaged. In coastal environments where metal is exposed to salt spray or salt fog or in heavy industrial environments, the metal surface must be cleaned at least once quarterly to prevent the accumulation of harmful deposits. A FAILURE TO INSTITUTE A SYSTEMATIC MAINTENANCE PROGRAM AS DESCRIBED ABOVE WILL VOID THIS WARRANTY.

Kawneer is not responsible for chalking or for fading or color changes that are less than the Excessive Chalking or Excessive Color Change referenced and warranted above. Normal weathering, such as the damaging effects of sunlight and exposure to the elements, such as extremes of weather and atmosphere, may cause any colored surface to fade, chalk, or become soiled or stained. These changes may not be uniform if the surfaces are not equally exposed to the sun and elements. The degree to which normal weathering occurs will vary depending on the air quality, the building's location and other factors over which Kawneer has no control. Metallic/mica flake colors are not color measurable and are not applicable to the Excessive Color Change warranty.

This Paint Finish Warranty will apply only to Metal, which is finished in the \_\_\_\_\_ plant and used within the continental United States, unless Kawneer agrees otherwise in writing.

**PART 5 -**

Limited Lifetime Warranty for Kawneer Doors Welded, Dual Moment Corner Construction.

Subject to the limitations and terms and conditions set forth herein, Kawneer warrants that the welded corner construction of the doors shall be free from material defects in workmanship and material for the normal useful life of the door ("Welded Corner Warranty"). This limited lifetime warranty applies solely and exclusively to Kawneer doors with welded dual moment corner construction.

IV. Additional Terms and Conditions.

The Products and Paint Finish Warranties will apply for a period of ten (10) years from the date of substantial completion of the Project, provided however, that under no circumstances will this Warranty begin later than six (6) months after the date of shipment of the products by Kawneer for the Project ("Warranty Period").

All Warranties set forth herein apply only if Kawneer's products are installed and maintained according to Kawneer's recommended practices and installation instructions for the Project, and with respect to the Products and Paint Finish Warranties, only to defects appearing within the Warranty Period, and with respect to all the Warranties, only if Kawneer is notified in writing within sixty (60) days after such defects either (i) appear or (ii) should have been discovered after the exercise of reasonable diligence. Failure of the claiming party to notify Kawneer within such time frames will automatically relieve Kawneer of any and all responsibility and/or liability under these any of these Warranties.

These Warranties do not cover, and Kawneer hereby disclaims all liability for, any products which have been subject to abuse, alteration, neglect, misuse, abnormal use, accident, fire, war, flood, earthquakes, acts of God, or to which parts, not supplied by Kawneer have been added, or to defects caused by depreciation or normal wear and tear.

All decisions regarding the existence of defects in material and workmanship and the occurrence of any of the matters affecting these Warranties shall be made by Kawneer and shall be final and binding upon the parties.

KAWNEER DOES NOT MAKE ANY OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The sole and exclusive remedy with respect to these Warranties or with respect to any other claim relating to defects or any other condition or use of the Products, finished Metal, and/or Kawneer Doors with Welded Dual moment Corner Construction supplied by Kawneer, however caused, and whether such claim is based upon warranty, contract, negligence, strict liability, or any other theory is limited to, at Kawneer's sole option, repair, refinish (in the case of refinished Metal), replacement or repayment by Kawneer of the purchase price paid for it. If Kawneer elects to repair or replace such Products, Kawneer will provide the products, materials and labor to make such repair or replacement. Refinishing of the defective Metal shall be performed by using standard finishing practices and materials as selected by Kawneer. Kawneer reserves the right to approve any contract for refinishing of defective Metal. The products repaired, replaced, refinished or otherwise restored will be warranted to the same extent and to the expiration date from the original date of shipment, and this Warranty will not be deemed to have been extended from the date of such warranty work. At no time do these Warranties confer upon the claiming party or any other party the right to proceed with repair, replacement, refinishing or restoration, without written notice and agreement by an authorized officer of Kawneer. Any such work undertaken by the claiming party or any other party will be for the claiming party's own account and will result in these Warranties becoming null and void.

KAWNEER'S AGGREGATE TOTAL CUMULATIVE LIABILITY UNDER THESE WARRANTIES IS LIMITED TO THE DOLLAR AMOUNT OF THE PURCHASER'S ORIGINAL PAYMENT MADE TO KAWNEER FOR MATERIAL FURNISHED BY KAWNEER ONLY. IN CONSIDERATION OF THESE WARRANTIES, KAWNEER SHALL NOT BE LIABLE FOR SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO LOSS OF USE, LOSS OF PROFITS OR GOODWILL, DAMAGES FOR NEGLIGENCE IN THE MANUFACTURE, DESIGN, OR INSTALLATION OF THE PRODUCTS, OR OTHER COMMERCIAL LOSS OR INJURY.

These are the only Warranties made in the connection with the sale and distribution of the Kawneer Products, Paint Finish, and Kawneer Doors with Welded Dual Moment Corner Construction. No representative, dealer, or any other person is authorized to make or makes any warranty, representation, or promise with respect to the Kawneer products. No terms or conditions other than those stated in these Warranties, and no agreement or understanding, oral or written, in any way purporting to modify these Warranties will be binding on Kawneer unless made in writing and signed by Kawneer's authorized representative. This Warranty is transferable and may extend to a purchaser of the original Owner of the premises for the balance of the term of the Warranty.

Customer's agreement to and acceptance of these Warranties shall be indicated by signing and returning a copy of this document to Kawneer.

Kawneer Company, Inc.

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date signed: \_\_\_\_\_

Accepted By:

Customer

Signature: \_\_\_\_\_

Title: \_\_\_\_\_

Date Signed: \_\_\_\_\_

END OF SECTION 084113

## SECTION 087100 - DOOR HARDWARE

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Finish hardware for doors as specified and as listed in "Hardware Sets" and required by actual conditions.
  - 2. Include screws, special screws, bolts, special bolts, expansion shields, and other devices for proper application of hardware.
- B. Related Sections include the following:
  - 1. Division 8 Section 08110 "Steel Doors and Frames": Preparation for door Silencers and other hardware.
  - 2. Division 8 Section 08410 "Aluminum Framed Storefronts". Preparation for Door hardware.

#### 1.2 GENERAL REQUIREMENTS

- A. Provide items, articles, materials, operations and methods listed, mentioned or Scheduled herein or on Drawings, in quantities as required to complete project. Provide hardware that functions properly. Prior to furnishing hardware, advise Architect of items that will not operate properly, are improper for conditions, or will not remain permanently anchored.

#### 1.3 SUBMITTALS

- A. Hardware Schedule: Submit 5 copies of hardware schedule in vertical format for Purpose of preliminary review and acceptance. Schedules which do not comply will Be returned for correction before checking. Hardware schedule shall clearly indicate Architect's hardware set and manufacturer of each item proposed. List shall contain Hardware item, base metal, finish, hand, size, and type number.
  - 1. Provide 2 copies of illustrations from manufacturer's catalogs and data in Brochure form.
  - 2. Check specified hardware for suitability and adaptability to details and surrounding Conditions. Indicate unsuitable or incompatible items and proposed substitutions In hardware schedule.
  - 3. Provide listing of manufacturer's template numbers for each item of hardware in Hardware schedule.
  - 4. Furnish other Contractors and Subcontractors concerned with copies of final Approved hardware schedule. Submit necessary templates and schedules as soon As possible to hollow metal, wood door, and aluminum door fabricators in Accordance with schedule they require for fabrication.
  - 5. Samples: Lever design or finish sample: Provide 3 samples if requested by architect.
- B. Installation Instructions: Provide manufacturer's written installation and adjustment Instructions for finish hardware. Finish Hardware Schedule submittal to list installation Notes for each door closer and any other pertinent hardware component in each heading To assure proper understanding of hardware mountings and operation. Send installation Instructions to site with hardware.
- C. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame Supplier and others as applicable to enable proper and accurate sizing and locations Of cutouts and reinforcing.

- D. Contract Closeout Submittals: Comply with Section 01700 including specific Requirements indicated.
1. Operating and maintenance manuals: Submit 3 sets containing the following:
    - A. Complete information in care, maintenance, and adjustment, and data on Repair and replacement parts, and information on preservation of finishes.
    - B. Catalog pages for each product.
    - C. Name, address, and phone number of local representative for each Manufacturer.
    - D. Parts list for each product.
  2. Copy of final approved hardware schedule, edited to reflect "As installed".
  3. Copy of final keying schedule.
  4. One complete set of special tools required for maintenance and adjustment of Hardware, including changing of cylinders.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer: Obtain each type of hardware (ie. Latch and locksets, hinges, closers) From single manufacturer, although several may be indicated as offering products Complying with requirements.
- B. Supplier: Recognized architectural finish hardware supplier, with warehousing Facilities, who has been providing hardware for period of not less than 3 years, And who is, or who employs a certified architectural hardware consultant (AHC) Who is available, at reasonable times during course of work, for consultation About project's hardware requirements. Hardware schedule shall be prepared and Signed by a certified AHC.
- C. Installer: Firm with 3 years experience in installation of similar hardware to that Required for this project, including specific requirements indicated.
- D. Regulatory Label Requirements: Provide nationally recognized testing agency label or Stamp on hardware for labeled openings. Where UL requirements conflict with Drawings or specifications, hardware conforming to UL requirements shall be provided. Conflicts and proposed substitutions shall be clearly indicated in hardware schedule.
- E. Handicapped Requirements: Doors to stairs (other than exit stairs), loading platforms, Boiler rooms, stages and doors serving other hazardous locations shall have knurled Or other similar approved marking of door lever handles or cross bars in accordance With local building codes. Where indicated to comply with accessibility requirements, Comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG).
- F. Pre-Installation Conference: Prior to the installation of hardware, manufacturer's Representatives for locksets, closers, and exit devices shall arrange and hold a jobsite Meeting to instruct the installing contractor's personnel on the proper installation of Their respective products. A letter of compliance, indicating when this meeting is held And who is in attendance, shall be sent to the Architect and Owner.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver hardware to jobsite in manufacturer's original packaging, marked to correspond With approved hardware schedule. Do not deliver hardware until suitable locked Storage space is available. Check hardware against reviewed hardware schedule. Store hardware to protect against loss, theft, or damage.

- B. Deliver hardware required to be installed during fabrication of hollow metal, aluminum, Wood, or stainless steel doors prepaid to manufacturer.

1.6 WARRANTY

- A. Guarantee workmanship and material provided against defective manufacture. Repair Or replace defective workmanship and material appearing within period of one year after substantial completion.
- B. Provide the following factory warranties on hardware products against defects in Material and workmanship from date of occupancy of Project.

Hinges and Continuous Hinges: Life of the opening  
Exit Devices: Five years Locksets: 7 Year  
Closers: Ten Years  
Balance of Finish Hardware: One Year

PART 2 - PRODUCTS

2.1 BUTTS AND HINGES

- A. Acceptable Manufacturers and Types:
- B. All hinges to conform to the following ANSI criteria: Standard weight hinges to ANSI/BHMA A156.1-1998 A2112 - (Brass/Bronze), A8112 (Steel) Heavy weight Hinges to ANSI/BHMA A156.1-1998 A2111 (Brass/Bronze), A8111 (Steel)

<u>Type</u>	<u>McKinney</u>	<u>Hager</u>
Type 1	TA2714	BB1279
Type 2	TA2314	BB1191
Type 3	T4A3386	BB1199
Type 4	T4A3786	BB1168

- C. Size:
  - 1. 2-1/4 inch Doors - 5 inch by 5 inch
  - 2. 1-3/4 inch Doors - up to 36" wide 4-1/2 inch by 4-1/2 inch
  - 3. 1-3/4 inch Doors - over 36" wide 5 inch by 4-1/2 inch
- D. Quantity:
  - 1. 2 - hinges per leaf for openings through 60 inches high.
  - 2. 1 - additional hinge per leaf for each additional 30 inches in height or fraction thereof.
- E. Drill 5/32 inch hole and use No. 12, 1-1/4 inch steel threaded to the head wood screws for hinges on wood doors.

2.2 CONTINUOUS HINGES

- A. Acceptable manufacturers:

<u>Pemkko</u>	<u>McKinney</u>
CFM -HD	MCK 12 HD
CFM	MCK 12

- B. All continuous hinges shall be guaranteed for the life of the opening. Continuous Hinges with electrical thru wire features shall be industry certified to meet a minimum of 1 million cycles and carry a minimum of 3.5 amps at 24 volts per lead wire. Continuous hinges shall be serviceable and removable without de-mounting the door From the frame. Electric thru wire modification must be guaranteed for no less than Five years.

### 2.3 FLUSH BOLTS AND DUSTPROOF STRIKES

- A. Products to conform to BHMA L04081; ANSI 156.16 (manual flush bolts), and ANSI A156.3, Type 25 (automatic flush bolts).
- B. Acceptable Manufacturers and Models:

<u>McKinney</u>	<u>Rockwood</u>	<u>Door Controls</u>
FB01M	550	780
FB06M	1842	842NH
FB11W	557	942NH
DPS3	570	80

- C. Non-labeled Openings: Provide 2 flush bolts FB01M for inactive leaf of pairs of locked And latched doors. Locate centerline of top bolt not more than 78 inches from Finished floor. Provide dustproof strike DPS3 for bottom bolt.
- D. Labeled Openings: Provide automatic flush bolt set FB06M or FB06W, as applicable, for Inactive leaf or pairs of doors. Provide dustproof strike DPS3 for bottom bolt.

### 2.4 LOCKSETS - MORTISE

- A. Mortise locksets to conform to ANSI A156.13 Operational Grade 1 and security grade 1 Series 1000
- B. Acceptable Manufacturers and Series
  - Sargent 8200
  - Best 35H
  - Schlage 9000
- C. Trim 8200 LNJ
- D. Provide lock functions specified in Hardware Sets, with following provisions:

1. Cylinders: Manufacturer's to be 7 pin removable core series .
2. Backsets: 2-3/4 inches.
3. Strikes: Provide wrought boxes and strikes with proper lip length to protect trim But not to project more than 1/8 inch beyond trim, frame or inactive leaf. Where Required, provide open back strike and protected to allow practical and secure Operation.



## 2.5 EXIT DEVICES

- A. All exit devices shall be ANSI A156.3, Grade 1 Certified and shall be listed by Underwriters Laboratories and bear the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Push rails shall be clad with satin stainless steel material and shall have matching end caps. Painted or anodized aluminum shall not be considered as acceptable. Lever trim shall be available in finishes and designs to match that of the specified locksets.

1) Specified Manufacturer: Adams Rite

- C. All exit devices shall be UL listed for panic. Exit devices for labeled doors shall be UL listed as "Fire Exit Hardware".
- D. Where lever trim is specified, provide lever design to match lockset levers.
- E. Provide cylinders for exit devices with locking trim and cylinder dogging.
- F. Provide cylinder dogging feature for non-rated exit devices.
- G. Provide keyed removable mullions, as specified in the Hardware Sets.
- H. Provide electrical functions and components to match those listed in the Hardware Sets.

## 2.6 KEYING

- A. Provide cylinders keyed to a Best Universal Lock high security system.
- B. Any future cylinders shall be Master keyed or Grand master keyed and keyed in groups To Owner's existing master key system. Factory master key with manufacturer Retaining permanent keying records.
- C. Keying Meeting: Owner representative, distributor representative and an Architect Representative must be present. Contact the Construction Manager to establish when And where keying conference will be held. A file copy of the Owner approved Keying schedule shall be submitted to the Owner and Architect. Confirm permanent Core type to be provided by Owner.
- D. Provide a visual key control identification on both the key and stamped on side of the Cylinder for any future cores. This identification will be in a D.H.I. nomenclature.

## 2.7 DOOR TRIM

- A. Acceptable Manufacturers and Types: Architectural door trim to conform to ANSI/BHMA A156.6

<u>McKinney</u>	<u>Hager</u>	<u>Rockwood</u>
DP503	31H	110-70B
PO55	60S	71F

- B. Push Plates: McKinney PO55 8 inches by 16 inch unless otherwise indicated. Where width of door stile prevents use of 6 inch wide plate, provide push plate one Inch less than width of stile but not less than 4 inches wide.
- C. Pulls: McKinney DP503, unless otherwise indicated.

Where required, mount back to back with push bars.

- D. Kick Plates and Mop Plates: Minimum of 0.050 inch thick, beveled 3 edges.
  - 1. At single doors provide width 1-1/2 inch less than door width on stop side for Kick plates and one inch less than door width on face side for mop plates.
  - 2. At pairs of doors provide width one inch less than door width on both sides.
  - 3. Height of kick plates to be 12 inches, unless otherwise indicated. Height of mop Plates to be 4" , unless otherwise indicated.

## 2.8 DOOR CLOSERS

- A. Acceptable Manufacturers and Types of Exposed Closers: Closers to conform to ANSI/BHMA A156.4, Grade 1
  - Sargent 351
  - L. C. N. 4400
  - Norton 8500
- B. Provide sized closers, adjustable to meet maximum opening force requirements Of ADA.
- C. Provide drop plates, brackets, or adapters for arms as required to suit details.
- D. Mount closers on room side of corridor doors, inside of exterior doors, and stair side Of stairway doors.
- E. Provide back-check for closers.
- F. Provide hold-open arms where indicated.
- G. Provide closers for doors as noted in Hardware Sets and, in addition, provide closers For labeled doors whether or not specifically noted in sets.
- H. Provide closers meeting the requirements of UBC 7-2 and UL 10C positive pressure Tests.

## 2.10 AUTOMATIC OPERATORS

- A. Acceptable Manufacturers and Types of Low Energy Operators: Low energy operators To conform to ANSI/BHMA A156.19 requirements and comply with UL listing for Fire rated assemblies. L.C.N.
- B. Operator units shall provide conventional door closer opening and closing forces Unless the power operator motor is activated by wall switch. Units shall have door Closer assembly with adjustable spring size, back check valve, sweep valve, latch valve, Speed control valve, and pressure adjustment valve to control door closing.
- C. Operator units shall have a three position selector mode switch that shall permit units to Be switched "ON" to monitor for function activation. "HO" for indefinite hold open Function, or "OFF" which shall deactivate all control functions but will allow standard Door operation by means of the internal mechanical closer.
- D. Low energy door operators shall have the following adjustments:
  - 1. Motor assist shall be adjustable from 0 to 30 seconds in 5 second increments.
  - 2. Door control shall be adjustable to provide compliance with the requirements of the Americans with Disabilities Act (ADA).
  - 3. Door closing force and back check shall be adjustable.

- 4. Motor start up delay.
- 5. Vestibule interface delay.
- 6. Electric lock delay.
- 7. Door hold open delay up to 30 seconds.

- E. Operator units shall have vestibule inputs to allow sequencing operation of two units.
- F. Operator units shall have a SPDT relay for interfacing with latching or locking devices.

2.11 OVERHEAD STOPS

- A. Acceptable Manufacturers and Types: Conform to ANSI/BHMA A156.8

<u>Sargent</u>	<u>Rixson</u>
690	1 Series
1530	10 Series
590	9 Series

- B. Provide sex bolt attachments for mineral core door application.

2.12 STOPS AND HOLDERS

- A. Acceptable Manufacturers and Types

Wall bumpers to conform to ANSI/BHMA A156.16, Type L02251  
Floor stops to conform to ANSI/BHMA A156.16, Types L02141/L02161

<u>McKinney</u>	<u>Hager</u>	<u>Rockwood</u>
WS02	236W	409
FS01	241F	440
FS02	243F	442

- B. Provide 1212 Series floor stop as applicable, for each door leaf except where floor stops are specified otherwise in Hardware Sets, or where conditions require the use of an Overhead stop.
- C. Provide 55 Series overhead stops for doors that swing more than 140 degrees before striking a wall.

2.13 THRESHOLDS

- A. Acceptable Manufacturers: Pemko, Reese Enterprises, and National Guard Products. Thresholds to conform to ANSI/BHMA A156.21, Type J12100

<u>Pemko</u>	<u>Reese</u>	<u>McKinney</u>
171A	S205A	MCK171

- B. Where thresholds are specified in hardware groups, provide 171A thresholds unless detailed otherwise.
- C. Refer to drawings for special details. Provide accessories, shims and fasteners. Where thresholds occur at openings with one or more mullions, they shall be cut for the mullions and extended continuously for the entire opening.

2.14 WEATHERSTRIPPING

- A. Acceptable Manufacturers and Product: Weatherstripping to conform to ANSI/BHMA A156.22

	<u>Pemko</u>	<u>Reese</u>
Sweeps	18062	964
Jambs/ Head	2891	855D
Astragal	18041	804D
Drip Cap	346C	R201

- B. Where weatherstripping is specified in hardware sets, provide 2891 unless detailed Otherwise.
- C. Provide self-tapping fasteners for weatherstripping being applied to hollow metal Frames.
- D. Where sweeps are specified in hardware sets, provide 18062 unless detailed otherwise.

2.15 GASKETING

- A. Acceptable Manufacturers: Pemko, Reese Enterprises, and McKinney. Refer to drawings for special details. Provide accessories, shims and fasteners.

<u>Pemko</u>	<u>Reese</u>
F771	F-897B

- B. Where smoke gasket is specified in hardware sets, provide f771 unless detailed Otherwise.
- C. Provide gaskets for 20-minute doors and doors designated for smoke and draft Control.
- D. Where frame applied intumescent seals are required by the manufacturer, provide Gaskets that comply with UBC 7-2 and UL 10C positive pressure tests.

2.16 KEY CABINET

- A. Basis-of-Design Product: Lund Deluxe Series 1200 wall type cabinet with one hook For each lock or cylinder plus at least 50 percent extra hooks.
- B. Comparable Manufacturers: Key Control or Telkee Inc.
- C. Provide each hook with one non-removable security key tag and one snap-on link Duplicate key tag.
- D. Provide tools, instruction sheets and accessories required to complete installation.
- E. Hardware Supplier to meet with Owner and help Owner to organize and place keys In key cabinet and complete index cards furnished with key system.

2.17 FASTENERS

- A. Including, but not limited to, wood or machine screws, bolts, nuts, anchors, etc. of Proper type, material, and finish required for installation of hardware.
- B. Use phillips head for exposed screws. Do not use aluminum screws to attach hardware.
- C. Provide self-tapping (TEC) screws for attachment of sweeps and stop-applied Weatherstripping.

2.18 TYPICAL FINISHES AND MATERIALS

- A. Finishes, unless otherwise specified:
  - 1. Butts: Outswinging Exterior Doors US32D (BHMA 630) Stainless Steel
  - 2. Butts: Interior Doors and Inswinging Exterior Doors US26D (BHMA 626) Satin Chrome
  - 3. Exit Devices: US32D (BHMA 630) Satin Stainless Steel
  - 4. Removable Mullions: US28 (BHMA 628) Anodized Aluminum
  - 5. Locks and Latches: US26D (BHMA 626) Satin Chrome
  - 6. Push Plates, Pulls and Push Bars: US32D (BHMA 630) Satin Stainless Steel
  - 7. Kick Plates, Armor Plates, and Edge Guards: US32D (BHMA 630) Satin Stainless Steel
  - 8. Overhead Stops and Holders: US26D (BHMA 626) Satin Chrome on Bronze
  - 9. Closers: Surface mounted. Sprayed Aluminum Lacquer.
  - 10. Miscellaneous Hardware: US32D (BHMA 630)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors, frames, and related items for conditions that would prevent the Proper application of finish hardware. Do not proceed until defects are corrected.

3.2 INSTALLATION

- A. Install finish hardware in accordance with reviewed hardware schedule and Manufacturer's printed instructions. Prefit hardware before finish is applied, remove And reinstall after finish is completed. Install hardware so that parts operate Smoothly, close tightly and do not rattle.
- B. Installation of hardware shall comply with NFPA 80 and NFPA 101 requirements
- C. Set units level, plumb and true to line and location. Adjust and reinforce attachment To substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene Mastic sealant, forming tight seal between threshold and surface to which set. Securely and permanently anchor thresholds, using countersunk non-ferrous Screws to match color of thresholds (stainless steel screws at aluminum thresholds).

- F. Lead Protection: Lead wrap hardware penetrating lead-lined doors. Levers and Roses to be lead lined. Apply kick and armor plates with 3M adhesive #1357, as Recommended by 3M Co., on lead-lined doors.

### 3.3 FIELD QUALITY CONTROL

- A. After installation has been completed, provide services of qualified hardware Consultant to check Project to determine proper application of finish hardware According to schedule. Also check operation and adjustment of hardware items.
- B. Adjust door control devices to compensate for final operation of heating and Ventilating equipment.

### 3.4 ADJUSTING AND CLEANING

- A. At final completion, hardware shall be left clean and free from disfigurement. Make Final adjustment to door closers and other items of hardware. Where hardware is Found defective repair or replace or otherwise correct as directed.
- B. Adjust door closers to meet opening force requirements of ADAAG.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior To acceptance or occupancy of space or area, return to work during week prior to acceptance or occupancy, and make final check and adjustment of hardware items in Such space or area. Clean operating items as necessary to restore proper function And finish of hardware and doors.
- D. Instruct Owner's personnel in proper adjustment and maintenance of door hardware And hardware finishes.
- E. Clean adjacent surfaces soiled by hardware installation.
- F. Replace shortages and incorrect items with correct material at no additional cost to Owner.
- G. At completion of project, qualified factory representative shall inspect closer Installations. After this inspection, letter shall be sent to Architect reporting on Conditions, verifying that closers have been properly installed and adjusted.

### 3.5 PROTECTION

- A. Provide for proper protection of items of hardware until Owner accepts Project as Complete.

### 3.6 HARDWARE SETS

- A. Provide door hardware for each door to comply with requirements in this Section, Door hardware sets / groups indicated in door and frame schedule, and the Door Hardware Schedule listed in the Drawings.
- B. Refer to the Drawings for the door schedule for hardware set required at each door opening on the service addition.
- C. Door schedule for Showroom Addition as follows:

**Hardware Schedule 2008-279.03**

**Set: SR-01**

Doors: 101

Hinge	Refer to Section 084110
Dorma Narrow Stile Exit Device with 320 Overlap Strike	9700 BB
Sargent Cylinder	10-6334
Pull	Refer to Section 084110
Dorma flush track Closer	8616 FT

Notes: Provide 5/16" spacer for door closer if required. Refer to section 084110 for additional information and hardware requirements. Coordinate with NanaWalls manufactures rep prior to ordering and installing Exit device.

**Set: SR-02**

Doors: 102, 108

Hinge	Refer to Section 084110
Sargent Cylinder	10-6334
Pull	Refer to Section 084110
Dorma flush track Closer	8616 FT

Notes: Provide 5/16" spacer for door closer if required. Refer to section 084110 for additional information and hardware requirements. Coordinate with NanaWalls manufactures rep prior to ordering and installing Closer.

**Set: SR-03**

Doors: 103

6 Refer to Section 08 5113				
2 Push	8600 Matching End Caps-US32D	US32D	AD	
1 Cylinder	10-6334	US26D	SA	
2 Pull	RM202.	US32D	RO	
2 Concealed Overhead Holder/Stop	6- Series	652	RF	
2 Surface Closer	351 OZ	EN	SA	087100
2 Mounting Plate	351B	EN	SA	087100
1 Threshold	171AK		PE	
2 Door Sweep	29326CNB		PE	

Notes: Weatherstrip and astragal integral with aluminum frame and door assembly. Refer to section 08 5113 for additional items and requirements.

**Set: SR-04**

Doors: 104

6 Refer to Section 08 5113

2 Push Rockwood	70c	US32D	RO	
2 Pull Rockwood	RM202	US32D	RO	
2 Concealed Overhead Holder/Stop	6- Series	652	RF	
2 Surface Closer	351 OZ	EN	SA	087100
2 Mounting Plate	351B	EN	SA	087100
1 Threshold	171AK		PE	
2 Door Sweep	29326CNB		PE	

Notes: Weatherstrip and astragal integral with aluminum frame and door assembly. Refer to section 08 5113 for additional items and requirements.

**Set: SR-05**

Doors: 105, 107

6 Refer to Section 08 5113

1 Push Rockwood	70c	US32D	RO	
1 Pull Rockwood	RM202	US32D	RO	
1 Concealed Overhead Holder/Stop	6- Series	652	RF	
1 Surface Closer	351 OZ	EN	SA	087100
1 Mounting Plate	351B	EN	SA	087100
1 Door Sweep	29326CNB		PE	

Notes: Refer to section 08 5113 for additional items and requirements.

**Set: SR-06**

Doors: 106

2 Continuous Hinge	MCK 12 HD		MC	
2 2 point dead latch	4781	US32D	RO	
2 Concealed Overhead Holder/Stop	6- Series	652	RF	
2 Surface Closer	351 OZ	EN	SA	087100
2 Mounting Plate	351B	EN	SA	087100
2 Door Sweep	29326CNB		PE	

Notes: Refer to section 08 5113 for additional items and requirements.



**Set: SR-07**

Doors: 109

Notes: Match existing hardware, finish to match new door.

**SECTION 08 8000 - GLAZING**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Glass.
- B. Glazing compounds and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 1113 - Hollow Metal Doors and Frames: Glazed doors and borrowed lites.
- B. Section 08 5113 - Aluminum Windows: Glazed windows.
- C. Section 10 2800 - Toilet, Bath, and Laundry Accessories: Mirrors.

**1.03 REFERENCE STANDARDS**

- A. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005.
- B. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants; 2005.
- C. ASTM C 1036 - Standard Specification for Flat Glass; 2006.
- D. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass; 2004.
- E. ASTM C 1193 - Standard Guide for Use of Joint Sealants; 2009.
- F. ASTM E 1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2007.
- G. ASTM E 2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2008.
- H. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2004.
- I. GANA (SM) - FGMA Sealant Manual; Glass Association of North America; 1990.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

**1.05 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum (3) years documented experience.

**1.06 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 50 degrees F (10 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

## 1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

## PART 2 - PRODUCTS

### 2.01 GLAZING TYPES

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing, low-E.
  - 1. Application(s): All exterior glazing unless otherwise indicated.
  - 2. Substitutions: Refer to Section 01 6000 - Product Requirements.
  - 3. Thermal Resistance (U-Value): 0.29, nominal.
  - 4. Total Solar Heat Gain Coefficient: 0.23, nominal.
  - 5. Total Visible Light Transmittance: 22 percent.
  - 6. Inboard Lite: Annealed float glass, 1/4 inch (6 mm) thick.
  - 7. Basis of Design: PPG Sungate 500 Low-E.
  - 8. Outboard Lite: Annealed float glass, 1/4 inch (6 mm) thick, minimum.
    - a. Tint: Lite Bronze.
    - b. Coating: Low-Emissivity Coating
  - 9. Inboard Lite: Annealed float glass, 1/4 inch (6 mm) thick.
    - a. Tint: Clear.
  - 10. Total Thickness: 1 inch (25 mm).
- B. Type IG-3 - Sealed Insulating Glass Units: Safety glazing:
  - 1. Applications: Provide this type of glazing in the following locations:
    - a. Glazed sidelights and panels next to doors.
    - b. Other locations required by applicable federal, state, and local codes and regulations.
    - c. Other locations indicated on the drawings.
  - 2. Type: Same as other vision glazing except use fully tempered float glass for both outboard and inboard lites.
- C. Type S-3 - Single Safety Glazing: Non-fire-rated.
  - 1. Applications: Provide this type of glazing in the interior locations:
    - a. Glazed lites in doors, except fire doors.
    - b. Glazed sidelights to doors, except in fire-rated walls and partitions.
    - c. Other locations required by applicable federal, state, and local codes and regulations.
    - d. Other locations indicated on the drawings.
  - 2. Type: Fully tempered float glass as specified.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch (6 mm).

### 2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with 2009 International Building Code with Maine Amendments.
  - 1. Use the procedure specified in ASTM E 1300 to determine glass type and thickness.
  - 2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
  - 3. Thicknesses listed are minimum.

### 2.03 GLASS MATERIALS

- A. Float Glass Manufacturers:
  - 1. Zeledyne: [www.versaluxglass.com](http://www.versaluxglass.com).
  - 2. Pilkington North America Inc: [www.pilkington.com](http://www.pilkington.com).
  - 5. PPG Industries, Inc: [www.ppg.com](http://www.ppg.com).
  - 6. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Float Glass: All glazing is to be float glass unless otherwise indicated.
  - 1. Annealed Type: ASTM C 1036, Type I, transparent flat, Class 1 clear, Quality Q3 (glazing select).
  - 2. Heat-Strengthened and Fully Tempered Types: ASTM C 1048.
  - 3. Tinted Types: Color and performance characteristics as indicated.
  - 4. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

#### 2.04 SEALED INSULATING GLASS UNITS

- A. Manufacturers:
  - 1. Viracon, Apogee Enterprises, Inc: [www.viracon.com](http://www.viracon.com).
  - 3. Substitutions: Refer to Section 01 6000 - Product Requirements.
- B. Sealed Insulating Glass Units: Types as indicated.
  - 1. Durability: Certified by an independent testing agency to comply with ASTM E 2190.
  - 2. Edge Spacers: Aluminum, bent and soldered corners.
  - 3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
  - 4. Purge interpane space with dry hermetic air.

#### 2.05 GLAZING COMPOUNDS

- A. Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; grey color.
- B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.
- C. Acrylic Sealant: Single component, solvent curing, non-bleeding; ASTM C 920, Type S, Grade NS, Class 12-1/2, Uses M and A; cured Shore A hardness of 15 to 25.
- D. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; cured Shore A hardness of 15 to 25.

#### 2.06 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C 864 Option I. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch (75 mm) long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C 864 Option I.
- E. Glazing Clips: Manufacturer's standard type.

### PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement; weeps are clear, and ready to receive glazing.

### 3.02 PREPARATION

- A. Prime surfaces scheduled to receive sealant.
- B. Install sealants in accordance with ASTM C 1193 and FGMA Sealant Manual.
- C. Install sealant in accordance with manufacturer's instructions.

### 3.03 GLAZING METHODS

**Note: Follow Manufacturer recommendations in selecting the Glazing Method. Use the Manufacturer recommended sealant.**

### 3.04 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

### 3.05 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- E. Trim protruding tape edge.

### 3.06 INSTALLATION - EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

- A. Cut glazing tape to length and set against permanent stops, 3/16 inch (5 mm) below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.
- D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- E. Install removable stops, with spacer strips inserted between glazing and applied stops, below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.
- F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch (9 mm) below sight line.

- G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.07 INSTALLATION - EXTERIOR WET METHOD (SEALANT AND SEALANT)**

- A. Place setting blocks at 1/4 points and install glazing pane or unit.
- B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch (600 mm) intervals, 1/4 inch (6 mm) below sight line.
- C. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 3/8 inch (9 mm) below sight line to ensure full contact with glazing and continue the air and vapor seal.
- D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### **3.08 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)**

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

### **3.09 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)**

- A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch (1.6 mm) above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches (150 mm) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch (600 mm) intervals, 1/4 inch (6 mm) below sight line.
- E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

### **3.10 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND)**

- A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch (600 mm) centers, kept 1/4 inch (6 mm) below sight line.
- B. Locate and secure glazing pane using glazers' clips.
- C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

### **3.11 MANUFACTURER'S FIELD SERVICES**

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

### **3.12 CLEANING**

- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

### **3.13 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

**END OF SECTION**

## **SECTION 09 2116 - GYPSUM BOARD ASSEMBLIES**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Metal channel ceiling framing.
- D. Cementitious backing board.
- H. Gypsum wallboard.
- I. Joint treatment and accessories.
- J. Water-resistive barrier over exterior wall sheathing.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B. Section 06 1000 - Rough Carpentry: Building framing and sheathing.
- C. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- D. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.
- F. Section 07 9005 - Joint Sealers: Acoustic sealant.
- H. Section 09 2216 - Non-Structural Metal Framing.
- I. Section 09 3000 - Tiling (Tile): Tile backing board.

#### **1.03 REFERENCE STANDARDS**

- A. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 1999 (R2005).
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (R2005).
- C. ASTM C 475/C 475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2002 (Reapproved 2007).
- D. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2007.
- E. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.
- F. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2007.
- G. ASTM C 840 - Standard Specification for Application and Finishing of Gypsum Board; 2007.
- H. ASTM C 954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2007.
- I. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.
- J. ASTM C 1280 - Standard Specification for Application of Gypsum Sheathing; 2007.



- K. ASTM C 1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets; 2004.
- L. ASTM C 1396/C 1396M - Standard Specification for Gypsum Board; 2006a.
- M. ASTM D 3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2000 (Reapproved 2005).
- N. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction; 2005.
- O. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.
- P. ASTM E 413 - Classification for Rating Sound Insulation; 2004.
- Q. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2007.
- R. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2006.
- S. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Test Reports: For all stud framing products that do not comply with ASTM C 645 or C 754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum (3) years of documented experience.

### PART 2 - PRODUCTS

#### 2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C 840 and GA-216.
- B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.
- C. Shaft Walls at HVAC Shafts: Provide completed assemblies with the following characteristics:
  - 1. Air Pressure Within Shaft: Sustained loads of 5 lbf/sq ft (0.24 kPa) with maximum mid-span deflection of L/240.
  - 2. Acoustic Attenuation: STC of 35-39 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.
- D. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
  - 1. Fire Rated Partitions: UL listed assembly as listed on the drawings.
  - 2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

## 2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Clark Western Building Systems; [www.clarkwestern.com](http://www.clarkwestern.com).
  - 2. Dietrich Metal Framing; [www.dietrichindustries.com](http://www.dietrichindustries.com).
  - 3. MarinoWare; [www.marinoware.com](http://www.marinoware.com).
  - 4. Phillips Manufacturing Company; [www.phillipsmfg.com](http://www.phillipsmfg.com).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
  - 1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi (275 MPa) minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
  - 2. Studs: "C" shaped with flat or formed webs with knurled faces.
  - 3. Runners: U shaped, sized to match studs.
  - 4. Ceiling Channels: C shaped.
  - 5. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- C. Exterior Non-Loadbearing Studs and Furring for Application of Gypsum Board: As specified in Section 09 2216.
- D. Shaft Wall Studs and Accessories: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 and specified performance requirements.
- E. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.
- F. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.

## 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum: [www.americangypsum.com](http://www.americangypsum.com).
  - 2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 3. Georgia-Pacific Gypsum LLC: [www.gp.com/gypsum](http://www.gp.com/gypsum).
  - 4. Lafarge North America Inc: [www.lafargenorthamerica.com](http://www.lafargenorthamerica.com).
  - 5. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 6. PABCO Gypsum: [www.pabcogypsum.com](http://www.pabcogypsum.com).
  - 7. Temple-Inland Inc: [www.templeinland.com](http://www.templeinland.com).
  - 8. USG Corporation: [www.usg.com](http://www.usg.com).
  - 9. Substitutions: See Section 01 6000 - Product Requirements.
- B. Backing Board For Wet Areas: One of the following products:
  - 1. Mold Resistance: Score of 10, when tested in accordance with ASTM D 3273.
  - 3. ANSI Cement-Based Board: Non-gypsum-based; aggregated portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C 1325.
    - a. Thickness: 1/2 inch (12.7 mm).
    - b. Products:
      - 1) Custom Building Products; Wonderboard.
      - 2) National Gypsum Company; PermaBase Brand Cement Board.

- 3) National Gypsum Company; PermaBase Flex Brand Cement Board.
  - 4) USG Corporation; Durock Brand Cement Board.
  - 5) Substitutions: See Section 01 6000 - Product Requirements.
- C. Ceiling Board: Special sag-resistant gypsum ceiling board as defined in ASTM C 1396/C 1396M; sizes to minimize joints in place; ends square cut.
1. Application: Ceilings, unless otherwise indicated.
  2. Thickness: 5/8 inch.
  3. Edges: Tapered.
  4. Products:
    - a. American Gypsum; Interior Ceiling Board.
    - b. CertainTeed Corporation; ProRoc Interior Ceiling.
    - c. Georgia-Pacific Gypsum LLC; ToughRock CD Ceiling Board.
- F. Exterior Gypsum Sheathing: See Section 061643
- Sizes to minimize joints in place; ends square cut.
1. Application: Exterior sheathing, unless otherwise indicated.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D 3273.
  3. Edges: Square, for vertical application.

## 2.04 ACCESSORIES

- A. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced.
- B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Water-Resistive Barrier: See section 07 2500.
- D. Joint Materials: ASTM C 475 and as recommended by gypsum board manufacturer for project conditions.
- E. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.
- F. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C 954; steel drill screws for application of gypsum board to load bearing steel studs.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

### 3.02 SHAFT WALL INSTALLATION

- A. Shaft Wall Framing: Install in accordance with manufacturer's installation instructions.
  1. Install studs at spacing required to meet performance requirements.
- B. Shaft Wall Liner: Cut panels to accurate dimension and install sequentially between special friction studs.

### 3.03 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C 754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
- C. Studs: Space studs as permitted by standard.
  1. Extend partition framing to structure where indicated and to ceiling in other locations.

2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
  3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Standard Wall Furring: Install at concrete walls scheduled to receive gypsum board, not more than 4 inches (100 mm) from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches (600 mm) on center.
- E. Acoustic Furring: Install resilient channels at maximum 24 inches (600 mm) on center. Locate joints over framing members.
- F. Furring for Fire Ratings: Install as required for fire resistance ratings indicated and to GA-600 requirements.
- G. Blocking: Install wood blocking for support of:
1. Framed openings.
  2. Wall mounted cabinets.
  3. Plumbing fixtures.
  4. Toilet partitions.
  5. Toilet accessories.

### 3.04 BOARD INSTALLATION

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- D. Exterior Sheathing: Comply with ASTM C 1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
1. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- E. Exterior Soffit Board: Install perpendicular to framing, with staggered end joints over framing members or other solid backing.
- F. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

### 3.05 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
  2. At exterior soffits, not more than 30 feet (10 meters) apart in both directions.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.
- D. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations shown on the drawings. Provide vent area specified.

### 3.06 JOINT TREATMENT

- A. Finish gypsum board in accordance with levels defined in ASTM C 840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
  - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

### 3.08 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**END OF SECTION**

## **SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Structural load bearing metal stud framing and Exterior wall stud framing.
- B. Section 06 1000 - Rough Carpentry: Wood blocking within stud framing.
- C. Section 08 3100 - Access Doors and Panels.
- D. Section 09 2116 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2007.
- B. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.
- C. ASTM C 754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2007.
- D. ASTM C 1002 - Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2007.
- E. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2004.
- F. ASTM E 413 - Classification for Rating Sound Insulation; 2004.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
  - 1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
  - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

#### **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum (3) years experience.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Metal Framing, Connectors, and Accessories:
  - 1. Clark Western Building Systems; [www.clarkwestern.com](http://www.clarkwestern.com).
  - 2. Dietrich Metal Framing; [www.dietrichindustries.com](http://www.dietrichindustries.com).
  - 3. MarinoWare; [www.marinoware.com](http://www.marinoware.com).
  - 4. Substitutions: See Section 01 6000 - Product Requirements.

### **2.02 FRAMING MATERIALS**

- A. Fire Rated Assemblies: Comply with applicable code and as follows:
- B. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
  - 1. Studs: C shaped with flat or formed webs with knurled faces.
  - 2. Runners: U shaped, sized to match studs.
  - 3. Ceiling Channels: C shaped.
  - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- C. Ceiling Hangers: Type and size as specified in ASTM C 754 for spacing required.
- D. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- E. Tracks and Runners: Same material and thickness as studs, bent leg retainer notched to receive studs with provision for crimp locking to stud.
- F. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C 754.
- G. Fasteners: ASTM C 1002 self-piercing tapping screws.
- H. Anchorage Devices: Power actuated.
- I. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness: as required for the full width of the partition.
- J. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.

### **2.03 FABRICATION**

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION OF STUD FRAMING**

- A. Extend partition framing to structure where indicated and to ceiling in other locations.
- B. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- C. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.
- D. Align and secure top and bottom runners at 24 inches (600 mm) on center.

- E. At partitions indicated with an acoustic rating:
  - 1. Provide components and install as required to produce STC rating of 42, based on published tests by manufacturer conducted in accordance with ASTM E 90 with STC rating calculated in accordance with ASTM E 413.
  - 2. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
  - 3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.
- F. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- G. Install studs vertically at spacing indicated on drawings.
- H. Align stud web openings horizontally.
- I. Secure studs to tracks using crimping method. Do not weld.
- J. Stud splicing is not permissible.
- K. Fabricate corners using a minimum of three studs.
- L. Double stud at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- M. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- N. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.

### 3.02 CEILING AND SOFFIT FRAMING

- A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.
- B. Install furring independent of walls, columns, and above-ceiling work.
- C. Securely anchor hangers to structural members or embed in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- D. Space main carrying channels at maximum 72 inch (1 800 mm) on center, and not more than 6 inches (150 mm) from wall surfaces. Lap splice securely.
- E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- F. Place furring channels perpendicular to carrying channels, not more than 2 inches (50 mm) from perimeter walls, and rigidly secure. Lap splices securely.

### 3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet (3 mm in 3 m).

**END OF SECTION**



**SECTION 093000 - TILE WORK**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS:**

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern, except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

**1.02 SUMMARY:**

- A. This Section includes the following:
  - 1. Ceramic tile
  - 2. Grout
  - 3. Tile Setting Materials
  - 4. Accessories
- B. Sealing of joints is specified in Section 079005, Joint Sealers.

**1.03 SUBMITTALS:**

- A. Product Data:
  - 1. Submit manufacturer's descriptive literature and product specifications for each product.
  - 2. Include manufacturer's technical data indicating compliance with all applicable standards.
  - 3. Shop drawings showing layout, joint locations and transitions treatments.
- B. Samples: Submit samples for each type, color, size and finish included in this project.
  - 1. Full size samples of each tile and appropriate trim shapes of each tile.
  - 2. Grout color samples of each color and type.
  - 3. Sealant color samples.

**1.04 QUALITY ASSURANCE:**

- A. Single-source Responsibility for Tile: Obtain each color, grade, finish, type, composition of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
- B. Single-Source Responsibility for Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
- C. Installer Qualifications: Acceptable to manufacturer and have documented experience on at least 5 projects of similar nature within the past 5 years.
- D. All tile shall conform with ANSI A 137.1.

**1.05 DELIVERY, STORAGE, AND HANDLING:**

- A. Deliver sand store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements of ANSI A 137.1 for labeling sealed tile packages.
- B. Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.

**1.06 PROJECT CONDITIONS:**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendation.
- B. Maintain temperatures at not less than 50 degrees F (10 degrees C) in tiles areas during installation and for seven (7) days after completion, unless higher temperatures required by referenced installation standard of manufacturer's instructions.

**1.07 EXTRA MATERIALS:**

- A. Deliver extra materials to owner. Furnish extra materials that match products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed, for each type, composition, color, pattern and size.

**1.08 INSTALLATION WARRANTY:**

- A. Provide a written five (5) year warranty for the installation of the tile which shall cover materials and labor is installation of materials are proven to be defective.

**PART 2 - PRODUCTS**

**2.01 TILE, GROUT, AND SETTING PRODUCTS:**

- A. Tile - Manufacturer, Color, Finish Selection:
  - 1. Refer to Drawings, Room Finish Schedule and Room Finish Index.
- B. Marble Threshold:
  - 1. Marble complying with ASTM C 503 for abrasive resistance, domestic and in color selected.
- C. Grouting Materials:

Epoxy Grout: **For Toilet Rooms**

- 1. 100% Solids Epoxy Mortar and Grout 470, two component, 100% solids epoxy mortar and grout conforming to ANSI A118.6 standards by TEC or approved equal.  
*Grout lines to maintain 3/16" width or less*

UnSanded Grout: **For restroom wall tiles**

- 1. AccuColor Unsanded Grout 620, polymer-modified unsanded Portland cement grout, conforming to ANSI A118.6 standards, as manufactured by TEC Specialty Products, INC [color: refer to drawings] *Grout lines to maintain 1/16" width or less*

- D. Termination / Transition Materials
  - 1. At all transitions between tile and a dis-similar floor material or height provide a transition strip manufactured by Schlüter-Systems or other approved equal in compliance with the manufacturer's recommendations.
- E. Crack Isolation Mortar: **New car delivery option**
  - 1. 1Flex Crack Isolation Mortar, one step flexible mortar providing crack isolation of up to 1/8" by TEC or approved equal. No ANSI spec currently available. Color: white
- F. Setting Materials: **New Car Delivery**
  - 1. Full Flex latex mortar (TA-390/391), one step flexible mortar, by TEC or approved equal. Exceeds ANSI A 118.4 and ANSI A 118.11 [color: white]
- G. Setting Materials: **All other areas**
  - 1. Match existing. Exceeds ANSI A 118.4 and ANSI A 118.11
- H. Crack Isolation Membrane: **All Areas**
  - 1. All areas without crack isolation mortar to have crack isolation membrane that meets the requirements of ANSI A108.17 and Tile Council of North America recommendations.

## 2.02 PRODUCTS, GENERAL:

- A. ANSI Standard for Ceramic Tile: Comply with ANSI A 137.1 "American National Standard Specifications for Ceramic Tile" for types and grades of tile indicated.
- B. ANSI Tile Installation Standard: Comply with parts of ANSI A 108 series installation standards included in "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods.
- C. TCA Installation Guidelines: Tile Council of American (TCA) "Handbook for Ceramic Tile Installation" current edition; comply with TCA methods indicated.
- D. Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation; 112 North Alfred St.; Alexandria, VA 22134; or Ceramic Tile Institute; 700 N. Virgil Ave.; Los Angeles, CA 90029.

## 2.03 THRESHOLDS:

- A. Fabricate threshold per TCA detail TH 611-96.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION:**

- A. Examine substrate and areas where tile is to be installed with installer for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

#### **3.02 INSTALLATION, GENERAL:**

- A. ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 Series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile" that apply to type of setting and grouting materials and methods indicated.
- B. All substrates must be level, clear and free from dirt, oil, grease, concrete sealers or curing compounds. Floor levels shall not exceed 1/8" in 10 ft.
- C. Comply with epoxy manufacturers written instructions for installation of epoxy grout.
- D. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.
- E. Adhesive shall be applied to surface and back of tiles. Cover at least 80% of tile surface with adhesive. Clean back of porcelain paver tile and back button.
- F. Concrete floor construction joints shall align with tile joints. This trade to coordinate with concrete contractor.
- G. Differential between tile surfaces shall be flat and true.
- H. Extend tile work into recessed and behind fixtures to form a complete covering without interruptions except otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern of joint alignments.
- I. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting other tile, trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, drains, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
- J. Jointing Pattern: Unless otherwise shown, lay tile in a grid pattern. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.
- K. Cutting: Saw cut only.
- L. Install tile edge trim at perimeter of tile floor where tile materials terminate against other floor materials. Secure horizontal leg below tile to concrete floor with fasteners as recommended.
- M. Install protective coverings on floor surfaces during construction.
- N. Patch, repair and extend existing tile as indicated on the drawings and as required to achieve new configuration. Where tile matches existing, all associate items shall match existing, grout, mortar, thin or thick set etc. crack isolation membrane is required even if not originally existing.

**3.03 INSTALLATION:**

A. General:

1. Install work in accordance with manufacturer's approved product installation procedures and as specified in this section.
2. Install in accordance with ANSI A 108.5 installation specifications for latex-modified Portland cement mortar.

B. Tile Installation:

1. General:

- a. Install tile in pattern shown on drawings. Joints shall be aligned and of same size when adjoining tiles on floor, base, walls and trim.
- b. where tile is indicated to match existing, match and align with the existing pattern.
- c. Tile should be cut straight and have edges aligned with adjacent materials. Grind edges of cut tile.
- d. Install tile under equipment and fixtures into recesses to form a complete tile pattern or joint alignment.
- e. Terminate tile neatly at edges, corners obstructions without disrupting the tile pattern or joint alignment.
2. Floors: Install tile in accordance with latest version of TCA method [F111, F112, F113, F114, F122, F131]
3. Walls: Install tile in accordance with latest version of TCA method [FW202, W243]

**3.04 CONTROL JOINTS:**

- A. Locate as indicated. If not indicated as recommended by TCA and approved by the Architect, generally locate at tile joints coincident with concrete floor slab joints.
- B. Comply with the TCA Method EJ-171.

**3.05 STONE THRESHOLD METHOD:**

A. Set thresholds in latex-Portland Cement mortar.

1. Shape of threshold shall conform to TCA method TH 611.
2. Provide threshold between new car delivery and the showroom if required because of change in elevation from existing tile to new tile can not be transition with a Schluter-Solution transition strip.

**3.06 CLEANING AND PROTECTION:**

A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so that are free of foreign matter.

1. Completely remove all grout haze and residue from the surface of the ceramic or stone tile with Barvish Concentrated grout haze remover or approved equal.
2. Unglazed tile may be cleaned with acid solutions only when permitted by the tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects and acid cleaning. Flush the surface with clean water before and after cleaning.

3. Grout joints must be clean and free of standing water, dust and any foreign substances.
- B. Finished Tile Work:
1. Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.
  2. After thorough cleaning apply a coat of penetrating sealers.
  3. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that insures that tile is without damage or deterioration at time of Substantial Completion.
  4. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
  5. Prohibit all foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed.

**END OF SECTION 09300**

## **SECTION 09 5100 - ACOUSTICAL CEILINGS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 07 9005 - Joint Sealers: Acoustical sealant.
- B. Refer also to Section 097750 for Sanigrad II fiberglass ceiling system.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM C 635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2004.
- B. ASTM E 1264 - Standard Classification for Acoustical Ceiling Products; 2008.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components.
- D. Samples: Submit two full size samples illustrating material and finish of acoustical units.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

#### **1.05 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### **1.06 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

### **PART 2 - PRODUCTS**

#### **2.01 ACOUSTICAL UNITS**

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc; [www.armstrong.com](http://www.armstrong.com).
  - 2. CertainTeed Corporation; [www.certainteed.com](http://www.certainteed.com).
  - 3. USG; [www.usg.com](http://www.usg.com).
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Acoustical Units - General: ASTM E 1264, Class A.
- C. Acoustical Panels Type: See Drawings
  - 1. Size: as indicated on the drawings
  - 2. Light Reflectance: Not less than 0.90 percent, determined as specified in ASTM E 1264.
  - 3. NRC Range: Not less than 0.70, determined as specified in ASTM E 1264.
  - 4. Articulation Class: 180 determined as specified in ASTM E 1264.
  - 5. Ceiling Attenuation Class (CAC): Not less than 35, determined as specified in ASTM E 1264.
  - 6. Panel Edge: Square.
  - 7. Surface Pattern: Perforated.

8. Surface Color: White.
9. Product: As specified on Drawings
10. Suspension System: Exposed grid Type As specified on Drawings.

## 2.02 SUSPENSION SYSTEM

- A. Manufacturers:
  1. Same as for acoustical units.
  2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System Type (As indicated on Drawings): Formed steel, commercial quality cold rolled; intermediate-duty.
  1. Profile: Tee; 15/16 inch (24 mm) wide face.
  2. Construction: Double web.
  3. Finish: White painted.

## 2.03 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Gypsum Board: Fire rated type; 5/8 inch (15 mm) thick, ends and edges square, paper faced.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### 3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- F. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- G. Do not eccentrically load system or induce rotation of runners.
- H. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  1. Use longest practical lengths.
  2. Overlap and rivet corners.



### 3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.

### 3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

## SECTION 097750 - FIBERGLASS REINFORCED PLASTIC PANELS

### PART 1 - GENERAL

#### 1.01 DESCRIPTION:

- A. This section describes the requirements for furnishing and installing fiberglass reinforced plastic panels according to manufacturer's recommendations.
- B. All-fiberglass ceiling grid system.

#### 1.02 SUBMITTALS:

- A. Submit in accordance with Section 013000.
  - 1. Two samples of each type of panel, each type of trim and fastener.
  - 2. Shop Drawings: Indicate the location and dimension of joints and fastener attachments.
  - 3. Installation Guide #6211.

#### 1.03 QUALITY ASSURANCE:

- A. Provide panels and molding only from the manufacturer specified to ensure warranty and color harmonization of accessories.

#### 1.04 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver of Materials: Package sheets on skids or pallets for shipment to project site.
- B. Storage of Materials: Store panels in a dry place at the project site.
- C. Handling: Remove foreign matter from face of panel by use of a soft bristle brush, avoiding abrasive action.

#### 1.05 PROJECT CONDITIONS:

- A. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.
- B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
- C. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Wall and ceiling panels shall be KEMLITE Kemply with Surfaseal fiberglass reinforced plastic panels as manufactured by KEMLITE COMPANY, Joliet, Illinois, USA Phone: 1-800-435-0080 or 1-815-467-8600, Fax: 1-815-467-8666
- B. Wall and Ceiling Panels:
  - 1. Wall Panels shall be: 3/4" BCX-Fir Plywood substrate with a factory laminated 0.09" (2.3 mm) embossed Fire-X Glasbord skin, size to be 4 ft. x 8 ft and single-sided.
  - 2. Ceiling Panels shall be: 1/2" BCX-Fir Plywood substrate with a factory laminated 0.09" (2.3 mm) embossed Fire-X Glasbord skin, size as indicated on drawings.
  - 3. Surface Burning Characteristics ASTM E-84: Class A (I)
  - 4. Thickness: 0.09" (2.3mm)
  - 5. Finish: Embossed
  - 6. Colors: To be selected by Architect from six standard colors.

7. Certification: UL Classified ICBO, NY MEA, USDA/FSIS
  8. Flex Strength psi (MPa): 13,600 psi (94 MPa)
  9. Flex Modulus psi (MPa): 600,000 psi (4137MPa)
  10. Tensile Strength psi (MPa): 7,100 psi (49 MPa)
  11. Tensile Modulus psi (MPa): 800,000 psi (5516 MPa)
  12. Barcol Hardness: 45
  13. Izod Impact Strength ft.-lb./in. notched (J/mm): 14.0 ft-lb/in notched (0.75 J/mm)
  14. Gardner Impact Strength in-lb (J): 45 in-lb (5.1 J)
  15. Coefficient of Linear Thermal Expansion in/in·°F ( $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$ ):  $1.7 \times 10^{-5}$  in/in·°F ( $31.0 \mu\text{m}/\text{m}\cdot^{\circ}\text{C}$ )
  16. Water Absorption % 24 hrs. @77°F (25°C): 0.32%
  17. R Value hr ft<sup>2</sup>°F/Btu (hr·m<sup>2</sup>·°C/kcal): 0.23 @ 0.09" (0.047 @ 2.3mm)
  18. Taber Abrasion Resistance % wt. loss (CS-17 wheels, 1000g. wt., 25 cycles): 0.020%
  19. Frontside Fluorescent ID Threads: Two
- C. Division Bars, Corner Trim: Panel manufacturer's standard length extruded vinyl pieces; longest length possible to eliminate end joints.
- D. Fasteners: Non-corrosive drive rivets.
- E. All-fiberglass Ceiling grid system:
1. Sanigrig II: rigid, high strength pultruded FRP ceiling grid system designed specifically to provide solutions for environments prone to moisture and corrosion. The system is ideal for new construction or the refurbishing of suspended ceilings which have failed due to moisture or corrosion infiltration. Class A fire rated per ASTM E-84.
  2. Sanigrig II will not rust, rot, pit, dent or peel, allowing for unmatched long term performance in a wide range of abusive environments. Genuine Kemlite Sanigrig II is identified by a single black thread embedded in the vertical leg of the tees.
  3. Kemlite Sanigrig II ceiling grid system is cost-efficient (eliminates expensive ceiling replacement); moisture resistant (does not support mold or mildew and will not rust or corrode); easily cut and drilled for quick installation, similar to typical metal system; and meets USDA/FSIS requirements.
  4. Components:
    - a) Wall Angles: 12' (4m) length fastened directly to the wall with Kemlite nylon drive rivets.
    - b) Hanger Wire: Provided by others, manufacturer's standard; secured with stainless steel anchors.
    - c) Main Runners: 12' 1 1/2" (3.7m), notched on 24 1/4" (0.6m) centers.
    - d) Cross Tee: 48 1/2", 24 1/4" and 24 1/2" (1.2m, 0.62m, and 0.62m) lengths, prenotched ends.
    - e) Connector Clip: Joins main runners.
    - f) Holddown Clips: Provide holddown clips (Part #C-24) for use with ceiling panels up to 9/32" (7.1mm) thick; and provide holddown clips (Part #C-25) for use with ceiling panels 9/32 - 1/2" (7.1mm-12.7mm).
    - g) Wall Anchor (Part #C-20): Secures main runner and cross tees to wall angle.
    - h) Color: As indicated on the drawings.
    - i) Grid Members: Manufacturer's standard white.
    - j) Clips: Manufacturer's standard white.
  5. Sanigrig II products shall meet or exceed the following properties:
    - a) Meets Class A finish requirements: Flame spread of less than 25, smoke developed less than 450 per ASTM E-84 latest version.

- b) Meets USDA/FSIS requirements.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION**

- A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean, and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
- B. Preparation: Ensure that all HVAC, electrical, plumbing and similar work above the ceiling level has been completed.
- B. Do not begin installation until backup surfaces are put into satisfactory condition.

#### **3.02 APPLICATION**

- A. Do all cutting with carbide tipped saw blades or drill bits, or cut with snips.
- B. Install panels with manufacturer's recommended gap for panel field and corner joints.
- C. Fastener holes in the panels must be predrilled 1/8" (3.2mm) oversize.
- D. For trowel type and application of adhesive, follow adhesive manufacturer's recommendation.
- E. Using products acceptable to manufacturer, install the frp panel system in accordance with panel manufacturer's printed instructions, Installation Guide #6211.
- F. Sanigrid II Application: Do all cutting with carbide tipped saw blade. Install per manufacturer's printed instructions, Installation Guide #6244.

#### **3.03 CLEANING**

- A. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.

### **END OF SECTION**

## SECTION 099100 - PAINTING AND COATINGS

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Interior, exterior, paint and coatings systems including surface preparation.

#### 1.2 RELATED SECTIONS

- A. Section 033000 - Concrete: Surface coordination and curing provisions.
- B. Section 051200 - Structural Steel: Shop priming structural steel.
- C. Section 055000 - Metal Fabrications: Shop priming ferrous metal.
- D. Section 064100 - Architectural Woodwork: Shop-applied stains and transparent finishes.
- E. Section 081113 - Steel Doors and Frames: Factory priming steel doors and frames.
- F. Section 092116 - Gypsum Board Assemblies: Surface preparation of gypsum board.

#### 1.3 REFERENCES

- A. Steel Structures Painting Council (SSPC):
  - 1. SSPC-SP 1 - Solvent Cleaning.
  - 2. SSPC-SP 2 - Hand Tool Cleaning.
  - 3. SSPC-SP 3 - Power Tool Cleaning.
  - 4. SSPC-SP5/NACE No. 1, White Metal Blast Cleaning.
  - 5. SSPC-SP6/NACE No. 3, Commercial Blast Cleaning.
  - 6. SSPC-SP7/NACE No. 4, Brush-Off Blast Cleaning.
  - 7. SSPC-SP10/NACE No. 2, Near-White Blast Cleaning.
  - 8. SSPC-SP11, Power Tool Cleaning to Bare Metal.
  - 9. SSPC-SP12/NACE No. 5, Surface Preparation and Cleaning of metals by Waterjetting Prior to Recoating.
  - 10. SSPC-SP 13 / NACE No. 6 Surface Preparation for Concrete.
- B. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- C. ASTM D 4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: For each paint system indicated, including:
  - 1. Product characteristics.
  - 2. Surface preparation instructions and recommendations.
  - 3. Primer requirements and finish specification.
  - 4. Storage and handling requirements and recommendations.
  - 5. Application methods.
  - 6. Cautions for storage, handling and installation.

- C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.
- D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

#### 1.5 QUALITY ASSURANCE

- A. Installer 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. Paint exposed surfaces. If a color of finish, or a surface is not specifically mentioned, Architect will select from standard colors and finishes available.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels unless indicated.
- D. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish surfaces for verification of products, colors and sheens.
  - 2. Finish area designated by Architect.
  - 3. Provide samples that designate primer and finish coats.
  - 4. Do not proceed with remaining work until the Architect approves the mock-up.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:
  - 1. Product name, and type (description).
  - 2. Application and use instructions.
  - 3. Surface preparation.
  - 4. VOC content.
  - 5. Environmental issues.
  - 6. Batch date.
  - 7. Color number.
- B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- C. Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.
- D. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

#### 1.7 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.8 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.
- B. Furnish Owner with an additional one percent of each material and color, but not less than 1 gal (3.8 l) or 1 case, as appropriate.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Sherwin-Williams, which is located at: 101 Prospect Ave. Cleveland, OH 44115; Toll Free Tel: 800-524-5979; Tel: 216-566-2000;
- B. Substitutions: Architect Approved Equal

### 2.2 APPLICATIONS/SCOPE

- A. Interior, Exterior, Paints and Coatings:
  - 1. Concrete: cast-in-place, cement board, and plaster.
  - 2. Masonry: Concrete masonry units.
  - 3. Metal: Aluminum, galvanized steel.
  - 4. Metal: Structural steel, joists, trusses, beams, partitions and similar items.
  - 5. Wood: doors, trim and similar items.
  - 6. Wallboard: Gypsum drywall.

### 2.3 PAINT MATERIALS - GENERAL

- A. Paints and Coatings:
  - 1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
  - 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color. Or follow manufactures product instructions for optimal color conformance.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Coating Application Accessories: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.
- D. Color: Refer to Finish Schedule for paint colors, and as selected.

### 2.4 INTERIOR PAINT SYSTEMS

- A. CONCRETE - (Walls & Ceilings, Poured Concrete, Precast Concrete, Unglazed Brick, Cement Board, Tilt-Up, Cast-In-Place)
  - 1. Latex Systems

- a. Semi-Gloss Finish
    - 1) 1st Coat: S-W Loxon Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series
    - 3) 3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series (4 mils wet, 1.3 mils dry per coat)
  - b. Eg-Shel / Satin Finish
    - 1) 1st Coat: S-W Loxon Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel Enamel, B20 Series
    - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel Enamel, B20 Series (4 mils wet, 1.3 mils dry per coat)
  - c. Flat Finish
    - 1) 1st Coat: S-W Loxon Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Latex Flat Wall Paint, B30 Series A24W8300 (8 mils wet, 3.2 mils dry)
    - 3) 3rd Coat: S-W ProMar 200 Latex Flat Wall Paint, B30 Series (4 mils wet, 1.4 mils dry per coat)
2. Alkyd Systems
- a. Semi-Gloss Finish (Solvent Base)
    - 1) 1st Coat: S-W Loxon Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
    - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series (4 mils wet, 1.7 mils dry per coat)
3. Concrete Stain (Water Base)
- 1) a. Flat Finish Opaque
  - 2) 1st Coat: S-W H&C Concrete Stain Solid Color Water Based
  - 3) 2nd Coat: S-W H&C Concrete Stain Solid Color Water Based (50-300 sq/ft per gallon)
  - 4)
- B. MASONRY - (CMU - Concrete, Split, Scored, Smooth, Fluted)
1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal)
      - 2) 2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series (4 mils wet, 1.3 mils dry per coat)
    - b. Eg-Shel / Satin Finish
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal)
      - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series (4 mils wet, 1.6 mils dry per coat)
    - c. Flat Finish
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal)
      - 2) 2nd Coat: S-W ProMar 200 Latex Flat, B30 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Flat, B30 Series (4 mils wet, 1.4 mils dry per coat)
  2. Alkyd Systems
    - a. Semi-Gloss Finish (Solvent Base)
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (75-125 sq ft/gal)
      - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
      - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series



- (4 mils wet, 1.7 mils dry per coat)
3. Concrete Stain (Water Base)
    - a. Flat Finish Opaque
      - 1) 1st Coat: S-W H&C Concrete Stain Solid Color Water Based
      - 2) 2nd Coat: S-W H&C Concrete Stain Solid Color Water Based (50-300 sq/ft per gallon)
- C. METAL (Aluminum, Galvanized)
1. Latex Systems
    - a. Semi-Gloss - Block Resistant Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series
      - 3) 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)
    - b. Eg-Shel / Satin Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series (4 mils wet, 1.5 mils dry per coat)
    - c. Flat Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Latex Flat, B30 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Flat, B30 Series (4 mils wet, 1.4 mils dry per coat)
  2. Alkyd Systems
    - a. Semi-Gloss (solvent base) Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
      - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series (4 mils wet, 1.7 mils dry per coat)
- D. METAL (Steel, Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous & Ornamental Iron, Structural Iron, Ferrous Metal)
1. Latex Systems
    - a. Semi-Gloss - Block Resistant Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series
      - 3) 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)
    - b. Eg-Shel / Satin Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series (4 mils wet, 1.5 mils dry per coat)
    - c. Flat Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series

- (2-4 mils dry)
  - 2) 2nd Coat: S-W ProMar 200 Latex Flat, B30 Series
  - 3) 3rd Coat: S-W ProMar 200 Latex Flat, B30 Series (4 mils wet, 1.4 mils dry)
  - 2. Alkyd Systems
    - a. Semi-Gloss (Solvent base)
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series (2-4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
      - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series (4 mils wet, 1.7 mils dry per coat)
- E. WOOD (Walls, Ceilings, Doors, Trim,)
- 1. Latex Systems
    - a. Semi-Gloss - Block Resistant Finish
      - 1) 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 (4 mils wet, 1.6 mils dry)
      - 2) 2nd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series
      - 3) 3rd Coat: S-W ProClassic Waterborne Acrylic Semi-Gloss Enamel, B31 Series (4 mils wet, 1.3 mils dry per coat)
    - b. Eg-Shel / Satin Finish
      - 1) 1st Coat: S-W PrepRite ProBlock Latex. B51 Series (4 mils wet, 1.4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series (4 mils wet, 1.5 mils dry per coat)
    - c. Flat Finish
      - 1) 1st Coat: S-W PrepRite ProBlock Latex. B51 Series (4 mils wet, 1.4 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Latex Flat, B30 Series
      - 3) 3rd Coat: S-W ProMar 200 Latex Flat, B30 Series (4 mils wet, 1.4 mils dry per coat)
  - 2. Alkyd Systems
    - a. Semi-Gloss (Solvent base) Finish
      - 1) 1st Coat: S-W Premium Wall & Wood Primer, B28W8111 (4 mils wet, 1.8 mils dry)
      - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
      - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series (4 mils wet, 1.7 mils dry per coat)
  - 3. Stain & Varnish
    - a. Clear Finish
      - 1) 1st Coat: S-W Minwax 250 VOC Oil Stain (Optional) Or S-W Wood Classics Interior Oil Stain, A49 Series (Optional)
      - 2) 2nd Coat: S-W Wood Classics Waterborne Polyurethane Varnish, Gloss or Satin
      - 3) 3rd Coat: S-W Wood Classics Waterborne Polyurethane Varnish, Gloss or Satin (4 mils wet, 1.0 mil dry per coat)
- F. DRYWALL (Walls, Ceilings, Gypsum Board, Plaster Board, etc.)
- 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W8200 (4 mils wet,

- 1.1 mils dry)
- 2) 2nd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series
- 3) 3rd Coat: S-W ProMar 200 Latex Semi-Gloss, B31 Series (4 mils wet, 1.3 mils dry per coat)
- b. Eg-Shel / Satin Finish
  - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W8200 (4 mils wet, 1.1 mils dry)
  - 2) 2nd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series
  - 3) 3rd Coat: S-W ProMar 200 Latex Eg-Shel, B20 Series (4 mils wet, 1.6 mils dry per coat)
- c. Flat Finish
  - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W8200 (4 mils wet, 1.1 mils dry)
  - 2) 2nd Coat: S-W ProMar 200 Latex Flat, B30 Series
  - 3) 3rd Coat: S-W ProMar 200 Latex Flat, B30 Series (4 mils wet, 1.4 mils dry per coat)
- 2. Alkyd Systems
  - a. Semi- Gloss Finish (Solvent Base)
    - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W8200 (4 mils wet, 1.1 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
    - 3) 3rd Coat: S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series (4 mils wet, 1.7 mils dry per coat)
  - b. Eg-Shel / Satin Finish
    - 1) 1st Coat: S-W ProMar 200 Latex Primer, B28W8200 (4 mils wet, 1.1 mils dry)
    - 2) 2nd Coat: S-W ProMar 200 Alkyd Eg-Shel, B33W200 Series
    - 3) 3rd Coat: S-W ProMar 200 Alkyd Eg-Shel, B33W200 Series (4 mils wet, 1.8 mils dry per coat)
- G. Exposed Ceiling Area Paint:
  - 1. Product: SW Super Save-Lite Hi-Tec Dryfall:
    - a. Flat – B48W70
    - b. Eg-Shel – B48W71
  - 2. Characteristics:
    - a. Finish: Flat or Eg-Shel finish
    - b. Color: White
    - c. Volume Solids: 50% +/- 2%
    - d. Weight Solids: Flat - 77% +/- 2%; Eg-Shel – 75% +/- 2%
    - e. VOC: Flat < 400 g/L; 3.33 lb/gal  
Eg-Shel < 400 g/L; 3.33 lb/gal
    - f. Recommended Spreading Rate per coat: Wet mils=3.0-4.0; Dry mils=1.5-2.0
    - g. Coverage: 400 – 533 sq ft/gal
    - h. Flash Point: Flat - 102deg F, PMCC; Eg-Shel 75deg F, PMCC
    - i. Clean Up: Mineral Spirits, R1K4

## 2.5 EXTERIOR PAINT SYSTEMS

- A. CONCRETE - (Cementitious Siding, Flexboard, Transite Board, Shingles (Non-Roof), Common Brick, Stucco, Tilt-up, Precast, and Poured-in-place Cement)
  - 1. Latex Systems

- a. Semi-Gloss Finish
    - 1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
    - 3) 3rd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
  - b. Satin Finish - Early Moisture Resistant Finish
    - 1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W Resilience Latex Satin, K43 Series
    - 3) 3rd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.44 mils dry per coat)
  - c. Flat Finish - Early Moisture Resistant Finish
    - 1) 1st Coat: S-W Loxon Acrylic Masonry Primer, A24W8300 (8 mils wet, 3.2 mils dry)
    - 2) 2nd Coat: S-W Resilience Latex Flat, K42 Series
    - 3) 3rd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.4 mils dry per coat)
- B. MASONRY (Concrete Masonry Units [CMU]- Cinder or Concrete Block)
- 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W PrepRite Block Filler, B25W25 (16 mils wet, 8 mils dry)
      - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
      - 3) 3rd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
    - b. Satin Finish - Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Loxon BlockSurfacer, A24W200 (16 mils wet, 8 mils dry)
      - 2) 2nd Coat: S-W Resilience Latex Satin, K43 Series
      - 3) 3rd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.44 mils dry per coat)
    - c. Flat Finish - Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Loxon BlockSurfacer, A24W200 (16 mils wet, 8 mils dry)
      - 2) 2nd Coat: S-W Resilience Latex Flat, K42 Series
      - 3) 3rd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.4 mils dry per coat)
- C. METAL - (Aluminum, Galvanized)
- 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
      - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
    - b. Satin Finish, Moisture Resistant Finish
      - 1) 1st Coat: S-W Resilience Latex Satin, K43 Series
        - a) 2nd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.44 mils dry per coat)
    - c. Flat Finish - Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Resilience Latex Flat, K42 Series
      - 2) 2nd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.4 mils dry per coat)

- D. METAL - (Misc. Iron, Ornamental Iron, Structural Iron & Steel, Ferrous Metal)
  - 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series (5-10 mils wet, 2-4 mils dry)
      - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
      - 3) 3rd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
- E. WOOD (Siding, Trim, Shutters, Sashes, Hardboard-Bare/Primed)
  - 1. Latex Systems
    - a. Semi-Gloss Finish
      - 1) 1st Coat: S-W Exterior Latex Wood Primer, B42W8041 (4 mils wet, 1.4 mils dry)
      - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
      - 3) 3rd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
    - b. Satin Finish - Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Exterior Latex Wood Primer, B42W8041 (4 mils wet, 1.4 mils dry)
      - 2) 2nd Coat: S-W Resilience Latex Satin, K43 Series
      - 3) 3rd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.44 mils dry per coat)
    - c. Flat Finish - Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Exterior Latex Wood Primer, B42W8041 (4 mils wet, 1.4 mils dry)
      - 2) 2nd Coat: S-W Resilience Latex Flat, K42 Series
      - 3) 3rd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.4 mils dry per coat)
  - 2. Stain - Water Reducible Systems
    - a. Semi-Transparent
      - 1) 1st Coat: S-W WoodScapes Polyurethane Stain, A15T5
      - 2) 2nd Coat: S-W WoodScapes Polyurethane Stain, A15T5 (100-350 sq ft/gal)
    - b. Solid Color
      - 1) 1st Coat: S-W WoodScapes Solid Color Stain, A15 Series
      - 2) 2nd Coat: S-W WoodScapes Solid Color Stain, A15 Series (200-400 sq ft/gal)
- F. VINYL SIDING EIFS, SYNTHETIC STUCCO
  - 1. Latex Systems
    - a. VinylSafe(tm) Early Moisture Resistant Finish
      - 1) 1st Coat: S-W Resilience Latex Gloss, K44 Series
      - 2) 2nd Coat: S-W Resilience Latex Gloss, K44 Series (4 mils wet, 1.6 mils dry per coat)
    - b. Semi-Gloss Finish
      - 1) 1st Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
      - 2) 2nd Coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series (4 mils wet, 1.5 mils dry per coat)
    - c. Satin Finish
      - 1) 1st Coat: S-W A-100 Exterior Latex Satin, A82 Series
      - 2) 2nd Coat: S-W A-100 Exterior Latex Satin, A82 Series (4 mils wet, 1.4 mils dry per coat)
    - d. VinylSafe(tm) Early Moisture Resistant Finish

- 1) 1st Coat: S-W Resilience Latex Satin, K43 Series
- 2) 2nd Coat: S-W Resilience Latex Satin, K43 Series (4 mils wet, 1.44 mils dry per coat)
- e. Flat Finish
  - 1) 1st Coat: S-W A-100 Exterior Latex Flat, A6 Series
  - 2) 2nd Coat: S-W A-100 Exterior Latex Flat, A6 Series (4 mils wet, 1.4 mils dry per coat)
- f. VinylSafe(tm) Early Moisture Resistant Finish
  - 1) 1st Coat: S-W Resilience Latex Flat, K42 Series
  - 2) 2nd Coat: S-W Resilience Latex Flat, K42 Series (4 mils wet, 1.4 mils dry per coat)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared; notify Architect of unsatisfactory conditions before proceeding. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Proceed with work only after conditions have been corrected and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

### 3.2 SURFACE PREPARATION

- A. General: Surfaces shall be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.
  1. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.
  2. Remove items including but not limited to thermostats, electrical outlets, switch covers and similar items prior to painting. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
- C. Block (Cinder and Concrete): Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75 degrees F. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.

- D. Concrete, SSPC-SP13 or NACE 6: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
- E. Cement Composition Siding/Panels: Remove all surface contamination by washing with an appropriate cleaner, rinse thoroughly and allow to dry. Existing peeled or checked paint should be scraped and sanded to a sound surface. Pressure clean, if needed, with a minimum of 2100 psi pressure to remove all dirt, dust, grease, oil, loose particles, laitance, foreign material, and peeling or defective coatings. Allow the surface to dry thoroughly. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments.
- F. Copper and Stainless Steel: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP 2, Hand Tool Cleaning.
- G. Drywall-Interior: Must be clean and dry. All nail heads must be set and spackled. Joints must be taped and covered with a joint compound. Spackled nail heads and tape joints must be sanded smooth and all dust removed prior to painting.
- H. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.
- I. Plaster: Must be allowed to dry thoroughly for at least 30 days before painting, unless the products are designed to be used in high pH environments. Room must be ventilated while drying; in cold, damp weather, rooms must be heated. Damaged areas must be repaired with an appropriate patching material. Bare plaster must be cured and hard. Textured, soft, porous, or powdery plaster should be treated with a solution of 1 pint household vinegar to 1 gallon of water. Repeat until the surface is hard, rinse with clear water and allow to dry.
- J. Steel: Structural, Plate, And Similar Items: Should be cleaned by one or more of the surface preparations described below. These methods are used throughout the world for describing methods for cleaning structural steel. Visual standards are available through the Society of Protective Coatings. A brief description of these standards together with numbers by which they can be specified follow.
  - 1. Solvent Cleaning, SSPC-SP1: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation.
  - 2. Hand Tool Cleaning, SSPC-SP2: Hand Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before hand tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.

3. Power Tool Cleaning, SSPC-SP3: Power Tool Cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust, and paint be removed by this process. Before power tool cleaning, remove visible oil, grease, soluble welding residues, and salts by the methods outlined in SSPC-SP1.
4. White Metal Blast Cleaning, SSPC-SP5 or NACE 1: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
5. Commercial Blast Cleaning, SSPC-SP6 or NACE 3: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 33 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
6. Brush-Off Blast Cleaning, SSPC-SP7 or NACE 4: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose paint. Tightly adherent mill scale, rust, and paint may remain on the surface. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP 1 or other agreed upon methods.
7. Power Tool Cleaning to Bare Metal, SSPC-SP11: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods.
8. Near-White Blast Cleaning, SSPC-SP10 or NACE 2: A Near White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of rust, stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods.
9. High- and Ultra-High Pressure Water Jetting for Steel and Other Hard Materials: SSPC-SP12 or NACE 5: This standard provides requirements for the use of high- and ultra-high pressure water jetting to achieve various degrees of surface cleanliness. This standard is limited in scope to the use of water only without the addition of solid particles in the stream.
10. Water Blasting, SSPC-SP12/NACE No. 5: Removal of oil grease dirt, loose rust, loose mill scale, and loose paint by water at pressures of 2,000 to 2,500 psi at a flow of 4 to 14 gallons per minute.



- K. Vinyl Siding, Architectural Plastics, and Fiberglass: Clean thoroughly by scrubbing with a warm, soapy water solution. Rinse thoroughly. Do not paint vinyl siding with any color darker than the original color, unless the product and color are designed for such use. Painting with darker colors may cause siding to warp.
- L. Wood: Must be clean and dry. Prime and paint as soon as possible. Knots and pitch streaks must be scraped, sanded, and spot primed before a full priming coat is applied. Patch all nail holes and imperfections with a wood filler or putty and sand smooth.

### 3.3 INSTALLATION

- A. General: Apply all coatings and materials with manufacture specifications in mind. Mix and thin coatings according to manufacturer's recommendations.
- B. Do not apply to wet or damp surfaces. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days. Test new concrete for moisture content.
- C. Apply coatings using methods recommended by manufacturer.
- D. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.
- E. Apply coatings at spreading rate required to achieve the manufacturers recommended dry film thickness.
- F. Regardless of number of coats specified, apply as many coats as necessary for complete hide, and uniform appearance.
- G. Inspection: The coated surface must be inspected and approved by the Architect just prior to each coat.

### 3.4 PROTECTION

- A. Protect finished coatings from damage until completion of project.
- B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION

## **SECTION 10 2113 - METAL TOILET COMPARTMENTS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Metal toilet compartments.
- B. Urinal screens.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 05 1200 - Structural Steel Framing: Concealed steel support members.
- B. Section 05 5000 - Metal Fabrications: Concealed steel support members.
- C. Section 06 1000 - Rough Carpentry: Blocking and supports.
- D. Section 10 2800 - Toilet Accessories.

#### **1.03 REFERENCE STANDARDS**

- A. ASTM A 424 - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2006.
- B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- C. ASTM A 666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2003.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.
- C. Product Data: Provide data on panel construction, hardware, and accessories.
- D. Samples: Submit two samples of partition panels, 4x4 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

### **PART 2 - PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Metal Toilet Compartments:
  - 1. General Partitions Mfg. Corp; Product: Powder Coated Steel
  - 2. Global Steel Products Corp; Product: Powder Coated Steel
  - 3. Substitutions: Section 01 6000 - Product Requirements.

#### **2.02 MATERIALS**

- A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M, with G90/Z275 coating.

#### **2.03 COMPONENTS**

- A. Toilet Compartments: Powder coated steel, floor-mounted unbraced.
- B. Doors, Panels, and Pilasters: Sheet steel faces, pressure bonded to sound deadening core, formed and closed edges; corners made with corner clips or mitered, welded, and ground smooth.
  - 1. Panel Faces: 20 gage (0.9 mm).
  - 2. Door Faces: 22 gage (0.8 mm).

3. Pilaster Faces: 20 gage (0.9 mm).
  4. Reinforcement: 12 gage (2.5 mm).
  5. Internal Reinforcement: Provide in areas of attached hardware and fittings. Mark locations of reinforcement for partition mounted washroom accessories.
- C. Door and Panel Dimensions:
1. Thickness: 1 inch (25 mm).
  2. Door Width: 24 inch (610 mm).
  3. Door Width for Handicapped Use: 36 inch (915 mm), out-swinging.
  4. Height: 58 inch (1 473 mm).
- D. Pilasters: 1-1/4 inch (32 mm) thick, of sizes required to suit compartment width and spacing.
- E. Urinal Screens: Wall mounted with two panel brackets, and floor-to-ceiling vertical upright consisting of pilaster anchored to floor and ceiling.

#### 2.04 ACCESSORIES

- A. Pilaster Shoes: Formed chromed steel with polished finish, 3 inch (175 mm) high, concealing floor fastenings.
1. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.
  2. Provide ceiling attachment using two adjustable hanging studs, attached to above-ceiling framing.
- B. Head Rails: Hollow chrome-plated steel tube, 1 x 1-5/8 inch (25 x 41 mm) size, with anti-grip strips and cast socket wall brackets.
- C. Brackets: Polished chrome-plated non-ferrous cast metal.
- D. Hardware: Polished chrome plated non-ferrous cast metal:
1. Pivot hinges, gravity type, adjustable for door close positioning; two per door.
  2. Thumb turn or sliding door latch with exterior emergency access feature.
  3. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
  4. Coat hook with rubber bumper; one per compartment, mounted on door.
  5. Provide door pull for outswinging doors.

#### 2.05 FINISHING

- A. Powder Coated Steel Compartments: Clean, degrease, and neutralize. Follow immediately with a phosphatizing treatment, prime coat and two finish coats powder coat enamel.
- B. Color: To be selected by Architect

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that field measurements are as indicated.
- C. Verify correct spacing of and between plumbing fixtures.
- D. Verify correct location of built-in framing, anchorage, and bracing.

#### 3.02 INSTALLATION

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.
- B. Maintain 3/8 to 1/2 inch (9 to 13 mm) space between wall and panels and between wall and end pilasters.

- C. Attach panel brackets securely to walls using anchor devices.
- D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.
- E. Field touch-up of scratches or damaged enamel finish will not be permitted. Replace damaged or scratched materials with new materials.

### **3.03 TOLERANCES**

- A. Maximum Variation From True Position: 1/4 inch (6 mm).
- B. Maximum Variation From Plumb: 1/8 inch (3 mm).

### **3.04 ADJUSTING**

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

**END OF SECTION**

## SECTION 102800 - TOILET ACCESSORIES

### 1.01 RELATED DOCUMENTS:

- A. All applicable portions of Division 1 - General Requirements are to be considered as included with this Section.
- B. The following are minimum requirements and shall govern, except that all Federal, Local and/or State Codes and Ordinances shall govern when their requirements are in excess hereof.

### 1.02 SUMMARY:

- A. This Section includes toilet and bath accessory items as scheduled.

### 1.03 SUBMITTALS:

- A. Product data for each toilet accessory item specified, including construction details relative to materials, dimensions, gages, profiles, mounting method, specified options, and finishes.
- B. Schedule indicating types, quantities, sizes, and installation locations (by room) for each toilet accessory item to be provided for project.
- C. Setting drawings where cutouts are required in other work, including templates, substrate preparation instructions, and directions for preparing cutouts and installing anchorage devices.

### 1.04 QUALITY ASSURANCE:

- A. Inserts and Anchorages: Furnish accessory manufacturer's standard inserts and anchoring devices that must be set in concrete or built into masonry. Coordinate delivery with other work to avoid delay.
- B. Comply with provisions of ADA and regional building code.

### 1.05 PROJECT CONDITIONS:

- A. Coordination: Coordinate accessory locations, installation, and sequencing with other work to avoid interference with and ensure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

### 1.06 WARRANTY:

- A. Warranty: Submit a written warranty executed by mirror manufacturer, agreeing to replace any mirrors that develop visible silver spoilage defects within warranty period. Warranty Period: 15 years from date of Substantial Completion.
- B. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide toilet accessories by one of the following:
  - 1. American Specialties, Inc.
  - 2. Bobrick Washroom Equipment, Inc.
  - 3. Bradley Corporation.

### 2.02 MATERIALS, GENERAL:

- A. Stainless Steel: AISA Type 302/304, with polished No. 4 finish, 0.034 inch (0.9 mm) minimum thickness.
- B. Mirror Glass: Nominal 6.0 mm thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electroplated copper coating, and protective organic coating.
- C. Galvanized Steel Mounting Devices: ASTM A 1153, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts and other devices of same material as accessory unit or of galvanized steel where concealed.

### 2.02 FABRICATION:

- A. General: Only a maximum 1-1/2 inch (38 mm) diameter, unobtrusive stamped manufacturer logo, as approved by the Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- C. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors or access panels with full-length, stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Framed Mirror Units, General: Fabricate frames for glass mirror units to accommodate wood, felt, plastic, or other glass edge protection material. Provide mirror backing and support system that will permit rigid, tamperproof glass installation and prevent moisture accumulation, as follows:
  - 1. Provide galvanized-steel backing sheet, not less than 0.034 inch (0.9 mm) and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- E. Mirror Unit Hangers: Provide, at contractor's option, system for mounting mirror units that will permit rigid, tamperproof, and theft proof installation, as follows:
  - 1. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

2. Heavy-duty wall brackets of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
- F. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply, etc. Provide minimum of six keys to Owner's representative.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION:**

- A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners appropriate to substrate as recommended by unit manufacture. Install units plumb and level, firmly anchored in locations and at heights indicated.
- B. Secure mirrors to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, according to manufacturer's instructions for type of substrate involved.
- C. Install grab bars to withstand a downward load of at least 250 lbf (1100 N), complying with ASTM F 446.

**END OF SECTION 10800**

## **SECTION 105230 - FIRE EXTINGUISHERS**

### **PART 1 - GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Accessories.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 06100 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 09900 - Paints and Coatings: Field paint finish.

#### **1.03 REFERENCE STANDARDS**

- A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; 2007.
- B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

#### **1.04 SUBMITTALS**

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate cabinet physical dimensions.
- C. Product Data: Provide extinguisher operational features.
- D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

#### **1.05 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

### **PART 2 - PRODUCTS**

#### **2.01 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  - 1. Provide extinguishers labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.
  - 2. Furnish and install fire extinguishers and cabinets as per code and directed by Fire Marshal.
- B. Water Type Fire Extinguishers: Stainless steel tank, with granular soda for pressurization, including hose and nozzle.
  - 1. Class 2A.
  - 2. Size 2.5 gal (11.4 liter).
  - 3. Size and classification as scheduled.
  - 4. Finish: Baked enamel, color as selected by Architect.
- C. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
  - 1. Class B:C.
  - 2. Size 10.
  - 3. Size and classification as scheduled.
  - 4. Finish: Baked enamel, color as selected by Architect.



- D. Foam Type Fire Extinguishers: Stainless steel tank, with pressure gage.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings.
- C. Secure rigidly in place.
- D. Place extinguishers and accessories in cabinets.
- E. Position cabinet signage as required.

### **END OF SECTION**