

# TECHNICAL SPECIFICATIONS FOR



## **Bid No. 6297 - Highland High School: Cafeteria Rehabilitation and Modernization**

**Bid Submittal Date:  
Wednesday, March 26, 2025  
Opening Time:  
2:00 P.M.  
Conference Room "A"**

**Non-Mandatory Job Walk:  
Thursday, March 13, 2025 at 9:00 a.m.  
Meet at the Highland High School flagpole  
2900 Royal Scots Way, Bakersfield, CA 93306**

***DVBE COMPLIANCE AND DEPARTMENT OF INDUSTRIAL  
RELATIONS (DIR) PUBLIC WORKS COMPLIANCE MONITORING***

**KERN HIGH SCHOOL DISTRICT  
Michael Zulfa, Ed.D., Superintendent**



**SCARCHITECT, INC.**

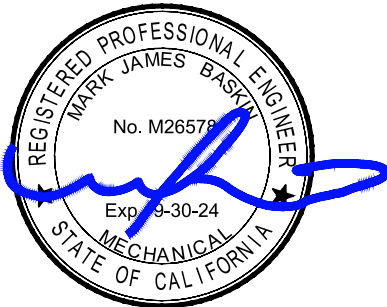
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**HIGHLAND HIGH SCHOOL  
CAFETERIA MODERNIZATION  
FOR  
KERN HIGH SCHOOL DISTRICT  
BAKERSFIELD, KERN COUNTY, CA.**



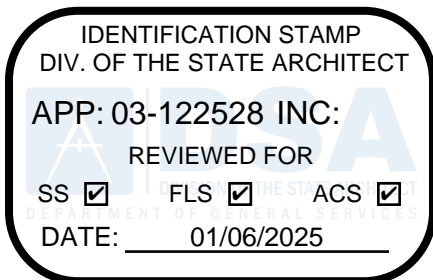
**BASKIN MECHANICAL ENGINEERS**

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Los Angeles, CA 90015  
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**APPROVED  
KERN HIGH SCHOOL DISTRICT**

By \_\_\_\_\_  
Board Resolution

## INDEX

### **DIVISION 0 – BID AND AGREEMENT DOCUMENTS**

Per KHSD

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

01 33 00	Submittals
01 41 00	Regulatory Requirements
01 45 00	Quality Control
01 74 19	Construction Waste Management
01 74 19A	Contractor's Construction Waste Recycling Plan
01 74 19B	Contractor's Reuse, Recycling and Disposal Report

### **DIVISION 02 - EXISTING CONDITIONS**

02 42 00	Minor Demolition for Remodeling
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### **DIVISION 03 - CONCRETE**

03 10 00	Concrete Work
03 21 00	Reinforcing Steel

### **DIVISION 04 - MASONRY**

04 20 00	Concrete Masonry Unit
----------	-----------------------

### **DIVISION 05 - METALS**

05 12 00	Structural Steel and Miscellaneous Iron
05 31 00	Steel Deck
05 51 33	Metal Ladders

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

06 10 00	Rough Carpentry
06 20 00	Finish Carpentry
06 22 00.02	Millwork and Cabinets

### **DIVISION 07 - THERMAL & MOISTURE PROTECTION**

07 21 10	Insulation
07 22 20	Roof Boards
07 31 13.10	Fiberglass Asphalt Shingle Roofing
07 51 10	TPO Single Ply Roofing
07 60 00	Sheetmetal
07 81 20	Sprayed On Fireproofing
07 91 00	Caulkings and Sealants

### **DIVISION 08 - OPENINGS**

08 11 00	Metal Doors and Frames
08 14 20	Wood Doors
08 33 00	Overhead Rolling Grilles
08 41 13	Aluminum Entrances and Storefront
08 71 00	Finish Hardware
08 81 00	Glass and Glazing

### **DIVISION 09 - FINISHES**

09 21 01	Lathing and Plastering
09 25 13	Exterior Plaster Finishing System
09 26 00	Veneer Plaster
09 29 00	Gypsum Drywall
09 30 00	Tile Work

09 53 23	Acoustic Tile
09 65 16	Resilient Flooring and Rubber Topset Base
09 67 23	Resinous Flooring
09 91 00	Painting

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**DIVISION 10 – SPECIALTIES**

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10 14 23	Zinc Etched Identification Signs
10 21 13.16	Solid Plastic Toilet and Shower Stalls
10 28 13	Toilet and Bath Accessories
10 44 00	Fire Extinguishers-Cabinet and Access
10 51 13	Interior Lockers

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**DIVISION 11 – EQUIPMENT**

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11 40 00	Food Service Equipment
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**DIVISION 12 – FURNISHINGS**

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NOT USED

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**DIVISION 13 - SPECIAL CONSTRUCTION**

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13 21 26	Insulated Cold Storage Rooms
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**DIVISION 14 - CONVEYING SYSTEMS**

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NOT USED

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**DIVISION 21 - FIRE SUPPRESSION**

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NOT USED

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**DIVISION 22 – PLUMBING**

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22 00 00	Plumbing
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**DIVISION 23 - HEATING, VENTILATING AND AIR CONDITIONING (HVAC)**

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23 00 00	Heating, Ventilating and Air Conditioning
23 09 00	Building Management System

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**DIVISION 26 – ELECTRICAL**

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26 01 00	Electrical Scope and General Requirements
26 05 73	Arc Flash Hazard Analysis-Short Circuit-Coordination Study
26 08 00	Electrical Acceptance Tests
26 22 00	Low Voltage General Purpose Transformers

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**DIVISION 28 – FIRE ALARM SYSTEM**

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28 31 11	Fire Alarm System
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**DIVISION 31 – EARTHWORK**

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31 20 00	Earthwork
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**DIVISION 32 – EXTERIOR IMPROVEMENTS**

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32 05 13.01	Termite Control
32 05 13.02	Vegetation Control
32 12 16	Asphaltic Concrete
32 13 13	Concrete Paving

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**DIVISION 33 – UTILITIES**

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NOT USED

**SUBMITTALS**

The following Supplemental Conditions apply to school projects and are in addition to the General Conditions, Section 10. Items in this Section modify the General Conditions and shall take precedence thereover. Unaltered portions of the General Conditions shall remain in effect.

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- a. Submittal procedures
- b. Construction Progress Schedules
- c. Proposed Products List
- d. Shop Drawings
- e. Product Data
- f. Samples
- g. Manufacturers' Instructions
- h. Manufacturers' Certificates

**1.02 RELATED SECTIONS**

- a. Section 01 45 00 - Quality Control: Manufacturers' field services and reports.
- b. Section 10, Article 53, Contract Closeout.

**1.03 SUBMITTAL PROCEDURES**

- a. Transmit each submittal with AIA Form G810 or Architect-approved form.
- b. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.
- c. Identify project, general contractor, construction manager, prime contractor or supplier; pertinent drawing sheet and detail number(s), and specification section number, as appropriate.
- d. Apply general contractor's stamp, signed or initialed certifying that review, 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.
- e. Deliver to Architect at business address. Coordinate submission of related items. Architect shall have a minimum of 21 calendar days for review of all submittals.

- f. Identify variations from contract documents and product or system limitations, which may be detrimental to successful performance of the completed work.
- g. Provide space 4" x 4" for contractor and architect review stamps.
- h. Revise and resubmit submittals as required, identify all changes made since previous submittal.
- i. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- j. All submittals, except shop drawings, required shall be submitted within 15 days unless noted otherwise or as shown on drawing from date of award of contract for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner.

#### 1.04 PROPOSED PRODUCTS LIST

- a. Within 15 days after date of award of contract, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- b. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

#### 1.05 SHOP DRAWINGS

- a. Submit in the form of one pdf electronic copy.
- b. After review, distribute in accordance with Paragraph 1.03 above and for Record Documents described in Section 10, Article 53 - Contract Closeout.
- c. All shop drawings shall be submitted within 30 days after the award of the contract.

#### 1.06 PRODUCT DATA

- a. Submit in the form of one pdf electronic copy.
- b. Mark submittal to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this project.
- c. After review, distribute in accordance with Paragraph 1.03 above and provide copies for Record Documents described in Section 10, Article 53 - Contract Closeout.

**1.07 SAMPLES**

- a. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- b. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection.
- c. Include identification on each sample, with full project information.
- d. Submit the number or samples specified in individual specification sections; one of which will be retained by Architect.
- e. Reviewed samples, which may be used in the work, are indicated in individual specification sections.

**1.08 MANUFACTURER'S INSTRUCTIONS**

- a. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- b. Identify conflicts between manufacturers' instructions and contract documents.

**1.09 MANUFACTURER'S CERTIFICATES**

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

END OF SECTION  
08/04/23

**REGULATORY REQUIREMENTS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

The following Supplemental Conditions apply to school projects and are in addition to the General Conditions, Section 10. Items in this Section modify the General Conditions and shall take precedence thereover. Unaltered portions of the General Conditions shall remain in effect.

**PART 1 GOVERNING (REVIEWING AND APPROVING) AGENCY**

The Governing (Reviewing and Approving) Agency for this project shall be:

DIVISION OF THE STATE ARCHITECT

**PART 2 STATE LAWS AND REGULATIONS**

2.01 The project shall be constructed under the complete jurisdiction of all laws of the State of California governing the construction of public buildings, to-wit:

**2021 I.B.C., Volumes 1 & 2 with 2022 C.B.C. Amendments**

- a. Contractor shall comply with California Building Code C.B.C., Titles 19 and C.C.R. Title 24 (2022 C.B.C.), Parts 1, 2, 6, 9, 11 & 12 in addition to all other applicable regulations. Contractor shall keep a copy of the latest edition of Titles 19, and Title 24, Parts 1, 2, 6, 9 & 12 on the job site at all times, and keep it available for reference use. Nothing in these plans or specifications shall be construed to permit work not conforming to these codes. A copy of stamped plans and specifications shall be kept on the job site and made available to the Owner's Inspector. The provisions of all applicable building codes and ordinances shall be considered a minimum requirement. Where the requirements of these Contract Documents exceed those of such codes or ordinances, these Contract Documents shall govern.
- b. All laws governing the employment of labor, qualifications for employment, posting of minimum wage rates, hours of work, employment of aliens, payment of employees, convict-made materials, domestic and foreign materials and accident prevention.
- c. Title 19 of the California Code of Regulations entitled "Public Safety".
- d. General Industrial Safety Orders: Each and every Contractor shall observe and conform to the provisions of Title 8, California Code of Regulations bearing upon safe and proper use, construction, disposal, etc., of materials, machinery and building appurtenances as therein set forth.
- e. Code Rules and Safety Orders: All work and materials shall be in full accordance with the latest rules and regulations of the California State Fire Marshal; the safety orders of the Division of Industrial Safety, Department of Industrial Relations, and any State Laws or Ordinances. Nothing in these plans and specifications is to be construed to permit work not conforming to these Codes.
- f. Title 24, CBC, Part 2, 2022 C.B.C. (2021 IBC)
- g. Title 24, CBC, Part 3, 2022 C.E.C. (2020 NEC w/NFPA 70)
- h. Title 24, CBC, Part 4, 2022 C.M.C. (2021 UMC)
- i. Title 24, CBC, Part 5, 2022 C.P.C. (2021 UPC)
- j. Title 24, CBC, Part 9, 2022 C.F.C. (2021 IFC)
- k. Title 24, CBC, Part 6, 2022 C.E.C.
- l. Title 24, CBC, Part 11, 2022 C.G.C.
- m. Title 19, CCR, Public Safety, Div. 1, State Fire Marshal Regulations.
- n. Occupational Health & Safety Act. (OSHA)



All of the above laws and regulations, through referral herein, are as much a part of the Contract as if they were incorporated in their entirety in this Section.

**2.02 ALTERATION REHABILITATION OR RECONSTRUCTION PROJECTS**

Pursuant to Section 4-317 (c) Part 1, Title 24, CCR, requires the following notes to be **added** to the specifications:

“Should any existing conditions such as deterioration or non-complying construction be discovered which is not covered by the DSA approved documents wherein the finished work will not comply with Title 24, California Code of Regulations, a construction change document, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.”

**PART 3 TESTS AND INSPECTIONS**

- a. Tests and Inspections shall be as specified in Section 01 45 00 00.
- b. The Architect or Registered Engineer in general responsible charge shall designate the testing of materials consistent with the needs of the project and shall issue specific instructions to the testing agency.

END OF SECTION  
11/01/2022

**QUALITY CONTROL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include the furnishing of all labor, materials and equipment required to complete all the tests and inspections of materials indicated on the drawings and as specified herein.

## 1.02 WORK INCLUDED

- a. Earthwork: Inspection of subgrade improvement operations, compacted fill and field density tests.
- b. Concrete Work: Testing and certification of concrete ingredients, compression cylinders, reinforcing steel and placement inspections.
- c. Masonry Work: Testing and certification of masonry units, mortar and grout specimens, core test specimens, reinforcing steel, and placement inspection of masonry work.
- d. Structural Steel: Sampling and testing of required specimens, inspection of structural fabrication, shop welding and field welding as required.

## 1.03 OWNER'S INSPECTOR

- a. A DSA Certified project inspector employed by the Owner in accordance with the requirements of State of California Code of Regulations, Title 24 will be assigned to the work. Their duties are specifically defined in Part 1, Title 24, C.C.R., Sec. 4-342.
- b. The work of construction in all stages of progress shall be subject to the personal continuous observation of the inspector. He shall have free access to any or all parts of the work at any time. The General Contractor shall furnish the inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the General Contractor from any obligation to fulfill this Contract.
- c. Defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the General Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge the expense to the General Contractor. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the General Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the General Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the General Contractor.

**1.04 COOPERATION**

- a. **Laboratory:** Shall cooperate with all trades whose work affects or is affected by the tests and inspections.
- b. **Cooperation:** The General Contractor to cooperate with and provide testing laboratory opportunity and assistance in taking samples, making field tests and making inspections.

**1.05 SPECIAL PROVISIONS**

- a. **Governing Agency:** Shall be as specified in Section 01 41 00.
- b. **Laboratory:** A DSA Accepted testing laboratory directly employed by the District (Owner) shall conduct all the required tests and inspection for the project and shall be approved by Owner, Architect, Structural Engineer and Governing Agency. (Laboratory of Record may not be selected or known at time of bid or award of contract).
- c. **Duties of Testing Laboratory:** Inspect stock, mark identified stock, select and mark test specimens, perform required tests, inspections as specified, furnish required reports and certificates.
- d. **Reports:** To be executed immediately upon conclusion of each procedure and forwarded to:

Architect	Structural Engineer	Contractor
Owner	Subcontractor	Job Inspector
Governing Agency		

- (1) One copy of all tests reports shall be forwarded to The Division of the State Architect by the testing agency. Such reports shall include all tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state definitely whether or not the material or materials tested comply with requirements.
- (2) **Verification of Test Reports:** Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering all of the tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.
- e. **Payment:** The Owner shall pay for all tests. When in the opinion of the Architect or the Division of the State Architect, additional tests are required, then such tests and inspection shall be paid for by the Owner but the amount paid shall be deducted from the Contract Price. Examples of such additional tests are: Tests of material substituted for previously accepted materials, unidentified materials, retests made necessary by the failure of materials to comply with the requirements of the specifications and load tests necessary because certain portions of the structure have not fully met specification or plan requirements.

- f. Selection of Samples: All samples and specimens for testing shall be selected by the inspector or by the testing laboratory, but not by the Contractor. The Contractor shall, at his own expense, furnish, package, mark and deliver all samples to be tested, when so directed by the inspector, testing laboratory, or as required by the specifications. Delivery of samples to the testing laboratory shall be made in ample time to allow tests to be made without delaying construction. No extra time will be allowed for the completion of the work by reason of delay in testing samples. The General Contractor shall allow free access at all times to the representatives of the testing laboratory to the sources from which samples are taken.
- g. Preparation of Specimens: Taken by and at expense of fabricator under direction of testing laboratory and machined or prepared to conform to appropriate ASTM specification. Cost of machining specimens is considered part of the testing.
- h. Architect and Structural Engineer reserve the right to demand for test and special examination any materials or part thereof to insure compliance with specifications, and may reject for satisfactory replacement, any material or part judged defective as a result thereof. Applies also to materials or sources of same substituted for those previously approved. Such tests or examinations, even though not specified shall be performed as and when required. Costs paid for by Owner, but the amount paid shall be deducted from the Contract.

#### 1.06 RELATED & APPLICABLE CODES

### **TITLE 24, PART 2 (2022 CBC) VOLUME 2 TESTS AND INSPECTION REQUIREMENTS**

#### **CONCRETE CHAPTER 19A**

##### **MATERIALS:**

- |                        |                      |
|------------------------|----------------------|
| 1. Portland Cement     | 1705 A.3.2; 1910 A.1 |
| 2. Concrete Aggregates | 1705 A.3.2; 1903 A.5 |
| 3. Reinforcing Bars    | 1705 A.3.2; 1910 A.2 |

##### **QUALITY:**

- |                               |   |
|-------------------------------|---|
| 1. Proportions of Concrete    | 1910 A.1; Table 1705 A.3, Item 5                              |
| 2. Strength Tests of Concrete | 1905 A.1.15; Table 1705 A.3, Item 5, ACI 318 Sec. 26.4, 26.12 |

##### **INSPECTION:**

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| 1. Batch Plant                        | 1705 A.3.3                            |
| 2. Waiver of Batch Plant              | 1705 A.3.3.1                          |
| 3. Preplacement and Placing           | 1705A.3.5; 1705A.3.6                  |
| 4. Post-Installed Anchors in Concrete | 1910 A.5; Table 1705 A.3, Items 4a&4b |

#### **MASONRY Chapter 21A**

##### **MATERIALS:**

- |                              |                    |
|------------------------------|--------------------|
| 1. Masonry Units             | 2103 A.1           |
| 2. Portland Cement, Lime     | 2103 A             |
| 3. Mortar & Grout Aggregates | 2103 A.2; 2103 A.3 |
| 4. Reinforcing Bars          | 2103 A.14          |

**QUALITY:**

- |                           |                              |
|---------------------------|------------------------------|
| 1. Portland Cement Tests  | 1910 A.1                     |
| 2. Mortar and Grout Tests | 2105 A.3                     |
| 3. Masonry Prism Tests    | 2105 A.2                     |
| 4. Masonry Core Tests     | 2105 A.4                     |
| 5. Masonry Unit Tests     | 2105 A.2, 2105 A.3; 1705 A.4 |
| 6. Reinforcing Bar Tests  | 1910 A.2                     |

**INSPECTION:**

- |                                      |   |
|--------------------------------------|---|
| 1. Reinforced Masonry                | 1705 A.4  |
| 2. Post-Installed Anchors in Masonry | 1705 A.4; 1910 A.5; 1616 A.1.19,<br>Table 1705 A.3, Items 4a & 4b |

**STEEL****CHAPTER 22A****MATERIALS:**

- |                     |          |
|---------------------|----------|
| 1. Structural Steel | 2205 A.1 |
| 2. Identification   | 2202 A.1 |

**QUALITY:**

- |  |          |
|--|----------|
| 1. Tests of Structural Steel                   | 2211 A.1 |
| 2. Tests of High Strength Bolts, Nuts, Washers | 2213 A.1 |
| 3. Tests of End Welded Studs                   | 2213 A.2 |

**INSPECTION:**

- |                                    |                             |
|------------------------------------|-----------------------------|
| 1. Shop Fabrication                | 1704 A.2.5; 1705 A.2        |
| 2. Welding                         | 1705 A.2.1                  |
| 3. High Strength Bolt Installation | 1705 A.2.1; Table 1705A.2.1 |

**WOOD****CHAPTER 23A****MATERIALS:**

- |                       |        |
|-----------------------|--------|
| 1. Lumber and Plywood | 2303.1 |
|-----------------------|--------|

**PART 2 EXECUTION**

## 2.01 EARTHWORK (Refer to Section 31 20 00)

- a. Testing Agency: Any required foundation consultation, examination or testing shall be done by an approved Geotechnical Engineer, per T24, Section 3304.1.
- b. Consultation or Procedures for this part of the work shall be only as requested by the Architect and Structural Engineer at the timework on the site is commenced and may consist of the following:
  - (1) Examination of exposed subgrades resulting from the cutting operation, including field density tests if considered necessary.
  - (2) Verify completed foundation excavations.
  - (3) Continuous inspection of any required filling and backfilling, including field density tests if considered necessary.
  - (4) Imported or Native Fill Material: Approved material, perform suitability tests for compaction, qualities and optimum moisture if required.
  - (5) Provide Continuous Inspection Supervision during removal and recompaction of existing soil and placement of fill.
  - (6) Inspect and approve completed footing excavations.

(7) Field Density Tests: Shall be made on samples from material in place as required to verify proper compaction densities of fills and backfills.

c. Densities and Method: Densities specified relate to ASTM Designation D-1557 Method A.

**2.02 CONCRETE WORK (Refer to Section 03 10 00)**

a. Inspections:

(1) Notification: The General Contractor shall notify the following people, giving advance notice prior to commencing the designated work:

Person Notified	Advance Notice	Prior to Commencing	For Inspection
Architect	24 hours	Form Work	Excav.
Architect & Inspector	24 hours	Pouring Conc.	Form & Steel
Governing Agency	48 hours	Pouring Conc.	Form & Steel

(2) No concrete shall be poured except in the presence of the Owner's Inspector and only after the forms and reinforcing steel have been approved by the Structural Engineer or his representative.

(3) Batch Plant Inspections: When transit mixed concrete is used, continuous inspection shall be maintained at the plant by a qualified concrete technician who shall issue tickets certifying that quantities and quality of all materials used in the concrete are in accordance with these specifications and the approved design mix. The Owner will pay the costs of this inspection. This inspection will not be required for non-structural concrete (as defined in Paragraph (4) following).

(4) Bonded Weightmaster Certificates: Non-structural concrete such as floor slabs on grade, walks, curb & gutter, etc., shall not require continuous batch plant inspection, but instead, a bonded weightmaster shall furnish notarized affidavits certifying that quantities and quality of all materials used in the concrete are in accordance with these specifications and the approved mix design. Waiver of batch plant inspection shall comply with Title 24, 2022 C.B.C., 2021 IBC, Vol 2, Sec. 1705A3.3.1.

b. Tests: All concrete materials to be tested and reported prior to any use of same.

(1) Portland Cement: Shall be tested in accordance with T24, Section 1901A.2 and ACI 318. One sample shall be taken for each 100 tons of cement except that when used in bulk loading ready mix plants where separate bins for pretested cement are not available, grab samples shall be taken for each shipment of cement placed in the bin with not less than one sample being taken for each day's pour and such samples shall be subsequently tested if required by the Architect, structural engineer or the Division of the State Architect.

(2) Aggregate: Shall be in conformance with T24, Sec. 1903A.5

(3) Reinforcing Steel: To be tested prior to use for compliance with T24, Sections 1910A.2 and 1903A.8 and ASTM A-615 requirements, and comply with quality standards of T-24, Section 2103A.4. Welded rebar shall be inspected and certified per T24, Section 1704A.3.1 and 1705.2.2

(a) Samples: To be selected by representative of testing laboratory from material at the building site or place of distribution, to consist of two (2) pieces, each 18 inches (18") long of each size, furnished, cut and prepared for testing by Contractor, marked and delivered by representative of testing laboratory.

- (b) Tests: One (1) tension and one (1) bend tests shall be made of each size of reinforcing steel including wire fabric. One (1) series of tests shall be made for each ten (10) tons or fraction thereof of each size of reinforcing steel if the bundles as delivered can be identified as to heat number and the mill analysis accompany the report. If they cannot be identified as to heat number, then one (1) series of tests shall be made from each two and one-half (2-1/2) tons or fraction thereof.
- (4) Cylinder Tests: Shall comply with T24, 1905A.1.17
  - (a) Three (3) cylinders of concrete shall be made for each fifty- (50) cubic yards of each grade of concrete or fraction thereof being placed each day. Each cylinder shall be dated, given a number, the point in the structure from which the sample was taken noted thereon and the slump noted thereon.
  - (b) Test cylinders shall be made at the job and stored in the testing laboratory in accordance with ASTM C-31. At the end of twenty-four (24) hours after making, the cylinders shall be stored under moist curing conditions at approximately 70 degrees F. and maintained therein until tested. The cylinders shall be tested in accordance with ASTM C-31. The cylinders shall develop the following minimum ultimate compressive strengths:
 

Design Strength	7 Day Test	28 Day Test	Location Used
2500 p.s.i.	1500 p.s.i.	2500 p.s.i.	Flatwork
3000 p.s.i.	1800 p.s.i.	3000 p.s.i.	Foundations, Ret. Wall, and Light Pole Footings
  - (c) If the strengths of the first two cylinder tests are satisfactory, the third cylinder shall not be tested, but destroyed. The third cylinder shall be tested if the strengths of the first two cylinders are not satisfactory.
  - (d) If the strength of the cylinders does not meet the minimum as mentioned above, core tests of the hardened concrete shall be made in accordance with T24, Section 1905A.1.17, and ACI 318. If the core tests show the concrete strength to be deficient, the concrete shall be deemed defective and removed. The General Contractor shall pay all costs of these core tests.
- c. Laboratory Designed Mixes: See Paragraph 3.01, Proportioning of Concrete Mixes, Section 03 10 00, Concrete Work.
- d. Mix Design;
  - (1) Mix design to be stamped and signed by a California registered Civil Engineer.
  - (2) Maximum w/c shall be 0.50.

2.03 MASONRY WORK (Refer to Section 04 20 00)

- a. Inspections:
  - (1) Notification: The General Contractor shall notify the following people, giving advance notice prior to commencing the designated work.

Person Notified	Advance Notice	Prior to Commencing	For Inspection
Architect & Inspector	24 hours	Grouting Wall (each lift)	Block Work & Steel

Architect, Inspector & Governing Agency	48 hours	Laying of Masonry	Concrete Block & Footing
---	----------	----------------------	-----------------------------

- (2) Grout Placement: No grout shall be placed except in the presence of the Owner's Inspector and only after the block work and reinforcing steel have been approved by the Structural Engineer or his representative.
- (3) All masonry shall be continuously inspected during laying by an inspector specially approved for that purpose by the Division of the State Architect.
- (4) Continuous inspection is required during all grouting of block. Weighmaster Certificates will be required on all grout pours each day.

b. Tests:

- (1) Block: Shall be tested using the methods described by ASTM C-140, and shall meet quality standards UBC Standard 21-4. It shall be tested and approved before any block is laid. Linear shrinkage tests shall conform with ASTM C140.
- (2) Mortar and Grout: Shall be tested and comply with quality standards of 2022 C.B.C., Section 2103A.
  - (a) Test Samples: At the beginning of all masonry work, field sampling shall be done in accordance with the 2022 C.B.C., Section 2105A.4, one (1) set of the mortar and grout shall be taken on three (3) successive working days and continuously stored in moist air until tested, for each test given in Table 1 [(1) 7-day and (1) 28-day test]. All samples shall meet the minimum strengths given herein.
  - (b) Mortar tests specimens: Shall be taken from the unit soon after spreading. After molding, the molds shall be carefully protected by a covering which shall be kept damp for at least twenty-four (24) hours, after which the specimens shall be stored under moist curing conditions at approximately 70 degrees F. and maintained therein until tested.
  - (c) Grout Specimens: Grout prisms (3"x3"x6") shall be cast in molds formed with masonry units having the same absorption and characteristics as those used on the job. Molds may be lined with porous paper. Two (2) prisms shall be made by the inspector for each thirty- (30) cubic yards of grout or fraction thereof being placed each day.
  - (d) Core Tests: (2022 C.B.C., Sec. 2105A.4) Not less than two (2) cores with a 6" diameter shall be taken. At least two (2) cores shall be taken from each building for each 5,000 square feet of area. One half of the cores shall be tested in shear. Minimum sheer strength shall be 97 p.s.i.. The remaining cores shall develop a minimum compressive strength of fifteen hundred (1500) pounds per square inch at twenty-eight (28) days.

TABLE I

MINIMUM MORTAR AND GROUT STRENGTHS (PSI)

COMPRESSION TESTS

At 7 Days	At 28 days	
Mortar on 2"x4" cylinders	1100	1800
Grout in typical prism	1200	2000

- (e) Cement: See Concrete work, Paragraph 2.02b. (1), of this Section.



- (f) **Aggregates:** Test samples of the aggregates to be used in the grout and mortar shall be taken and tested in accordance with ASTM C-270 and C-33, respectively.
- (g) **Reinforcing Steel:** See Concrete Work, Paragraph 2.02b. (3), this Section.

#### 2.04 STRUCTURAL STEEL (Refer to Section 05 12 00)

- a. **Inspections:** All structural welding, both shop and field welding shall be done under the supervision of a qualified welding inspector, qualified in accordance with T24, Section 1705A.2.1., the American Welding Society, CWI or CAWI, approved by the Architect, Structural Engineer and the Governing Agency. The inspector shall furnish the Architect, Structural Engineer and Governing Agency with a report on forms supplied that the welding which is required to be inspected is proper and has been done in conformity with the plans and specifications. He shall check the material, equipment and procedure as well as the welds and the ability of the welder. The welding inspector shall be employed by the testing laboratory. Inspection of welding shall be according to T24, Sec. 1704A.3. Inspection of shop fabrication shall be according to T24, Sec. 1704A.2.
- b. **Tests:**
  - (1) All structural steel that is to be tested will be listed per T24, Section 2212A.1 on the "Order for Tests and Inspections" sheet which is issued at the start of the job. It shall be tested and approved by the testing laboratory prior to fabrication or delivery to the site.
  - (2) If the steel can be identified in accordance with ASTM A-6 and is accompanied by mill analysis and test reports for each heat, it may be used without testing. Identification of the steel at the fabricator's plant shall be made by a representative of the testing laboratory.
  - (3) When the steel cannot be identified or its source is questionable, one set of tension and bend tests shall be made for each 5 tons or fractional part thereof for each size to be used.
  - (4) **Automatic End Welded Studs:** In accordance with T24, Sec. 2212A.2.
  - (5) **Ultrasonic Testing:** All full penetration butt welds of beams to columns and of columns to base, plates shall be tested ultrasonically in accordance with procedures for testing and acceptance criteria established in the "Structural Welding Code, AWS D1.1", latest edition.
  - (6) **High strength bolts:** Shall be tested in accordance with the inspection procedure established in the "Specification for Structural Joints Using ASTM A-325 or A-490 Bolts, and T24, Section 2213A.1

END OF SECTION  
08/10/2023

**CONSTRUCTION WASTE MANAGEMENT**

DIVISION 00 AND 01 ARE A PART OF THIS SECTION.

**PART 1 GENERAL**

## 1.01 Waste Management Goals:

1. This project will recycle or salvage for reuse a minimum of **50%** by weight of the non-hazardous waste generated on-site.
2. This project shall reuse or recycle **100%** of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing.
3. Waste reduction will be achieved through building design, and reuse and recycling efforts will be maintained throughout the construction process.
4. The General Contractor shall be responsible for monitoring the documentation of all waste generated during the project. Sub-contractors and the General Contractor will be required to provide designated dumpsters/bins for particular categories of waste. All contractors hauling waste or responsible for hauling waste shall be required to provide documentation of the amount of waste removed from the site, location to which waste was hauled, and the amount of waste that was recycled. The General Contractor will coordinate locations of such bins so as to not impact access to work on the project while maintaining proximity to the work.

## 1.02 Waste Prevention Planning:

1. Compliance with CCR, Title 24, Part 11 2022 Green Building Standards Code, City of Bakersfield Solid Waste Division and the Kern County Waste Management Department mandatory recycling requirements for businesses. C.O.B.S.W.D. and K.C.W.M.D. recyclables include:
  - a. newspaper
  - b. corrugated cardboard
  - c. white and colored office paper
  - d. glass bottles and jars
  - e. metal cans
2. Compliance with C.O.B.S.W.D., K.C.W.M.D. and Kern County Bena Road Landfill bans, i.e. no disposal of tires, appliances, yard waste, mandatory recyclables, hazardous waste, batteries, fluorescent tubes, and large metal items.
3. Project Construction Documents – Requirements for waste management which will be included in all work. The General Contractor will contractually require all subcontractors to comply with the CCR, Title 24, Part 11 2022 Green Building Standards Code and the C.O.B.S.W.D., K.C.W.M.D. recycling requirements. A copy of this Construction Waste Management Plan will accompany all Subcontractor Agreements and require subcontractor participation.
4. The Construction Waste Reduction Plan shall be implemented and executed as follows and as on the chart:
  - a. Salvageable materials will be diverted from disposal where feasible.
  - b. There will be a designated area on the construction site reserved for a row of dumpsters each specifically labeled for respective materials to be received.
  - c. Before proceeding with any removal of construction materials from the construction site, Recycling Coordinators will inspect containers for compliance with CCR, Title 24, Part 11 2022 Green Building Standards Code and C.O.B.S.W.D.. K.C.W.M.D. requirements.
  - d. Wood cutting will occur in centralized locations to maximize reuse and make collection easier.
  - e. Hazardous waste will be managed by a licensed hazardous waste vendor.

## 1.03 Communication &amp; Education Plan:

1. The General Contractor will conduct an on-site pre-construction meeting with subcontractors. Attendance will be required for the subcontractor’s key field personnel. The purpose of the meeting is to reinforce to subcontractor’s key field employees the commitments made by their companies with regard to the project goals and requirements.
2. Waste prevention and recycling activities will be discussed at the beginning of each weekly subcontractor coordination meeting to reinforce project goals and communicate progress to date.
3. As each new subcontractor comes on site, the recycling coordinators will present him/her with a copy of the Waste Management Plan and provide a tour of the recycling areas.
4. The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan.
5. All recycling containers will be clearly labeled. Containers shall be located in close proximity to the building(s) under construction in which recyclables/salvageable materials will be placed.
6. Lists of acceptable/unacceptable materials will be posted throughout the site.
7. All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.
8. Recycling coordinators shall inspect the containers on a weekly basis to insure that no contamination is occurring and precautions shall also be taken to deter any contamination by the public.

1.04 Motivation Plan:

1. The project team will develop and publish a project mission statement that can be distributed to the subcontractors, attached to subcontracts, and posted at the jobsite.
2. The General Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review project goals and requirements with the project team. Attendance will be a prerequisite for award of subcontracts. A sign-off will be required by subcontractors attending the meeting that the project goals are understood. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the jobsite.

1.05 Evaluation Plan:

1. The General Contractor will develop, update, and post at the jobsite a graph indicating the progress to date for achieving the project’s waste recycling goal of 50% by weight of the total project waste stream.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

3.01 Expected Project Waste, Disposal, and Handling:

The following charts identify waste materials expected on this project, their disposal method, and handling procedures:

<b>Material</b>	<b>Quantity</b>	<b>Disposal Method</b>	<b>Handling Procedure</b>
Land clearing debris		Keep separate for reuse and or wood sale	Keep separated in designated areas on site.
Clean dimensional wood and palette wood		Keep separate for reuse by on-site construction or recycle at designated recycle location.	Keep separated in designated areas on site. Place in “Clean Wood” container.

**SECTION 01 74 19**

<b>Material</b>	<b>Quantity</b>	<b>Disposal Method</b>	<b>Handling Procedure</b>
Plywood, OSB, particle board		Reuse, landfill	Keep separated in designated areas on site. Place in "Trash" container.
Asphalt		Grind, reuse, recycle	Store on site until reuse on project or recycle by hauling to designated location.
Painted or treated wood		Reuse, landfill	Keep separated in designated areas on site. Place in "Trash" container.
Concrete		Recycle	
Concrete Masonry Units		Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas on site
Metals		Recycle	Keep separated in designated areas on site. Place in "Metals" container.
Gypsum drywall (unpainted)		Recycle	Keep scraps separate for recycling – stack on pallets in provided on site. All scrap drywall will be taken back by contractor to drywall supplier
Paint		Reuse or recycle	Keep separated in designated areas on site
Insulation		Reuse, landfill	
Flooring		Reuse, landfill	
Carpet and pad		Reuse or recycle with carpet manufacturer	
Glass		Glass Bottles	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/Cardboard" container
Plastics		Plastic Bottles Plastic bags/scrap Reuse, Recycle	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/Cardboard" container
Beverage		Recycle	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/Cardboard" container
Cardboard		Recycle	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/Cardboard" container

**SECTION 01 74 19**

<b>Material</b>	<b>Quantity</b>	<b>Disposal Method</b>	<b>Handling Procedure</b>
Paper and newsprint		Recycle	Keep separated in designated areas on site. Place in "Glass/Plastic bottles/Metal Cans/Mixed Paper/Cardboard" container
<b>TOTAL</b>			

**3.02 Responsible Party for Waste Disposal:**

1. General Contractor shall monitor all waste management activities and collect all documentation of recycling and disposal.
2. Earthwork Contractor shall regrind existing paving and haul to location designated by Owner including documentation of amounts hauled. Reuse as required or permitted on this project.
3. Concrete Contractor shall provide separate bins for concrete waste, including hauling to recycling facility and documentation of all amounts.
4. Concrete Masonry Contractor shall provide separate bins for CMU was including hauling to recycling facility and documentation.
5. Metal Stud/Drywall Contractor shall provide separate bins for metal stud waste and drywall waste including hauling to recycling facility and documentation.
6. Demolition Contractor shall provide hauling and recycling or disposal of materials generated from demolition of existing building/s including documentation of material recycled and disposed of in landfill.
7. The General Contractor shall provide separate bins for metal (other than metal studs), cardboard, plastic, glass and aluminum containers and general trash and debris including documentation and hauling to recycling facility.
8. Name of landfill for disposal of non-recyclable waste: Contractor shall determine
  - a. Transfer Stations: Contractor shall determine
  - b. Landfills (ultimate disposal location): Contractor shall determine
9. Landfill tipping fee: \$\_\_\_\_\_ / ton Contractor shall verify
10. Estimate of waste for landfill disposal: Contractor shall verify

**3.03 Recycling Calculation example:**

1. If all construction waste was disposed in landfill:  
 \_\_\_\_\_ tons = \_\_\_\_\_ lbs/2000 lbs/ton , \_\_\_\_\_ tons x \$\_\_\_\_\_/ton = \$\_\_\_\_\_
2. With recycling: TOTAL = \$\_\_\_\_\_

**3.04 Recycling locations:**

1. Asphalt
  - a. A/C Materials, 4717 Mendian Ave., Bakersfield, CA 93308 – 322-3424

- b. A&M Disposal & Recycling, 4233 Quinn Rd., Bakersfield, CA 93308 – 399-5575
  - c. Asphalt & Concrete Recycling, 4801 Wible Rd., Bakersfield – 396-8695
  - d. Griffith Company, 3950 Shell St., Bakersfield, CA – 831-7331
  - e. Granite Company, 21541 Bear Mountain Blvd., Arvin, CA 93203 – 854-3051
  - f. Valley Tree Construction, 4233 Quinn Rd., Bakersfield, CA 399-1783 or 872-5145
2. Building Materials
- a. California Material Exchange (CalMax) – 877-520-9703
3. Cardboard & Corrugated
- a. BARC – 397-3622
  - b. Golden State Metal, 2000 E Brundage Ln, 327-3559
  - c. JC Pallet Co., 5800 State Rd., 393-2229
  - d. Sierra Metals, 1620 E Brundage Ln, 327-7073
4. Commercial Recycling
- a. Revive Recycling, 3624 Buck Owens Blvd., Ste 7, 322-7374
5. Concrete
- a. See Asphalt – above
6. Drywall
- a. Hondo Inc., 20807 Stockdale Hwy, 589-1042
  - b. Quality Soil Amendments, 20807 Stockdale Hwy, 587-4457
7. Glass/Plastic Containers
- a. Golden State Metals, 1620 E Brundage Ln, 327-3559
  - b. Sierra Metals, 1620 E Brundage Ln, 327-7073
  - c. Smurfit-Stone Recycling, 2710 O St, 327-3841
8. Pallets
- a. JC Pallet Co., 5800 State Rd., 393-2229
  - b. Kern County Bena Road Landfill, 17 miles east of Bakersfield, off Tower Line Rd on Bena Rd, open Sunday-Saturday 8 am to 4 pm.
9. Paper – Office/Mixed
- a. BARC – 2240 S Union Ave, 834-2272
  - b. Sierra Metals, 1620 E Brundage Ln, 327-7073

- c. Smurfit-Stone Recycling, 2710 O St, 327-3841
- 10. Scrap Metals
  - a. Golden State Metals, 1620 E Brundage Ln, 327-3559
  - b. Sierra Metals, 1620 Brundage Ln, 327-7073
  - c. Midway Recycle/Western Scrap, 7200 Downing Ave., 589-9712
  - d. Nix Scrap Metals, 1100 James Rd., 387-1216
  - e. Rick's Recycling, 2200 S. Union Ave, 832-3248
- 11. Mixed Waste
  - a. Metro Recycling Corp, 58 Mt Vernon Ave., 1 mi south of 58, 661-201-3535
- 12. Landfill
  - a. General Trash
    - i. Kern County Bena Road Landfill, 17 miles east of Bakersfield, off Tower Line Rd on Bena Rd, open Sunday-Saturday 8 am to 4 pm. Also accepts for recycling: large appliances, asphalt, concrete, pallets, and green waste.

RECYCLING OPERATIONS

Action ***	Who	When
<input type="checkbox"/> Choose bins/collection methods	_____	_____
<input type="checkbox"/> Order bins - oversee deliver	_____	_____
<input type="checkbox"/> Site bins/collection sites for optimum convenience	_____	_____
<input type="checkbox"/> Sort or process wood	_____	_____
<input type="checkbox"/> Sort or process metal	_____	_____
<input type="checkbox"/> Sort or process cardboard	_____	_____
<input type="checkbox"/> Sort or process drywall	_____	_____
<input type="checkbox"/> Sort or process <u>CSWD mandatory items</u> (material)	_____	_____
<input type="checkbox"/> Sort or process _____ (material)	_____	_____
<input type="checkbox"/> Schedule material pickups/dropoffs	_____	_____
<input type="checkbox"/> Protect Materials from Contamination	_____	_____
<input type="checkbox"/> Document material pickups/dropoffs	_____	_____

\*\*\* Depending on the service option chosen, these may be the responsibility of either the field personnel, the hauler, a full-service recycling contractor, or the subcontractors.

COMMUNICATION PLAN - Except for mandatory items (\*), check other items intended to be used.

Action	Who	When	Completed
<input type="checkbox"/> Complete Construction Waste Mgmt. Plan*	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Hold Orientation/Kick-off Meeting*	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Update & Progress in Weekly Job-Site Meetings*	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Encourage Just-In-Time Deliveries	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Post Targeted Materials (Signage)	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Distribute Tip Sheets for Job-Site Personnel	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Post Goals/Progress (Signage)	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> _____	_____	_____	<input type="checkbox"/>

MOTIVATION PLAN - Except for mandatory items (\*), check other items intended to be used.

Action	Who	When	Completed
<input type="checkbox"/> Use formal agreements committing Subs to program	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Require Mis-Sorters to Re-Sort Bin	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Provide Stickers, T-Shirts, or Hats	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Public Recognition of Participating Subs	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Letters of Recognition	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Awards Luncheon	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> _____	_____	_____	<input type="checkbox"/>

EVALUATION PLAN - Except for mandatory items (\*), check other items intended to be used.

Action	Who	When	Completed
<input type="checkbox"/> Perform Short Form Waste Audit	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Perform Full Waste Audit	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Perform Mid-Course Assessment	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Perform Monthly Cost and Materials Tracking*	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> Perform Final Evaluation*	_____	_____	<input type="checkbox"/>
<input type="checkbox"/> _____	_____	_____	<input type="checkbox"/>



**SECTION 01 74 19A**  
**CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING PLAN**

*(Submit After Award of Contract and Prior to Start of Work)*

Project Title:		
Contract or Work Order No.:		
Contractor's Name:		
Street Address:		
City:	State:	Zip:
Phone: ( )	Fax: ( )	
E-Mail Address:		
Prepared by: (Print Name)		

Date Submitted:		
Project Period:	From:	TO:

**Reuse, Recycling or Disposal Processes To Be Used**

*Describe the types of recycling processes or disposal activities that will be used for material generated in the project. Indicate the type of process or activity by number, types of materials, and estimated quantities that will be recycled or disposed in the sections below:*

- 01 - Reuse of building materials or salvage items on site (i.e. crushed base or red clay brick)
- 02 - Salvaging building materials or salvage items at an off site salvage or re-use center (i.e. lighting, fixtures)
- 03 - Recycling source separated materials on site (i.e. crushing asphalt/concrete for reuse or grinding for mulch)
- 04 - Recycling source separated materials at an off site recycling center (i.e. scrap metal or green matls)
- 05 - Recycling commingled loads of C&D matls at an off site mixed debris recycling center or transfer station
- 06 - Recycling material as Alternative Daily Cover at landfills
- 07 - Delivery of soils or mixed inerts to an inert landfill for disposal (inert fill).
- 08 - Disposal at a landfill or transfer station.
- 09 - Other (please describe)

**Types of Material To Be Generated**

*Use these codes to indicate the types of material that will be generated on the project*

- |   |                     |                  |                          |                 |
|---|---------------------|------------------|--------------------------|-----------------|
| A = Asphalt                             | C = Concrete        | M = Metals       | I = Mixed Inert          | G = Green Matls |
| D = Drywall                             | P/C=Paper/Cardboard | W/C = Wire/Cable | S= Soils (Non Hazardous) |                 |
| M/C = Miscellaneous Construction Debris | R = Reuse/Salvage   | W = Wood         | O = Other (describe)     |                 |

Facilities Used: Provide Name of Facility and Location (City)

Total Truck Loads: Provide Number of Trucks Hauled from Site During Reporting Period

Total Quantities: If scales are available at sites, report in tons. If not, quantify by cubic yards. For salvage/reuse items, quantify by estimated weight (or units).

**SECTION I - RE-USED/RECYCLED MATERIALS**

*Include all recycling activities for source separated or mixed material recycling centers where recycling will occur.*

Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) M	04	ABC Metals, Los Angeles	24	355		
<b>a. Total Diversion</b>			<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

[PROJECT TITLE]  
[DATE]

**SECTION 01 74 19A  
CONTRACTOR'S CONSTRUCTION WASTE AND RECYCLING PLAN**

Continued

SECTION II - DISPOSED MATERIALS						
<i>Include all disposal activities for landfills, transfer stations, or inert landfills where no recycling will occur.</i>						
Type of Material	Type of Activity	Facility to be Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) D	08	DEF Landfill, Los Angeles	2	35		
b. Total Disposal				0	0	0

SECTION III - TOTAL MATERIALS GENERATED						
<i>This section calculates the total materials to be generated during the project period (Reuse/Recycle + Disposal = Generation)</i>						
				Tons	Cubic YD	Other Wt.
a. Total Reused/Recycled				0	0	0
b. Total Disposed				0	0	0
c. Total Generated				0	0	0

SECTION IV - CONTRACTOR'S LANDFILL DIVERSION RATE CALCULATION						
<i>Add totals from Section I + Section II</i>						
			Tons	Cubic Yards	Other Wt.	
a. Materials Re-Used and Recycled			0			
b. Materials Disposed			0			
c. Total Materials Generated (a. + b. = c.)			0	0	0	
d. Landfill Diversion Rate (Tons Only)*			#DIV/0!			

\* Use tons only to calculate recycling percentages:  $Tons\ Reused/Recycled/Tons\ Generated = \% \text{ Recycled}$

Contractor's Comments (Provide any additional information pertinent to planned reuse, recycling, or disposal activities):

Notes:

- Section 01151A is a Division 01 General Requirement under CSI MasterFormat 1998 Edition.  
For CSI MasterFormat 2004 Edition, this Section may be renumbered as follows:  
Under Division 00, Procurement and Contracting Requirements, Project Forms 00 60 00  
Use: Section 00 62 22 Construction Waste Diversion Plan
- Suggested Conversion Factors: From Cubic Yards to Tons (Use when scales are not available)  
Asphalt: .61 (ex. 1000 CY Asphalt = 610 tons. Applies to broken chunks of asphalt)  
Concrete: .93 (ex. 1000 CY Concrete = 930 tons. Applies to broken chunks of concrete)  
Ferrous Metals: .22 (ex. 1000 CY Ferrous Metal = 220 tons)  
Non-Ferrous Metals: .10 (ex. 1000 CY Non-Ferrous Metals = 100 tons)  
Drywall Scrap: .20  
Wood Scrap: .16

**SECTION 01 74 19B**  
**CONTRACTOR'S REUSE, RECYCLING, AND DISPOSAL REPORT**

*(Submit With Each Progress Payment)*

Project Title:		
Contract or Work Order No.:		
Contractor's Name:		
Street Address:		
City:	State:	Zip:
Phone: ( )	Fax: ( )	
E-Mail Address:		
Prepared by: (Print Name)		

Date Submitted:		
Period Covered:	From:	To:

**Reuse, Recycling or Disposal Processes Used**

*Describe the types of recycling processes or disposal activities used for material generated in the project. Indicate the type of process or activity by number, types of materials, and quantities that were recycled or disposed in the sections below:*

01 - Reuse of building materials or salvage items on site (i.e. crushed base or red clay brick)  
 02 - Salvaging building materials or salvage items at an off site salvage or re-use center (i.e. lighting, fixtures)  
 03 - Recycling source separated materials on site (i.e. crushing asphalt/concrete for reuse or grinding for mulch)  
 04 - Recycling source separated materials at an off site recycling center (i.e. scrap metal or green matls)  
 05 - Recycling commingled loads of C&D matls at an off site mixed debris recycling center or transfer station  
 06 - Recycling material as Alternative Daily Cover at landfills  
 07 - Delivery of soils or mixed inerts to an inert landfill for disposal (inert fill).  
 08 - Disposal at a landfill or transfer station.  
 09 - Other (please describe)

**Types of Material Generated**

*Use these codes to indicate the types of material that were generated on the project*

A = Asphalt      C = Concrete      M = Metals      I = Mixed Inert      G = Green Matls  
 D = Drywall      P/C=Paper/Cardboard      W/C = Wire/Cable      S= Soils (Non Hazardous)  
 M/C = Miscellaneous Construction Debris      R = Reuse/Salvage      W = Wood      O = Other (describe)

Facilities Used: Provide Name of Facility and Location (City)

Total Truck Loads: Provide Number of Trucks Hauled from Site During Reporting Period

Total Quantities: If scales are available at sites, report in tons. If not, quantify by cubic yards. For salvage/reuse items, quantify by estimated weight (or units).

**SECTION I - RE-USED/RECYCLED MATERIALS**

*Include all recycling activities for source separated or mixed material recycling centers where recycling occurred.*

Type of Material	Type of Activity	Facilities Used/Location	Total Truck Loads	Total Quantities		
				Tons	Cubic YD	Other Wt.
(ex.) M	04	ABC Metals, Los Angeles	24	355		
<b>a. Total Diversion</b>			0	0	0	0



**MINOR DEMOLITION FOR REMODELING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 CODES AND ORDINANCES

All work is to be conducted in complete accordance with all applicable provisions of local and State safety and health ordinances.

1.02 DESCRIPTION AND CONDITION OF PREMISES

- a. The building affected by this Contract is set forth in "Scope of Work" below and has been used for the designated occupancy since original construction.
- b. Plans are available for the structure(s) at the office of the Architect for review by the Contractor. It is the intent and purpose of this Contract that the Contractor demolish all of the work as specified herein or on the plans, regardless of material of which it is constructed.
- c. Contractor shall accept the premises in the condition as found on the first day of work under the Contract. He shall assume all risk regarding damage or loss, whether by reason of fire, theft or other casualty or happening to specified building. No such damage or loss shall relieve the Contractor from Contract obligation to complete this work.

1.03 SCOPE OF WORK

- a. Scope of work shall include all labor, materials, equipment, transportation and appliances to complete the work of demolition and site restoration as hereinbelow specified and as per drawings and as reasonably required to complete the contract.
- b. Removal of existing framing, furring, bracing, concrete slabs, walls and footings, fasteners, equipment, finishes, support systems, plumbing, electrical and HVAC systems and all other items required to complete the work in this contract.
- c. Disposal legally and off the site of all debris, rubbish and salvage.
- d. Construction and provision of proper barricades, signs and protective structures and devices.
- e. Responsibility of cleanliness and safety of work area and all other affected premises during the period of the Contract.
- f. Filling, backfilling and grading of site as specified.

**1.04 SURVEY OF EXISTING CONDITIONS**

The bidders are required to examine the building and determine for themselves the extent of the work included in this Contract.

**1.05 WORKING AREA**

A portion of the building site shall be allotted to the Contractor for the prosecution of his work. He shall confine his operations to this area and shall provide barricades or guards as required by the City and/or County Code requirements.

**1.06 RESPONSIBILITY AND COORDINATION**

- a. Responsibility accrues to the Contractor for the condition, good order, health and safety of all premises and individuals his work may affect.
- b. It shall be the responsibility of the Contractor to notify any utility companies and the owner concerning the cutting off or restoring of service or of relocating or modifying any such service that the work of this contract may require. He shall protect and maintain in operation any utility or sewer line that is required to remain operative during the period of the contract that his work may affect.
- c. The Contractor shall coordinate and require such cooperation of the various trades as will be necessary to complete each and every part of the work, even though not specifically indicated, noted or detailed on the drawings or specified.

**1.07 PERMITS AND LICENSES**

The Contractor shall secure, take out and/or maintain all required permits, approvals and licenses necessary to legally complete this work and shall be responsible for insuring that each and every one of his subcontractors is properly and duly licensed and have required permits to perform any of their work requiring same.

**1.08 SALVAGE MATERIALS**

- a. The Owner reserves the right to retain ownership of any equipment or fixtures removed from the building. All removed equipment or fixtures shall be stored neatly in an area designated by the Owner for a period of 48 hours after the Owner's representative has been notified. All items that are not claimed by the Owner within the specified time period shall be removed from the site and properly disposed of.
- b. All salvage materials removed from the building shall be placed in neat piles and stacks in the working area and removed from the site at the earliest practicable date.

- c. The Contractor shall not dispose of the improvements or materials removed from the building at the site by sale, gift, or in any manner whatsoever to the general public; provided however, that these provisions shall not be construed as limiting or prohibiting the sale or disposal of such salvage to duly licensed contractors or material men. The Contractor shall assume all responsibility arising out of such operation.

**PART 2 EXECUTION**

**2.01 DEBRIS**

All debris resulting from the demolition shall be removed and hauled away from the site immediately. Debris and rubbish shall not be allowed to accumulate on the site. Such material shall be sprinkled while being handled or loaded to relieve annoyance to the balance of the premises and to the neighborhood. No burning of rubbish shall be permitted at the site.

**2.02 PROTECTION**

- a. The Contractor shall enclose the area with fence barricades as per City and/or County code requirements. Barricades shall be substantially and neatly erected and braced and in areas near existing buildings where hazards may exist from falling materials, shall be constructed in a manner to intercept any materials that may fall as a result of demolition work.
- b. Barricades and fences shall have substantial gates, equipped with good locks and the working area shall be kept securely locked at all times work is in progress.
- c. The Contractor shall provide signs and post warnings in all necessary places to exclude all persons except those directly connected with the work from entering the working area or where vehicles are operating or materials are being stored. The Contractor shall be responsible for preventing unauthorized persons from entering the working area.
- d. The Contractor shall execute demolition work to insure protection of adjacent buildings, shrubs, trees and lawns from damage, which might occur from any cause and shall not interfere with use of adjacent buildings or safe passage to and from same.

**2.03 USE OF EXPLOSIVES** will not be permitted.

**2.04 TREES AND PLANTINGS**

Trees and shrubs as indicated on the plan and their roots, stumps, etc., within the working area are to be removed.

**2.05 UTILITIES**

- a. It shall be the responsibility of the contractor to notify any utility companies and the owner concerning the cutoff and restoration of service or of relocating or modifying any such service that the work in this contract may require. He shall protect and maintain in operation any utility or sewer line that is required to remain operative during the period of the contract that his work may affect.
- b. The Contractor shall keep a record as to location and size of all capped pipe and/or conduit during demolition on a blue line print furnished by the Architect.

**2.06 SCAFFOLDING, LADDERS, ETC.**

All temporary construction, scaffolding, ladders, runways, hoistways, etc., shall be furnished and maintained by the Contractor as required and shall comply with all laws, ordinances, rules and regulations governing the construction and use of same.

**2.07 CLEANING**

- a. Upon completion of the work, the Contractor shall remove all protections, tools, materials, plant apparatus and rubbish or debris of any sort and leave the premises neat and orderly.
- b. The Contractor shall also inspect any other areas or premises of public or private property that may have been damaged, made dirty or otherwise disorderly as a result of his work and restore to good order any such area or premises.

END OF SECTION  
03/05/2008



**CONCRETE WORK**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor; materials and equipment required to complete the concrete work as indicated on the drawings and as specified herein.

1.02 WORK INCLUDED (But not limited to the following items)

- a. Provide and install concrete, plain and reinforced, in place.
- b. Provide and install formwork and shoring.
- c. Placing only of bolts, anchors, frames, inserts, stair nosings
- d. Provide and install control and expansion joints.
- e. Curing, protection and patching of concrete.
- f. Finishing concrete surfaces.
- g. Concrete pits and slabs for plumbing, electrical, heating and ventilation.
- h. Cost of concrete mix designs.
- i. Vapor barrier and sand fill under concrete floor slabs.
- j. Clean up work related to this Section.

1.03 RELATED WORK

- a. Reinforcing steel is specified in Section 03 21 00.
- b. Filling, backfilling and compaction are specified under Section 31 20 00.
- c. Furnishing of bolts, anchors, frames, inserts, etc. is specified in Sections 31 20 00, 05 12 00, and 06 10 00.
- d. Concrete valve boxes for plumbing work are specified in Section 22 00 00.
- e. The cost of testing all materials, *including cement and aggregate* shall be paid by the Owner. The Contractor shall cooperate in furnishing test materials so that tests may be completed prior to their installation.
- f. Concrete encased electrical conduit is specified in Section 26 01 00.
- g. Vegetation control is specified in Section 32 05 13.02.
- h. Termite control is specified in Section 32 05 13.01.

1.04 TESTS AND INSPECTIONS

- a. Refer to Section 01 45 00, Quality Control, for these requirements.
- b. No work of this Section shall be covered until inspected by the Engineer or his authorized representative.
- c. Tests and evaluation shall conform to T24, Sec. 1903A.
- d. Vapor and Waterproofing Admixture representative shall verify all concrete batches prior to concrete mix leaving plant. Installing contractor shall be an approved SPG installer.

1.05 SPECIAL REQUIREMENTS

All concrete shall be mixed, formed, placed and cured, finished and protected in conformance with the recommendations of the Portland Cement Association and the American Concrete Institute unless otherwise shown or noted in these specifications.

## 1.06 DEFECTIVE CONCRETE

Concrete not meeting the minimum strength requirement, not formed as indicated, not true to intended alignment, which has large voids or rock pockets, which has wood or debris embedded in it, which has a surface deviation of greater than one-eighth inch (1/8") in ten feet (10'-0") or does not fully conform to the specifications shall be deemed defective and if so directed by the Architect, shall be removed and replaced with concrete complying with the drawings and specifications. Precast panels or other concrete damaged due to erection operations shall be deemed defective concrete.

**PART 2 PRODUCTS**

## 2.01 MATERIALS

- a. Portland Cement: Shall conform to ACI 318-19, Type V, and T24, Sec. 1903A.2 with the following modifications:
  - (1) The cement shall not contain more than 0.60% total alkali when calculated as Sodium Oxide.
  - (2) The percentage of Tricalcium Silicate shall not be limited.
  - (3) Cement shall be stored in such a manner as to protect it from inclusion of foreign material and damage by moisture. Only one (1) brand of cement shall be used for this work.
  
- b. Aggregates: Shall conform to ASTM C-33-86 except as modified below.
  - (1) Fine aggregate: Shall consist of a washed natural sand of hard, strong and durable particles, which do not contain more than two percent (2%) by weight of deleterious substances such as clay lumps, shale, schist, alkali, mica, coated grains, or soft and flaky particles. Fine aggregate shall be graded uniformly from fine to coarse and when combined with coarse aggregate shall meet the requirements of Table 1.
    - a.) Crushed fine aggregate otherwise known as Crusher fines, or "rock dust" shall be 100% passing #4 sieve screen and shall be spread and compacted while damp to moist. At the time of concrete placement, the blotter layer should be dry to damp, compacted, and smooth. Concrete should not be placed if the blotter layer is wet as it will act as a water reservoir beneath the concrete and all apparent advantages of its use will be nullified. The blotter layer should not be sprayed with water prior to concrete placement.
  - (2) Coarse Aggregate: Shall consist of a clean, hard, fine grained, sound crushed rock, or washed gravel. It shall contain not more than five percent (5%) by weight of flat, thin, elongated, or laminated material nor more than two percent (2%) by weight shale or cherty material. Coarse aggregate shall be graded uniformly from one fourth inch (1/4") in size to maximum size and when combined with fine aggregate shall meet the requirements of Table 1.

TABLE I

## GRADING OF COMBINED AGGREGATES

Sieve Number or Size in Inches (Woven Wire Cloth)	Percent by Weight		
	1-1/2" Max.	1" Maximum	3/4" Maximum
Passing a 1-1/2"	95-100	---	---
Passing a 1"	70-90	90-100	---
Passing a 3/4"	50-80	70-95	90-100
Passing a 3/8"	40-60	45-70	55-75
Passing a #4	35-55	35-55	40-60
Passing a #8	25-40	27-45	30-46
Passing a #16	16-34	20-38	23-40
Passing a #30	12-25	12-27	13-28
Passing a #50	2-12	5-15	5-15
Passing a #100	0-3	0-5	0-5

- c. Water: Shall be clean and free from deleterious acids, alkali, oil and organic matter and shall be potable.
- d. Concrete Slab Control Joints: Shall be one of the following types as indicated and located on the drawings:
- (1) Construction Joints: Shall be Burke #NC-203 "Keyed Kold Joint", or approved equal, 26 gauge galvanized steel continuous joint form with #54-505 removable kap at exterior slabs and #54-510 kap at interior slabs. Seal exterior joints with Sikaflex 2c, color as selected.
  - (2) Expansion Joints: Shall be formed with Burke 1/2" x 4" fiber expansion joint with Burke 1/2" x 1/2" removable plastic cap. Sealant shall be two-part polyurethane, Sikaflex 2c, color as selected.
  - (3) Control Joints: Shall be 1/8" w x 1-1/4" d tooled or saw-cut joints. Control joints may be plastic "Zip-Strips" by Burke or W.R. Meadows (1-1/2" dp. min.).
- e. Crushed Fine Aggregate Fill Under Slabs: Shall conform to the crushed fine aggregate specification in 2.01b. above.
- f. Vapor Barrier:
- (1.) Vapor barrier must have all of the following qualities:
    - a. Maintain permeance of less than 0.010 Perms [grains/(ft<sup>2</sup> · hr · in Hg)] as tested in accordance with ASTM E 1745 Section 7.1 (7.1.1-7.1.5)
  - (2.) Other performance criteria:
    - a. Strength: ASTM E 1745 Class A.
    - b. Thickness: 15 mils minimum
  - (3.) Vapor barrier products:
    - a. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).
    - b. Other acceptable products:  
Or equal products that meet all of the specified performance criteria in paragraphs (1), (2).
- g. Vapor Barrier Sealing Accessories:
- (1) Sealing Seams
    - (a) Stego Tape by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).

- (b) Or approved equal
- (2) Sealing Penetrations
  - (a) Stego Tape by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).
  - (b) Vapor-proofing mastic: Mastic by Stego Industries LLC, (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com).
  - (c) Or approved equal.
- (3) Sealing Perimeter/Terminating Edge of Vapor Barrier
  - (a) Stego Crete Claw by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).
  - (b) StegoTack Tape (double-sided sealant tape) by Stego Industries LLC, (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com).
  - (c) Use of one-sided seaming tape to seal the perimeter must be submitted to the architect for pre-approval.
  - (d) Or approved equal
- (4) Screed/Formwork Penetration Prevention:
  - (a) Beast Foot by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).
  - (b) Or approved equal.
- (5) Vapor Barrier-Safe Screed System
  - (a) Beast Screed by Stego Industries LLC, (877) 464-7834  
[www.stegoindustries.com](http://www.stegoindustries.com).
  - (b) Or approved equal
- h. Sealer/Hardener/Curing Compound for exterior concrete: Shall conform to ASTM C-309, Type I, Class A. Provide and apply per manufacturers recommendations, W.R. Meadows "Med-Cure"; Nox-crete Inc. "Bro-Cure"; Curecrete Chemical Co. "Ashford Formula", or approved equal. The compound shall *not* be of wax base and shall not impair in any way the application of floor coverings,
- i. Abrasive Aggregate: Shall be aluminum oxide grits or crushed emery, factory graded, packaged, rustproof and non-glazing. "GRIP IT", manufactured by L&M Construction Chemicals, Inc.
- j. Rock Salt: Shall be standard brand in chips, similar to that packaged for use by the general public in ice cream freezers.
- k. Admixture: Water-reducing admixture shall be Pozzoloth 322N, T-24, Section 1903A6.6 Zeecon "H", Grace WRDA-79 or approved equal, conforming to ASTM 494. Vapor and Water proofing Admixture shall be as manufactured by SPG, Vapor Lock 20/20.
- l. Manufactured Grout: Shall be non-shrink, non-metallic, non-corrosive and high strength, conforming to Corps. of Engineers CRD-621. Silkagrout 212, W.R. Meadows #588 grout or approved equal.
- m. Form Release: Provide form-coating material, which conforms to the regulations of the local air quality management district in force at the time of application. Use a non-staining, non-residual, chemically active release agent. DEBOND FORM COATING, manufactured by L&M Construction Chemicals, Inc. or "Crete Lease 880 VOC", by Cresset Chemical Company.
- n. Fly Ash: Shall comply with ASTM C618, class NORF (Class C is not permitted) Not more than 15% by weight of fly ash shall be substituted for ASTM C150 Portland Cement.
- o. Stair nosing shall be style No. 950 as manufactured by American Safety Tread Company, Helena, Alabama 35080. Telephone 1-800-245-4881. Nosings shall be cast in Feracast, with #24 virgin grain Silicon Carbide granules embedded into the walking surface while the matrix is in a molten state. Nosings shall terminate not more than 3" from ends of steps for poured concrete stairs. Nosings shall be

furnished with concealed cast anchors. All metals shall be furnished in natural metal finish. Feracast shall have one coat of shop applied black paint.

### PART 3 EXECUTION

#### 3.01 PROPORTIONING OF CONCRETE MIXES

- a. Strength: As indicated on Structural Drawings. Compressive strength, when tested in accordance with ASTM C39/C39M, strength at 7 days shall be at least 60% of the minimum required 28-day strength unless noted otherwise on drawings. Where non-structural 'concrete paving' is required, its compressive strength shall be 2500 p.s.i. Its strength shall be at least 1500 p.s.i. at 7 days and at least 2500 p.s.i. at 28 days.
- b. Proportions: The Contractor shall propose to the Architect an Engineered *Laboratory Designed Mix/es with Engineers Stamp/seal* based on the following limitations. The mix design shall be approved prior to use. The mix designer shall determine the relative amounts of cement, admixtures, fine and coarse aggregate and mixing water in accordance with T24 Method B or Method C, Section 1905A.2.3. The Contractor shall pay the costs of concrete mix designs, including the cost of aggregate, gradation analysis where required.

TABLE II  
CONCRETE MIXES

Complies with table 19A-A3 of C.B.C. Title 24

Sacks of Cement Concrete Type	Maximum Size of Aggregate	Minimum 94 lbs. per Cubic yard. of Concrete	Maximum Gallons Water per 94 lbs. Sack of Cement
3000 psi	3/4"	5.75	7.3
	1"	5.50	7.3
	1-1/2"	5.25	7.3
2500 psi	3/4"	5.50	7.6
	1"	5.25	7.6
	1-1/2"	5.50	7.6
3000 psi	3/8"	6.75	5.8
4000 psi	1"	6.00	5.66

- c. Minimum Cement Content: The minimum cement contents indicated above may be reduced by a maximum of 0.25 sacks per cubic yard, subject to the approval of the Engineer, if the resulting mix design can be substantiated by:
  - (1) The recent experience of the laboratory with the materials and facilities of the manufacturer, and
  - (2) Documented test results of trial batching or of the use of the specific mix on prior work.
- d. Admixture: The admixture shall not be used to replace cement. Vapor and Water proofing admixture shall be added in quantities as approved by admixture manufacturer and shall be inspected by manufacturer's representative at the batch plant. Contact SPG at 310-650-4263 for Vapor and Moisture admixture inspection.

- e. Slump: The amount of mixing water used (including free moisture carried by the aggregate) shall not exceed the maximum allowed in Table III. In addition, the amount used shall be the minimum necessary to produce the following maximum allowable slumps but, in no case shall the water/cement ratio exceed .5:

Concrete foundations..... 4" maximum  
 All other concrete ..... 5" maximum

- g. Fly Ash may be added but not more than 15% by weight of Fly Ash shall be substituted for ASTM C150 Portland Cement.

3.02 PROPORTIONING OF GROUT AND DRYPACK (Handmixed)

- a. Grout: Shall be composed of one (1) volume of portland cement and three (3) volumes of fine aggregate and only enough water to make the mixture flow under its own weight.
- b. Drypack: Shall be composed as for grout except that only enough water shall be added to set the mixture (no free water and no slump). Drypack will be tamped into place.
- c. Do not use grout or drypack that has been mixed longer than thirty (30) minutes.

3.03 GROUT (Manufactured)

Manufactured grout shall be used at all 'blocked-out' and embedded steel or aluminum items and as shown on structural drawings.

3.04 FORMS

- a. General Construction Requirements: Forms shall be constructed of wood built true to line and grade, mortar tight, and sufficiently rigid to prevent excessive deflection between supports. The arrangement and construction shall be subject to the approval of the Engineer, but responsibility for adequacy of the forms shall rest with The Contractor. Forms shall be arranged so as to properly receive and engage other construction and all anchorage sleeves, inserts, bolts, conduit, or other devices shall be installed prior to the placing of concrete.
- b. Forms for Exposed Concrete: All exposed concrete shall be formed with 5/8" (minimum) Douglas Fir "Plyform" placed with the grain of the outer plies in the direction of their span. Form construction shall insure that the concrete surfaces will conform to the tolerances of "Recommended practices for Concrete Form Work" (A.C.I. 347). The supporting studs or joists shall be spaced not more than twelve inches (12") center to center. The surfaces of the forms shall be smooth and free from irregularities. Wall form panels shall be placed with their long dimension horizontal and so as to form continuous horizontal joints. All exposed sharp corners shall be formed with 3/4" chamfers or fillets.
- c. Form Ties or Bolts: Shall be used to fasten the forms. They shall be of sufficient strength and number to prevent spreading of the forms. They shall be of such type that they can be entirely removed or cut back one inch (1") or more from the finished concrete surface. Wire ties will not be permitted.
- d. Form Coating: Forms shall be coated with form release applied shortly before the concrete is placed but prior to placing the reinforcement.
- e. Cleaning: All dirt, chips, sawdust, nails and other foreign matter shall be completely removed from the forms before concrete is placed. Forms previously used shall be thoroughly cleaned of all dirt, mortar and other foreign matter before being reused.

- f. Removal: The forms shall not be removed until the concrete has sufficiently hardened to permit their removal with safety, but in no case in less time than as follows:

Columns, Walls, Vertical Forms .....	24 hours
Slabs.....	7 days
Joists, Beams and Girders.....	14 days

All removal shall be accomplished in such a manner as to prevent injury to the concrete. Comply with T24, Sec. 1906A.2.

- g. Foundation Concrete: Shall be placed directly into neat excavations provided the trench walls are stable as determined by the Architect or Structural Engineer subject to approval of the Division of the State Architect. In such cases, the minimum formwork shown on the structural drawings is mandatory to insure clean excavations immediately prior to and during the placing of concrete.

**3.05 VAPOR BARRIER**

Install per ASTM E1643. Place a 15 mil vapor barrier over the compacted crusher fines with all side seams lapped a minimum of 6 inches and sealed with the specified accessory. At perimeters, vapor barrier shall be turned up against footings or walls and sealed to walls, footings or slab with specified accessory. Penetrations through membrane required by piping, conduit, drains, reinforcing and anchors shall be formed by cutting slits in membrane material and then sealing membrane surface and sealing against the riser. For interior forming applications, avoid the use of non-permanent stakes driven through the vapor barrier. Use blunt-end and/or threaded nail stakes (screed pad posts) and insert them into Beast Foot or approved equal. Ensure Beast Foot’s peel-and-stick adhesive base is fully adhered to the vapor barrier. For a vapor barrier-safe, fixed-elevation concrete screeding application, install Beast Screed (vapor barrier-safe screed system) per manufacturer’s instructions prior to placing concrete. Concrete shall be placed directly on top of the vapor barrier.

**3.06 CRUSHER FINE FILL**

Fill Under Interior Floor Slabs: Place vapor barrier over crusher fines. Apply two inches (2") of crusher fines fill subgrade, grade smooth and level and roll to smooth, even surface. Crusher fines shall spread and compacted while damp. At the time of concrete placement, the crusher fines layer should be dry to damp, compacted and smooth. Do not spray crusher fines prior to placement of concrete. Exterior concrete slabs will not require this fill except where indicated on the drawings.

**3.07 EMBEDDED ITEMS**

- a. The Contractor shall cooperate with all tradesmen to insure that all conduit, anchor bolts, sleeves, inserts, hangers, etc. are properly installed and secured in correct position. All embedded items shall be thoroughly clean and free from rust, scale, oil or other foreign matter. All embedded items, including bolts, shall be securely held in their final positions by means of wood templates before any concrete is poured.

- b. Pipes, other than electrical conduit, shall not be embedded in structural concrete. Conduit shall be located within the middle half of the slab and its outside diameter shall not be greater than one third ( $1/3$ ) of the slab thickness.
- c. The Contractor shall properly form all reglets and rebates required in the concrete to receive flashings, frames and other equipment. Dimensions and details shall be obtained from the equipment to be provided for.

### 3.08 MIXING

Transit Mixed Concrete: Shall be mixed and delivered in accordance with the requirements of T24, Section 1905A. Transit mixed concrete shall not be delivered to the work with the total specified amount of water incorporated therein. Two and one-half ( $2-1/2$ ) gallons of water per cubic yard shall be withheld but may be incorporated in the mix under the supervision of the project Inspector. Transit mixed concrete shall be mixed for a period of not less than ten (10) minutes at a peripheral drum speed of approximately two hundred (200) feet per minute and mixing shall be continued until discharge is complete. Concrete will be rejected if not discharged within one and one-half ( $1-1/2$ ) hours during normal weather or forty-five (45) minutes during hot weather after the addition of cement to the aggregates. The manufacturer of the transit mixed concrete shall furnish with each mixer truck a certificate stating the quantity of cement water, fine aggregate, coarse aggregate and admixture (if used) in each batch delivered to the job.

### 3.09 PLACING

- a. General: Concrete shall be used while fresh and before it has taken an initial set. Retempering partially hardened concrete with additional water will not be permitted. Concrete shall be placed in horizontal layers of such thickness that can be satisfactorily consolidated with vibrators. The concrete shall be placed as nearly as possible in its final position and the use of vibrators for extensive shifting of fresh concrete shall not be permitted. Fresh concrete shall not be permitted to fall more than six feet ( $6'-0"$ ) without the use of adjustable length pipes of "elephant trunks". The use of chutes in conveying concrete will not be permitted except with the Structural Engineer's approval and only if segregation does not occur and concrete of proper consistency flows freely. Once concreting is started, it shall be carried on as a continuous operation at such a rate that the concreting surface is at all times plastic and flows readily until the section is completed between predetermined construction joints.
- b. Compacting: All concrete, including slabs, shall be thoroughly compacted by means of high frequency internal vibrators. The vibrators shall not be attached to or held against the forms or reinforcing.
- c. Concrete Slab Construction Joints: Per T24, Sec. 1906A.4.
  - (1) All vertical members, such as walls and columns, shall be poured at least two (2) hours before horizontal members are poured therein to permit the concrete in the vertical members to take its initial settlement.
  - (2) After the pour has been completed to the construction joint and the concrete has hardened, the entire surface of the joint shall be thoroughly cleaned of surface laitance.
  - (3) A modified mix of concrete as hereinbefore specified with fifty percent (50%) of the coarse aggregate omitted may be deposited on horizontal construction joints before proceeding with the regular specified mix. This



- same modified mix may be used where conditions make puddling difficult or where reinforcing is congested.
- (4) The location of construction joints shall be as shown on the plans or as approved by the Structural Engineer and the Architect. All construction joints shall be keyed.
  - (5) Maximum spacing shall be 20 feet on center for sidewalks, 20 feet on center for curbs and gutters, 10 feet on center for mow strips, 20 feet on center for retaining walls.
- d. Concrete Slab Expansion Joints:
- (1) Expansion joints shall be placed around all steel columns, buttresses, etc. to relieve restriction of movement.
  - (2) Expansion joints shall be placed at sidewalks/concrete paving spaced at 20' o.c. max.
  - (3) Expansion joints shall be placed at sidewalks used to separate buildings. Place parallel with walk on one side min.
  - (4) Expansion joints shall be placed at curbs/gutters and V-gutters spaced at 20' o.c. max.
  - (5) Expansion joints shall be placed at mow-strips, spaced at 10' o.c. max.
  - (6) Expansion joints shall be placed at all change of directions in concrete slabs, walls, sidewalks, curbs, etc., typical unless noted otherwise.
- e. Concrete Slab Control Joints:
- (1) Joints in concrete slabs on grade shall be spaced a maximum of 15'-0" o.c. for interior reinforced slabs and 4'-0" o.c. for exterior non-reinforced & reinforced concrete slabs. Joints shall be located where shown on plans.
  - (2) Saw-cut control joints shall be cut within three (3) hours of finishing slab as indicated on plans. All control joints shall be tooled to a round edge. No hard edges shall be permitted.
  - (3) Control joints 20' or shorter in length may be done with zip strips, only if strip can be installed in straight line.
- f. Cold Weather Requirements: Concrete shall not be placed on frozen ground, nor shall it be mixed or placed when atmospheric temperature is below 35 degrees F., unless means are employed to heat the aggregates and water so the concrete shall have a minimum temperature of 50 degrees F. The concrete shall then be protected from freezing or frost for a period of five (5) days after placing by a means acceptable to the Structural Engineer and the Division of the State Architect. Calcium Chloride shall not be added to the mix.
- g. Hot Weather Requirements: The maximum placing temperature of concrete, when deposited, shall be 90 degrees F. Concrete (excepting foundations) shall not be placed when the maximum air temperature is expected to exceed 100 degrees F. on the day of placement unless specifically approved by the Structural Engineer. Such approval may require any or all of the following precautions:
- (1) Provide shade for slabs to be finished after 11:00 a.m.

- (2) Store all materials and equipment in the shade.
- (3) Take special care to obtain the coolest mixing water available. Note that the use of ice may be required in order that the maximum temperature of the mix at the time of depositing does not exceed 90 degrees F.
- (4) Forms to receive concrete shall be kept cool by sprinkling until the pour has started.
- (5) A fog spray of water shall be used to keep concrete surfaces moist during the finishing operation and until curing is commenced.
- (6) The use of an approved water reducing retarder (admixture).

### 3.10 CONCRETE FINISH AND LOCATION

- a. Abrasive Aggregate Finish: Shall be located on exposed finish concrete ramps, and landings.
- b. Steel troweled Finish: Shall be located on areas to receive resilient flooring.
- c. Hard, Trowel-Burnished Finish: Shall be located in exposed concrete maintenance rooms only.
- d. Rock Salt Finish: Shall be located on exposed finish concrete steps and where indicated on drawings.
- e. White Pigmented Curing Compound\*: Shall be applied to all exterior concrete slabs/walks/curbs/gutters, etc., verify applications of clear or white with Architect.
- f. Clear Curing Compound\*: Shall be applied to all exterior concrete slabs/walks/curbs/gutters, etc., verify application of clear or white with Architect.
- g. Broomed Concrete Finish: shall medium on all surfaces less than 6% slope and heavy broom finish or all surfaces greater than 6% slope.

### 3.11 FORMED SURFACES

- a. After form removal, all fins and ridges shall be removed from the concrete surfaces. All exterior form bolts shall be removed to a depth of at least one-inch (1") below the surface of the concrete. Voids and holes left by removal of form ties shall be cleaned and filled with mortar. Mortar shall consist of one (1) part by volume of cement to two (2) parts of sand. Rock pockets shall be chipped out down to sound material and filled with mortar.
- b. Architectural concrete or concrete surfaces to be left permanently exposed shall be patched as mentioned above and then honed smooth, rubbed and sacked. Coat areas completely with grout, wood float, let set and then rub with burlap.

### 3.12 TOOLING AND MARKINGS (EXTERIOR)

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\*Clear or white curing compounds shall not be applied to curbs or slabs, which are to receive paint or striping.

- a. General: All exposed flat work shall be tooled as indicated on drawings, or as otherwise specified, with additional markings as required where structures and/or items penetrate through slab. Tooling to be uniform, straight, and minimum 1/8" wide x 1-1/4" deep.
- b. Planter walls, curbs, etc. shall have chamfer joints, tool markings, etc., as directed, to control cracking. Markings, etc., shall be continuous across tops and down backs.

### 3.13 CONCRETE FINISHING GENERAL REQUIREMENTS

- a. Workmanship: Employ only skilled workmen, experienced in their respective trades and work. All work performed in a first class workmanlike manner, subject to approval of Architect, or project Inspector
- b. Markings: Notify Architect in sufficient time prior to completion of setting forms for exterior flat work to permit on-site review of proposed control, construction and expansion joint locations.
- c. Finishing Samples: Prepare three- (3) foot square flatwork samples of the following finishes (where indicated for use on this job) for Owner's approval:
 

Rock salt finish	Broom finish (medium)
Abrasive aggregate finish	

Samples of finished surfaces shall be made and submitted to the Architect for approval not less than (10) days prior to installing concrete work. Samples to remain intact for comparison until flat work completed.
- d. Finishing: Concrete shall be allowed to stand long enough to evaporate excess surface water, but not until initial set takes place. Surfaces to receive ceramic tile to be broomed. Other surfaces wood floated to a true, level surface and then hand troweled to a smooth surface, free from imperfections. Finish surfaces shall not deviate more than one-eighth inch (1/8") from a ten-foot straight edge laid in any direction. Exposed concrete wearing surfaces troweled, additionally, to a hard polished finish. Unless otherwise directed, brooming, if selected, to be performed at right angles to slope. Follow slopes and lines as indicated.
- e. Curing:
  - (1) All newly placed concrete shall be kept moist until application of permanent curing.
  - (2) Slabs poured in hot or dry weather shall have a fog spray applied to them commencing during the troweling and they shall be kept wet until the placement of permanent curing, which shall be done immediately after final troweling.
  - (3) All concrete shall be permanently cured by one of the following methods:
    - (a) Sealer/Hardener/Curing compound spray-applied per manufacturer's recommendations.
    - (b) Pigmented curing compound spray-applied per manufacturer's recommendations.
    - (c) Clear curing compound spray-applied per manufacturer's recommendations.
- f. Abrasive Aggregate Finish: Shall be provided on ramps, sloped walks, and landings and other areas indicated on the drawings. Wet abrasive aggregate and distribute evenly over surface at the rate of 1/2 lb. per square foot of surface. Tamp flush with surface, taking care not to bury the particles. Float and trowel as specified in paragraph d. Before final acceptance of work, treat all non-

slip surfaces with a mild solution of hydrochloric acid to expose the abrasive particles.

- g. Rock Salt:
  - (1) When concrete has sufficiently set up, hand distribute the rock salt evenly over the entire surface at the rate of 5 lbs. per 100 square feet. Tamp salt into surface with a floating tool or other suitable implement.
  - (2) Apply specified curing compound and at such time as concrete has sufficiently hardened, dissolve remaining rock salt crystals with clear water.

#### 3.14 CLEAN UP

- a. Upon completion of all other work in the building, all interior and exterior finished concrete surfaces shall be swept clean and all mortar, plaster, paint, oil and stains removed therefrom.
- b. The Contractor shall remove from the premises all surplus material, equipment and debris which are the result of his operations.

END OF SECTION  
01/22/2024

**REINFORCING STEEL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor, materials and equipment required to complete the reinforcing steelwork as indicated on the drawings and as specified herein.

## 1.02 WORK INCLUDED (But not limited to the following items)

- a. Furnish, bend and install reinforcing steel for all concrete work.
- b. Furnish only, reinforcing steel for masonry work.
- c. Accessories for all reinforcing work.
- d. Clean up work related to this Section.

## 1.03 RELATED WORK

- a. Placing of reinforcing steel in masonry work is specified in Section 04 20 00.
- b. Placing concrete is specified in Section 03 10 00.

## 1.04 TESTS AND INSPECTIONS

- a. Refer to Section 01 45 00, "Quality Control", requirements.
- b. *The Owner shall engage a testing laboratory to perform material evaluation tests.*
- c. No materials of this section shall be placed into the work until sampling, testing and certifications have been approved by the Architect or Structural Engineer.
- d. No work of this section shall be covered or concealed until inspected by the Engineer, his authorized representative or *the Owner's Inspector*.
- e. *Where samples are taken from bundles as delivered from the mill, with the bundles identified as to heat number, and provided mill analyses accompany the report, then one tensile test and one bend test will be made from a specimen of each 10 tons or fraction thereof of each size of reinforcement steel.*
- f. *Where positive identification of the heat number cannot be made, or where random samples are taken, then one series of tests will be made from each 2-1/2 tons or fraction thereof of each size of reinforcement steel.*

## PART 2 PRODUCTS

## 2.01 MATERIALS

- a. Reinforcing Bars:
- (1) #3 and smaller - ASTM A615, Grade 40.
  - (2) Larger than #3 - ASTM A615, Grade 60, unless noted otherwise.
  - (3) Welded Rebar: ASTM A706, Grade 60.
  - (4) Spiral Rebar: ASTM A-82, cold drawn bars. Reinforcement shall comply with C.B.C. Section 1910 A.2.
- b. Welded Wire Fabric: (WWF) shall be electric welded steel wire fabric conforming to ASTM A-185.
- c. Welded Steel Deformed Wire Fabric: Shall conform to ASTM A-497.
- d. Smooth Dowels: Shall conform to ASTM A-615, Grade 60. 1/2" diameter and smaller bars shall be Grade 40.
- e. Reinforcing Wire: Shall be cold drawn steel wire conforming to ASTM A-82.
- f. All reinforcing shall be new, clean, free from oil, dirt, loose mill scale, excessive rust, mortar, or other coatings that would destroy or reduce the bond.

## PART 3 EXECUTION

## 3.01 CLEANING

Before use, reinforcement shall be cleaned so as to be free of mortar, oil, dirt, loose mill scale and loose rust or other coatings that would destroy or reduce the bond.

## 3.02 BENDING

- a. *Minimum bend diameters shall conform to ACI 318-19.*
- b. *Bars shall be bent cold.*
- c. *Measure bend diameters on the inside of the bar.*

## MINIMUM DIAMETER OF BENDS

<u>Bar size</u>	<u>Min. Diameter</u>
Nos. 3 through 8	6 bar diameter
Nos. 9 through 11	8 bar diameter
Nos. 14 & 18	24 bar diameter
Stirrups or ties	
Nos. 5 or smaller	4 bar diameter

## 3.03 PLACING

Reinforcing shall be accurately placed in accordance with the drawings and meeting CRSI and shall be securely tied in position with at least No. 16 gage annealed wire at all bar intersections. Metal chairs and bolsters (at 32" o.c. each way max.) shall be used to hold all steel above the form bottoms at the proper distance. Metal spacers shall be used to secure the proper spacing of the steel. Precast concrete dobies (at 48" o.c. max.) shall be used to support reinforcing steel off the ground in footings and off the soffit of concrete exposed to weather. The clear distance between parallel bars shall not be less than 1-1/2 times the bar diameter, but in no case less than 1-1/2" nor less than 1-1/3 times the maximum size of coarse aggregate.

## 3.04 SPLICING

Splicing shall not be permitted without the approval of the Structural Engineer unless detailed on Structural Drawings. Splices shall be made with a lap of at least Class "C" unless noted otherwise. The bars shall be placed in contact and wired together in such a manner as to maintain a clearance of not less than the minimum clear distance to the other bars and to the surface of the concrete. In general, stagger splices at least 4'-0". Splice wire mesh with a lap of at least the dimension of one mesh + 2". Welded splices shall be in accordance with CBC Title 24, 1903 A.8.

## 3.05 TOLERANCES

Reinforcement shall be placed in specified positions meeting CRSI requirements, but not less than the following tolerances:

- a. Depth: + 1/4" for members 24" or less in depth.
- b. Depth:  $\pm 1/2$ " for members greater than 24" in depth.
- c. Length:  $\pm 1$ ".

## 3.06 MASONRY DOWELS

The masonry contractor shall supervise and be responsible for the proper installation of reinforcing dowels into the concrete work by the reinforcing steel contractor.

## 3.07 WELDED REINFORCING

- a. All welding of rebar shall conform with American Welding Society specifications AWS D1.4-11, latest edition as modified by CBC Standard No.19-1.
- b. If mill test reports are not available, chemical analysis shall be made of bars, representative of the bars to be welded. Bars conforming to ASTM A-706-89 may be assumed to have a C.E. = 0.55. Bars with a C.E. above 0.75 shall not be welded. Welding shall not be done on or within 2 bar diameters of any bent

portion of a bar, which has been bent cold. Welding of crossing bars shall not be permitted for assembly of reinforcement, unless authorized by the Structural Engineer and approved by the Division of the State Architect.

**3.08 CLEAN UP**

The contractor shall remove from the site all surplus material, equipment and debris which are the results of his operations.

END OF SECTION  
08/05/2022



**CONCRETE MASONRY UNIT**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor, materials, and equipment required to complete the concrete unit masonry work as indicated on the drawings and as specified herein.

1.02 WORK INCLUDED (But not limited to the following items)

- a. Provide and install all concrete unit work.
- b. Provide and install all mortar and grout in connection with the installation of concrete units.
- c. Placement only of steel reinforcing for concrete units except dowels cast in concrete work for concrete units.
- d. Provide supervision of dowel installation in concrete work.
- e. Setting and incorporating into the concrete units of all accessories, sheet metal work, miscellaneous iron, anchor bolts, etc., as furnished by other trades.
- f. Clean up work related to this Section.
- g. Cement and aggregate testing and grout mix designs.

1.03 WORK NOT INCLUDED

- a. Furnishing of reinforcing steel and installation of steel dowels cast in concrete for concrete units is specified in Section 03 21 00.
- b. Furnishing of accessories, miscellaneous steel, etc., incorporated in concrete units but specified under the sections to which they apply.
- c. Forms, shoring, and centering for masonry work to be furnished under Section 06 10 00.

1.04 INSPECTIONS, NOTIFICATIONS AND TESTS

Shall be as specified in Section 01 45 00- Quality Control.

**PART 2 PRODUCTS**

2.01 CONCRETE UNIT

Concrete unit shall be per, Chapter 21A of the 2022 CBC and shall comply with Article 2.3 of TMS 602 for hollow load-bearing concrete masonry units are made from mediumweight aggregates conforming with ASTM C331 or Normal aggregates or both. Upon delivery to purchaser the linear shrinkage of units shall not exceed 0.065%. See Drawings for types/colors and size of unit.

**2.02 PORTLAND CEMENT**

1. Portland cement shall conform to ASTM C150, Type II with the following exceptions:
  - a. The cement shall not contain more than 0.60 percent total alkali when calculated as Sodium Oxide.
  - b. The percentage of Tricalcium Silicate shall not be limited.
  - c. Cement shall be stored in such a manner as to protect it from inclusion of foreign material and damage by moisture. Only one (1) brand of cement shall be used for this work.

**2.03 AGGREGATES**

- a. Fine Aggregates: Sand for mortar and grout shall consist of a washed natural sand of hard, strong and durable particles and conforming to ASTM C33, except that not less than three percent (3%) by weight of the sand shall pass the number one hundred (100) sieve.
- b. Coarse Aggregates: Shall consist of a clean hard, fine-grained sound crushed rock or washed gravel conforming to ASTM C33, Table 2. It shall contain not more than five percent (5%) by weight of flat, thin, elongated or laminated material nor more than two percent (2%) by weight of shale or cherty material. Maximum size shall be three-eighths inch (3/8").
- c. Pea Gravel- to be used for drainage course material (backfill) and decorative finishes shall be screened gravel that consists of clean, washed, small round stones which will be retained by a No.4 (4.75mm) sieve and will pass a 3/8"(9.5mm) sieve.

**2.04 HYDRATED LIME**

Hydrated lime shall conform to Type S hydrated lime per ASTM C207.

**2.05 REINFORCING**

See Section 03 21 00 - Reinforcing Steel.

**2.06 WATER**

Water shall be clean and free from deleterious acids, alkali, oil, and organic matter.

**2.07 ADMIXTURES**

- a. Concrete Units: Water repellent admixture shall be dry block as manufactured by Grace.
- b. Mortar: Water/vapor proofing shall be VL 25/25 as manufactured by SPG.
- c. Grout: Water/vapor proofing shall be VL 20/20 as manufactured by SPG.

Contact Info: Grace Construction Products (877) 423-6491  
Specialty Products Group (877) 957-4626

## 2.08 MORTAR

- a. Mortar Type: Shall be Type "S" mortar 2103A.2. 2022 CBC, and conform to ASTM C270.
- b. Proportioning: based on loose dry volumes:
 

Portland Cement	1 part
Hydrated lime or lime putty	1/4 part (min.)
	1/2 part (max.)
Sand (damp, loose volumes)	3 to 4-1/2 parts sand
- c. Mortar Strength: The mortar shall attain a minimum compressive strength of 2000 psi at an age of 28 days.
- d. Mortar Color: Integrally colored mortar shall be used with integrally colored concrete unit masonry.

## 2.09 GROUT

- a. Grout Mix: The grout mix design shall be prepared by a Testing Laboratory and approved by the Structural Engineer before grouting is started. The General Contractor shall pay for the cost of the grout mix design. The grout mix shall be based on the following proportions.
  - (1) Based on dry loose volumes:
 

Portland cement	1 part
Sand	2-1/4 (min.) to 3 (max.) parts
Pea Gravel	1 (min.) to 2 (max.) parts
  - (2) Water: Add the amount necessary to cause the grout to flow into all joints of the masonry without segregation.
  - (3) Mixing: Shall be as specified for a mixing of mortar, Paragraph 3.02.
  - (4) Strength: The grout shall attain a minimum compressive strength of 2000 psi at an age of 28 days.
  - (5) Minimum Cement Content: 6.3 sacks per cu. yd.
  - (6) Slump: Maximum slump shall be nine (9) to ten (10) in.

**PART 3 EXECUTION**

## 3.01 LAYING OF CONCRETE UNITS

- a. Preparation: All masonry units shall be clean and free from dust, grease, or other objectionable material.
- b. Joints:
  - (1) Unit shall be laid in running (common) bond unless otherwise noted on plans, with three-eighths inch (3/8") minimum thick mortar bed on entire horizontal surface of unit. Head joints shall be solidly filled and shall be shoved tightly against adjoining unit to obtain three eighths inch (3/8") joint.
  - (2) Mortar joints shall be straight, clean, and uniform in thickness. Vertical joints shall be tooled with a round bar and horizontal joints with a V-shaped bar, as required, to produce a dense surface well bonded to the unit at the edges.
  - (3) Where walls are to receive plaster, the joints shall be struck flush.
  - (4) Where joints are to be concealed under paint, these joints shall be filled flush and then sacked to produce a dense surface without sheen.

- c. Alignment: Unit shall be laid in such a manner as to preserve the unobstructed vertical continuity of the cells to be filled. Any overhanging mortar or other obstruction or debris shall be removed from inside the cells and from the reinforcing.

### 3.02 MIXING OF MORTAR

- a. Materials for mortar shall be measured in suitable calibrated devices. Shovel measurements will not be accepted. The lime shall be the last material added to the mix.
- b. The mortar materials and the maximum amount of water to produce a workable consistency shall be mixed for at least 3 minutes in a mechanical batch mixer.
- c. Retempering of mortar shall be done only by adding water into a basin made with the mortar and carefully working the water into the mortar. Mortar shall not be used that is non-plastic or over 1-1/2 hours old.

### 3.03 PLACING OF REINFORCEMENT

- a. Cleaning: Before use, reinforcement shall be cleaned so as to be free of mortar, oil, dirt, loose mill scale, excessive rust or other coatings that would destroy or reduce the bond.
- b. Bending: Bends shall be made around a pin having a diameter of not less than four (4) times the bar diameter for stirrups and ties and six (6) times the bar diameter for other bars except for bars larger than one inch (1") which shall be eight (8) times the bar diameter. Bars shall be bent cold.
- c. Dowels: This contractor shall supervise and be responsible for the proper installation of reinforcing dowels by others. Dowels shall not be bent to obtain the proper alignment with the vertical cell.
- d. Splicing:
  - (1) Splices, in no case shall the length of a lapped splice be less than forty (40) bar diameters per CBC 2109A.2.1 unless otherwise noted. The bars shall be placed in contact and wired together in such a manner as to maintain the proper clearances.
  - (2) In general, horizontal splices shall be staggered at least four feet (4'-0").
  - (3) No splices in the vertical reinforcement will be allowed unless shown on the drawings.
- e. Placing:
  - (1) Reinforcing shall be accurately placed in accordance with the drawings and shall be fully embedded in grout and shall not be bedded in mortar or mortar joints except for wall mesh as indicated on the drawings. There shall be one-half inch (1/2") minimum clearance between any bar and masonry.
  - (2) The vertical bars shall be placed prior to the erection of the wall and shall be held in position at top and bottom and at intervals not exceeding 192 diameters of the reinforcement with at least No. 16 gauge annealed wire.

- (3) All reinforcement that will be included in a grout pour shall be positioned and wired in place before the cells are grouted. It is not permissible to "stick" the bars in the grout.

### 3.04 EMBEDDED ITEMS

- a. The Contractor shall cooperate with all tradesmen to insure that all conduit, anchor bolts, sleeves, inserts, hangers, hollow metal door frames, etc., are properly installed and secured in correct position. All embedded items shall be thoroughly clean and free from rust, scale, oil or other foreign matter.
- b. Pipes, other than electrical conduit, shall not be embedded in masonry. Rigid electrical conduit may be embedded in structural masonry in locations indicated on the approved drawings.
- c. All embedded items shall be accurately and securely set in place before the grouting of the cells is started. All bolts shall be set in place by using a wood template. All bolts shall be grouted in place with not less than one inch of grout between the bolt and the masonry.

### 3.05 GROUTING

- a. The method of grouting shall be per low-lift method, see T24, Section 2104A.1.3.1.2.2
- b. Placing:
  - (1) Units shall be laid and grouted solid in lifts not exceeding:  
*2'-0" in height.*
  - (2) When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the grout 1" below the top of the unit.
  - (3) Grouting of beams over openings shall be done in a continuous operation.
  - (4) All grout shall be rodded with a heavy reinforcing bar or vibrated with a mechanical vibrator immediately after placing.

### 3.06 CLEANING

- a. During construction, care shall be exercised to keep the masonry as clean as possible. Any mortar dropped or spattered on the work shall be removed immediately and the surface washed clean.
- b. This Contractor shall remove from the premises all surplus material, equipment and debris which are the results of his operation.

END OF SECTION  
08/05/2022

**STRUCTURAL STEEL AND MISCELLANEOUS IRON**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor, materials and equipment required to complete the fabrication and erection of all the steel work as indicated on the drawings and as specified herein.

## 1.02 WORK INCLUDED (But not limited to the following items)

- a. Fabrication and erection of all structural steel framing, including rolled shapes, special shapes, (i.e., plate girders, tapered beams), plates pipe, square and rectangular tubing and any steel over 1/8" thick and light gauge Zee purlins.
- b. Anchorage, base plates, templates and connections as required.
- c. Furnishing only of bolts, anchors, frames, inserts, and miscellaneous items to be installed in the work of other trades.
- d. Painting and protective finishes for above items as specified herein.
- e. Shop Drawings.
- f. Temporary erection bracing as required.
- g. Clean up
- h. Field prime painting and touch up of all bolts, rivets, connecting devices and welds and all parts where shop coat has been burned or rubbed off.
- i. Protection and cleaning of adjacent work soiled, spattered, or stained during erection and installation of this work.
- j. Furnishing of steel samples to be tested.

## 1.03 RELATED WORK

- a. Metal studs and furring are specified in Section 09 21 00.
- b. Louvers, grills, and other items made from sheet metal thinner than 10 gauge are specified in Section 07 60 00.
- c. Metal doors, windows and frames thereof are specified in Section 08 11 00.
- d. Metal in connection with plumbing, electrical and mechanical trades, unless detailed on the Structural Drawings are specified in their respective sections.
- e. Installation of bolts, anchors, frames, inserts, and miscellaneous items in the work of other trades is specified in Section 06 10 00.
- f. Hardware is specified in Section 08 71 00.
- g. Metal decking is specified in Section 05 30 00.
- h. The cost of testing all materials shall be paid by the Owner except as provided in Section 01 45 00.
- i. Automatic end welded studs where used for connection of metal decking is specified under Steel Decking, Section 05 30 00.
- j. Drypacking is specified under Section 06 10 00.
- k. Painting is specified under Section 09 91 00.

## 1.04 SHOP DRAWINGS

- a. Submittals: Submit two sets of blue-line prints and one set of reproducible transparencies of shop drawings to Architect for approval. Roll prints and transparencies in reverse, so they will lie flat when unrolled. Checking corrections, if any, will be made on prints and transferred to transparencies. The set of reproducible transparencies with marked corrections will be returned to Contractor. Architect will retain the two sets of corrected prints. After approval, do not change any details, materials or methods until and unless approval cycle is repeated, and re-approval is obtained.
- b. Re-submittals: If re-submittals are required, follow same procedure as outlined above for initial submittal. If re-submittal is not required, send one set of blue-line prints of corrected transparencies to Architect who will transmit them to project inspector for job-site file.
- c. Responsibility: Approval of details and materials or methods will not relieve Contractor from responsibility of successfully completing work in accordance with specified requirements and within Contract Time Period.

## 1.05 FIELD MEASUREMENTS

- a. The Contractor shall verify all dimensions, including grade and details or existing field conditions.
- b. Deviations between existing construction and drawings affecting this work shall be called to the attention of the Architect and work of this section postponed until the required corrections have been made.

## 1.06 INSPECTIONS, NOTIFICATIONS AND TESTS

Shall be as specified in Section 01 45 00.

**PART 2 PRODUCTS**

## 2.01 MATERIALS

The various materials shall be new material conforming to the specifications of the ASTM as follows:

- a. Structural Steel A-36 at plates except A992 or A-572 for wide flange shapes
- b. Bolts: Machine A-307  
High Strength A-325
- c. Pipe Grade noted on drawings A-53
- d. Square and rectangular Tubing, Grade "C" A-500
- e. Light Gauge Steel, Grade "A" A-653
- f. Miscellaneous Iron any commercial grade mild steel
- g. Automatic End-Welded Studs Nelson Granular Flux Filled C1015 Cold Rolled Steel A-108
- h. Welding electrodes AWS E70XX
- i. Safety Stair Nosings:  
Stair nosings shall be style No. 950 as manufactured by American Safety Tread Company, Helena, Alabama 35080. Telephone 1-800-245-4881. Nosings shall be cast in Feracast, with #24 virgin grain Silicon Carbide granules embedded into the walking surface while the matrix is in a molten state. Nosings shall terminate not more than 3" from ends of steps for poured concrete stairs. Nosings shall be furnished with concealed cast anchors. All metals shall be furnished in natural metal finish. Feracast shall have one coat of shop applied paint.

**PART 3 EXECUTION****3.01 FABRICATION**

- a. General: The Contractor shall fabricate the material and erect same with workmen skilled in these branches of the structural steel industry.
- b. Tolerances: Material, fabrication, and erection tolerances shall be as set forth in the latest edition of the AISC "Specification for the Design, Fabrication and Erection of Structural Steel Buildings."
- c. Cleaning and Straightening: All material, before being fabricated, shall be cleaned of all scale and rust and shall be thoroughly straightened by methods that will not injure the material; deformations resulting from fabrication processes shall be corrected by similar methods. Heat shrinkage of low alloy structural steel will not be permitted.
- d. Gas Cutting shall be done by machine where possible. All re-entrant corners shall be shaped notch-free to a radius of at least one-half inch (1/2").

**3.02 BOLTED CONNECTIONS**

- a. Holes for bolts shall be one-sixteenth inch (1/16") larger than the nominal diameter of the bolt. Holes may be punched if the thickness of the material is less than the nominal diameter plus one-eighth inch (1/8"). If the thickness of the material is greater than the nominal diameter plus one-eighth inch (1/8"), the holes shall be drilled or subpunched and reamed.
- b. Machine bolts shall be used in all bolted connections unless noted otherwise.
- c. High Strength (H.S.) bolts shall conform to and be installed in conformance with the "Specifications for Structural Joints using ASTM A-325F Bolts", approved by the Research Council on Riveted and Bolted Structural Joints (of the Engineering Foundation). The bolts shall be tightened by means of a calibrated wrench or turn-of-nut method to provide the minimum bolt tension specified in Table 3 of the above mentioned specification. Hardened washers shall be used under the heads or nuts whichever is turned during tightening, for both the calibrated wrench method or the turn-of-nut method. Where the surface of a high strength bolted part has a slope of more than 1:20, a beveled washer shall be used to compensate for the lack of parallelism.
- d. Drifting to enlarge unfair holes is prohibited. Holes that must be enlarged to admit bolts shall be reamed and a larger bolt used.

**3.03 WELDED CONNECTIONS**

- a. Welding shall be done by the electric shielded arc process in conformance with the requirements of the latest edition of the AISC "Specification for the Design, Fabrication and Erection of Structural Steel Buildings" and Sections 3 and 4 of the A.W.S. "Structural Welding Code D1.1".
- b. Operators shall be qualified by tests prescribed in the "Standard Qualification Procedure" of the A.W.S.



- c. Automatic end welded studs shall be welded in accordance with the manufacturer's recommendations and in such a manner as to provide complete fusion between the end of the stud and the plate. There should be no porosity or evidence of lack of fusion in the weld. The stud shall decrease in length during welding approximately 1/8" for 5/8" diameter and under and 3/16" for over 5/8" diameter. Welding shall be done only by qualified welders approved by the welding inspector.

3.04 BASE PLATES AND BEARING PLATES

- a. Base plates and bearing plates shall be set in precise position, properly leveled. The plates shall be supported on double-nut steel wedges or shims, as indicated and shall be maintained in proper position until drypack beds have been placed by the General Contractor.
- b. Base plate holes for footing anchor bolts may be 3/16" (three-sixteenths inch) larger than the nominal diameter of the anchor bolt.

3.05 ERECTION

- a. General: The structural steel shall be erected plumb, square, true to line and level and in precise position as indicated on the drawings.
- b. Bracing: Temporary bracing shall be employed wherever necessary to take care of all loads to which the structure may be subjected, including equipment and the operation of same. Such bracing shall be left in place as long as may be required for safety. Wherever material, erection equipment or other loads are carried during erection, proper provision shall be made to take care of stresses resulting from such loads.
- c. Temporary Connections: As erection progresses, the work shall be securely bolted, or welded, to take care of all dead load, wind and erection stresses.
- d. Alignment: No permanent bolting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

3.06 PAINTING

- a. Shop Coatings:
  - (1) Cleaning: After inspection and approval, all steel work shall be thoroughly cleaned by "Power Tool Cleaning" or "Blast Cleaning" of loose mill scale, loose rust, weld slag or flux deposit, dirt. Oil, grease or salts shall be removed by "Solvent Cleaning". Cleaning shall conform to the Steel Structures Painting Council Surface Preparation Specifications as follows:  
 Solvent cleaning . . . . .SSPC - SP1 - 63  
 Power tool cleaning . . . . .SSPC - SP3 -63  
 Commercial blast cleaning . . . . .SSPC - SP6 - 63
  - (2) Painting: After cleaning, all steel work (except where encased in concrete or edges to be field welded or steel to be galvanized) shall be given one complete and even coat of Devguard 4160-7100 multi-purpose tank and structural primer conforming to Federal Specification TT-P-664 Type II and TT-P-615D, TT-P-636D and TT-P-645B if surface is power tool cleaned, Type III if surface is blast cleaned. Approved paint manufacturers as listed under Specification Section 09 91 00.
  - (3) Galvanizing: Where specified for structural steel shapes, plates and bars and their products, galvanizing shall be performed by the hot-dip process after

fabrication into the largest practical sections. Galvanizing shall conform to ASTM A-123.

- (a) Where specified for small structural steel or cast steel articles (i.e., bolts, nuts, washers, etc.), galvanizing shall be performed after fabrication in accordance with ASTM A-153.
- (b) When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the spelter coating.
- (c) Field Galvanizing: After erection, all parts where paint has been rubbed or burned off and all bolts, rivets, connecting devices and welded areas shall be prime painted as specified for shop painting.

**3.07 CLEAN UP**

All rubbish and debris resulting from the operations of this trade shall be cleaned up and removed from the site as the work progresses.

END OF SECTION  
06/25/2020

**STEEL DECK**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 - GENERAL**

1.1 SECTION INCLUDES

- A. Acoustical roof deck.
- B. Roof deck.
- C. Composite floor deck.
- D. Cellular floor deck.
- E. Metal form deck.
- F. Bearing plates and angles.
- G. Acoustical insulation in roof deck flutes.

1.2 RELATED SECTIONS

- A. Section 05 12 00 – Structural Steel and Miscellaneous Iron: Steel angle concrete stops at deck edges.

1.3 REFERENCES

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.
- G. AWS D1.3 - Structural Welding Code - Sheet Steel; American Welding Society.
- H. FM P7825 - Approval Guide; Factory Mutual Research Corporation.
- I. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.

- J. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.
- K. SSPC-Paint 15 - Steel Joist Shop Primer; The Society for Protective Coatings.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings.
- M. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings).
- N. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Select and design metal deck in accordance with SDI Design Manual.
- B. Calculate to structural working stress design and structural properties specified.

**1.5 SUBMITTALS**

- A. See Section 01 33 00 , for submittals procedures.
- B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, cellular raceways and outlet box locations, pertinent details, and accessories.
- C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- D. Certificates: Certify that meet or exceed specified requirements.
- E. Submit manufacturer's installation instructions.
- F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

**1.6 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience and approved by manufacture.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Cut plastic wrap to encourage ventilation.
- B. Delivery and Storage: Deliver, store and handle decking and accessories in such manner not to damage or overload the decking during construction period. Do not use decking for storage or as a working platform until units have been welded in position. Stack decking stored at the site before erection on platforms or pallets and cover with watertight ventilated covering, slope for positive drainage.

**PART 2 - PRODUCTS**

## 2.1 MANUFACTURERS

## A. Steel Deck:

1. Verco Manufacturing Co. [www.vercodeck.com](http://www.vercodeck.com) Deck to be PLB-36
2. Or Equal per substitution requirements listed in Division 0

## 2.2 STEEL DECK

## A. Roof Deck: Non-composite type, fluted steel sheet:

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 50/340; galvanized coating per Structural Drawings.

## 2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.
- B. Welding Materials: AWS D1.1.
- C. Fasteners: Galvanized hardened steel, self-tapping.
- D. Weld Washers: Mild steel, uncoated, 3/4 inch (19 mm) outside diameter, 1/8 inch (3 mm) thick.
- E. Shop and Touch-Up Primer: SSPC-Paint 25, zinc oxide, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I – Inorganic, SSPC Paint-20 Type II Organic, complying with VOC limitations of authorities having jurisdiction.
- G. Flute Closures: Closed cell foam rubber, 1 inch (25 mm) thick or individual sheet metal closure each flute, profiled to fit tight to the deck.

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

- A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
- B. On concrete and masonry surfaces provide minimum 4 inch (100 mm) bearing.
- C. On steel supports provide minimum 2 inch (50 mm) bearing.
- D. Unless otherwise noted on plans, fasten deck to steel support members at ends and intermediate supports at 12 inches (300 mm) on center maximum, parallel with the deck flute and at each transverse flute using welds.
  - 1. Welding: Use fusion welds through weld washers.
  - 2. Place and secure special deep fluted sections for integral concrete bridging.
- E. Unless noted otherwise on plans, clinch lock seam side laps @ 12" centers.
- F. Weld deck in accordance with AWS D1.3.
- G. Where deck changes direction, install 6 inch (150 mm) minimum wide sheet steel cover plates, of same thickness as deck. Fusion welds 12 inches (300 mm) on center maximum spacing.

**END OF SECTION**

05/21/2024

**METAL LADDERS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.
- b. See Details on Drawings.

1.02 WORK INCLUDED

- a. Metal ladder and brackets

1.03 RELATED WORK

Section 06 10 00, Carpentry

1.04 SUBMITTALS

- a. Submit product data per Section 01 33 00.
- b. Include sizes, types, finishes, scheduled locations, and details of adjoining work.
- c. Submit manufacturer's installation instructions.

**PART 2 PRODUCTS**

2.02 ACCEPTABLE MANUFACTURERS

- a. Models 521-A with standard ship ladder bracket, O'Keeffe's Inc. Aluminum Building Products, 75 Williams Avenue Street, San Francisco, CA 94124, (415) 822-4222

2.02 FABRICATION

- a. Rungs shall be no less than 1-1/4" in section and 18-3/8" long, formed from tubular aluminum extrusions, alloy 6063-T6 and shall be square, deeply serrated on all edges. To withstand 1000 lb. load.
- b. Channel side rails shall be no less than .125" wall thickness by 3" wide with a minimum section modulus of .49.

2.03 FINISH

- a. Aluminum 6063-T6 alloy mill finish.

**PART 3 EXECUTION**

3.01 INSPECTION

- a. Verify rough openings and correct location.
- b. Provide required blocking for anchorage

3.02 INSTALLATION

- a. Install frame plumb and level in wall and ceiling openings.
- b. Position to provide convenient access
- c. Secure rigidly in place in accordance with manufacturer's instructions.

END OF SECTION  
08/05/2022

**ROUGH CARPENTRY**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 - GENERAL**

## 1.1 SECTION INCLUDES

- a. Scope of work the work of this section should include all labor, material equipment and appliance required the drawings and/or specified herein.

## 1.2 SECTION INCLUDES

- a. Structural framing.
- b. Floor, wall, and roof sheathing.
- c. Preservative treatment of wood.
- d. Miscellaneous framing and sheathing.
- e. Telephone and electrical panel boards.
- f. Wood nailers and curbs for roofing and items installed on roof.
- g. Roofing cant strips.
- h. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, and wood trim.
- i. Miscellaneous wood nailers and furring strips.

## 1.3 RELATED SECTIONS

- a. Section 05 12 00 - Structural Steel and Miscellaneous Iron

## 1.4 REFERENCES

- a. ANSI A208.1 - American National Standard for Particleboard.
- b. AFPA T10 - Wood Frame Construction Manual; American Forest and Paper Association.
- c. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- 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.
- e. ASTM D 2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.
- f. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- g. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
- h. AWPA C9 - Plywood -- Preservative Treatment by Pressure Processes; American Wood-Preservers' Association.
- i. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.
- j. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Preservers' Association.



- k. AWWPA U1 - Use Category System: User Specification for Treated Wood; American Wood-Preservers' Association.
- l. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce).
- m. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; Redwood Inspection Service.
- n. SPIB (GR) - Grading Rules; Southern Pine Inspection Bureau, Inc.
- o. WCLB (GR) - Standard Grading Rules for West Coast Lumber No. 17; West Coast Lumber Inspection Bureau.
- p. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association.

#### 1.5 SUBMITTALS

- a. See Division 1 - Administrative Requirements, for submittal procedures.
- b. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- c. Shop Drawings and Calculations: For site fabricated truss frames, indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, details, and sequence of erection. Drawings and calculations must be signed and stamped by the Professional Engineer responsible for the design.
- d. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

#### 1.6 QUALITY ASSURANCE

- a. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
  - 1. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee.
- b. Exposed-to-View Rough Carpentry: Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping.
- c. 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 AWWPA standards.

#### 1.7 QUALIFICATIONS

- a. Design structural site fabricated trusses under direct supervision of a Professional Engineer experienced in design of such trusses and licensed in the state in which the project is located.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- a. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

### **PART 2 - PRODUCTS**

#### 2.1 DIMENSION LUMBER

- a. Sizes: Nominal sizes as indicated on drawings.
- b. Moisture Content: Provide seasoned lumber with 19% maximum moisture content.
- c. Structural Framing:
  - 1. Species and grade as indicated on drawings.
- d. Miscellaneous Blocking, Furring, and Nailers:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

## 2.2 ACCESSORIES

- a. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere. Type as indicated on drawings.
  - 2. Furnish bolts and attachments to other trades for installation in masonry and concrete work.
  - 3. Nails: Common wire, galvanized for exterior use.
  - 4. Lag Screws and Wood Screws: Steel. Conforming to ANSI/ASME Standard B18.2.1, galvanized for exterior use.
  - 5. Machine Bolts: ASTM A307, galvanized for exterior use.
  - 6. Plain Washers: ANSI B18.22, galvanized for exterior use.
  - 7. Hangers, Straps, Ties and other Framing Connectors: Steel, Galvanized. "Simpson Strong-Tie" unless noted otherwise.
- b. Sill Flashing: As specified in Section 07 60 00.
- c. Subfloor Glue: Waterproof, water base, air sure type, cartridge dispensed.
- d. Building Paper: No. 15 asphalt felt.

## 2.3 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.
- b. Preservative Treatment:
  - 1. Manufacturers:
    - a. Arch Wood Protection, Inc; [www.wolmanizedwood.com](http://www.wolmanizedwood.com).
    - b. Chemical Specialties, Inc; [www.treatedwood.com](http://www.treatedwood.com).
    - c. Osmose, Inc; [www.osmose.com](http://www.osmose.com).
    - d. Substitutions: See Division 00.
- c. Preservative Pressure Treatment of Lumber Above Grade: AWPA Use Category UC3B, Commodity Specification A (Treatment C2) using waterborne preservative to 0.25 lb/cu ft retention.
  - 1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
  - 2. Treat lumber in contact with roofing, flashing, or waterproofing.
  - 3. Treat lumber in contact with masonry or concrete.
  - 4. Treat lumber less than 18 inches above grade.
    - a. Treat lumber in other locations as indicated.
  - 5. Preservative Pressure Treatment of Plywood Above Grade: AWPA Use Category UC2 and UC3B, Commodity Specification F (Treatment C9) using waterborne preservative to 0.25 lb/cu ft 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 above grade.
  - e. Treat plywood in other locations as indicated.
- d. Preservative Pressure Treatment of Lumber in Contact with Soil: AWPA Use Category UC4A, Commodity Specification A (Treatment C2) using waterborne preservative to 0.4 lb/cu ft retention.
- 1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
  - 2. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) in exposed exterior applications subject to leaching.

### PART 3 - EXECUTION

#### 3.1 FRAMING INSTALLATION

- a. Verify that surfaces to receive rough carpentry materials are prepared to require grades and dimensions.
- b. Conduct work under direction of capable experienced foreman.
- c. Accurately located members to line and dimension. Ensure full contact of timbers framed together. Ensure let-in members in full contact on two surfaces. Where there is a significant variation in moisture content between individual members, shrinkage shall be allowed for and final connection shall not be made until moisture content of adjacent members has been stabilized. Allow no construction over framing members until final connections and/or adjustments have been made to achieve maximum strength at connections and maximum future movement from shrinkage or expansion.
- d. Cutting: Do all cutting and framing required to accommodate structural members, piping conduit, ducts and installation of mechanical, electrical, and other equipment and apparatus.
  - 1. Obtain Architect's approval for cutting of structural members not detailed on structural drawings.
  - 2. Reinforce cut sill and top plates with metal straps in accordance with the requirements of the drawings.
- e. Bracing and Shoring: Provide all supports, guys and braces, required to stabilize structure during construction.
- f. Accurately saw-cut and fit lumber into position and securely nail, spike, lag bolt, or bolt as required.
- g. Fasteners: Installation of fasteners shall be performed in accordance with ANSI/ASME Standard B18.6.1. Drill holes for fasteners and size as noted:
  - 1. Nails and spikes: Smaller than diameter of fastener. Pre-drill as required to prevent splitting.
  - 2. Lag Bolts: Drill holes same length as shank. Bit size, no larger than base of threaded portion of screw.
  - 3. Bolts: Holes 1/32" - 1/16" larger than bolt.
  - 4. Framing Connectors: Smaller than diameter of fastener. Pre-drill as required to prevent splitting.

5. No lubricant of any kind shall be used on any fastener depending on friction for holding.
- h. Nailing: Refer to details and tables on drawings for specific nailing requirements. In absence of specific instruction, comply with the following:
  1. Edge Distance: 1/4 length of fastener.
  2. Toe Nailing: Drive toe nails at an angle or approximately thirty degrees with the piece and started approximately one-third the length of the nail from end of piece.
  3. Replace split or otherwise damaged structural members.
- i. Bolts: Use standard cut washer under bolt heads and nuts against wood. Use heavy plate washer or malleable iron washer where noted on drawings. Drive into place. Ensure full engagement of nut, but projection of bolt beyond nut not to exceed one bolt diameter. Tighten nuts at installation and again immediately prior to enclosure.
- j. Lag Screws: Lubricate with soap or similar material. Turn into place without driving. Ensure penetration into lagged member of 60 percent of screw length. Lead hole shall have diameter of about 70 percent of the root diameter of the screw. Provide washers of same sizes as specified for bolts.
- k. Framing Connectors: Drive nails into all holes of each connector. Install all bolts in each framing connector unless detailed otherwise.
- l. Screws: Screws shall not be driven by hammering.
- m. Frame openings with two or more studs at each jamb and support headers on cripple studs unless noted otherwise in the drawings.
- n. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.

### 3.2 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

- a. Place full width continuous sill flashings under framed walls on cementitious foundations. Lap flashing joints 4 inches and seal.
- b. Place sill gasket directly on sill flashing. Puncture gasket cleanly and fit tightly to protruding foundation anchor bolts.
- c. Coordinate installation of wood decking, wood chord metal joists, glue laminated structural units, prefabricated wood trusses, and plywood web joists.
- d. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- e. Coordinate curb installation with installation of decking and support of deck openings.

### 3.3 SILLS AND PLATES

- a. Install Pressure Preservative-treated lumber for plates and sill in contact with concrete or masonry construction..
- b. Bolt to foundations and slabs. Level sill with shims, washers placed, and nuts tightened to level bearing.
- c. Park space between sill and concrete with non-shrink grout.

### 3.4 STUD WALLS, PARTITIONS AND FURRING

- a. Provide studs in continuous lengths without splices.

- b. Plates: Provide single bottom plate and double top plate. Stagger joints 4' minimum in top plates.
- c. Nail or anchor plates to supporting construction.
- d. Corners and Intersections: Frame with 3 studs or as detailed in the drawings.
- e. Openings: Frame with double studs each side and double headers placed on edge, resting on cripple studs.
- f. Provide continuous horizontal blocking row at mid-height of single-story partitions over 8' high and at midpoint of multi-story partitions, using 2" thick members of same width as wall or partitions.
- g. Cut-in blocks wherever necessary for bracing or backing for applied finish or fixtures. Cut-in 2" solid blocking between studs at all horizontal joints in non-structural plywood wall sheathing.

### 3.5 JOISTS AND RAFTERS

- a. Joists and Rafters: Lay with crowning edge up with full end bearing.
- b. Openings: Frame for hatches, vents, and other openings as required.
- c. Bridging: Provide bridging for roof joists or rafters of more than 8" which are spaced 32" on center or less. Bridge roof joist or rafters every 10' by solid blocking 2" thick and full depth of joist or rafter, or by wood cross bridging of not less than 1"x3" or nailed metal cross bridging of equal strength. Where cross bridging is used, drive lower ends of such cross bridging up and nail after roof sheathing has been nailed.
- d. Solid Blocking: Install between roof rafters and ceiling joists over partitions and at end supports as indicated.
- e. Plywood Roof Sheathing: Install plywood over rafters or decking as indicated on drawings. Thickness and nailing shall be as indicated on structural drawings.
- f. Plywood Joints: Install 1/2" H clips at butt joints of roof sheathing, between rafters spaced 24" on center where solid blocking is not required.

### 3.6 SITE APPLIED WOOD TREATMENT

- a. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.
- b. Allow preservative to dry prior to erecting members.

### 3.7 TOLERANCES

- a. Framing Members: 1/4 inch from true position, maximum.
- b. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- c. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION  
07/18/2022

**FINISH CARPENTRY**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment and appliances required to complete all the work shown on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- a. Provide barricades as required.
- b. All scaffolding required for the work of this trade.
- c. Laying out of the work.
- d. All rough and finish carpentry with necessary grounds, blocking, backing, nails, rough hardware and preservative treated lumber.
- e. All sheathing, furring, stripping, (except for direct application of acoustic tile) and plaster grounds.
- f. All dry packing.
- g. Cutting and patching as required by the work of other trades.
- h. All rough hardware, including bolts, millwork assembly bolts, nails, etc., for attachment of wood to wood and wood to masonry or concrete.
- i. Installation of all miscellaneous iron, bolts, washers, nuts, screws, lag screws, etc.
- j. Installation of all structural steel not otherwise installed under other sections.
- k. Installation of all millwork and finish trim (furnished under Millwork Section).
- l. Installation of toilet accessories.
- m. Cleaning of glass, finish hardware, plumbing, electric fixtures and plates upon completion of the work.
- n. Clean the building and building site upon completion of all work.
- o. Hanging of all doors
- p. Installation of finish hardware.
- q. All Douglas Fir plywood.
- r. All gypsum board under surface mounted electrical fixtures.
- s. All insulation building board.
- t. All caulking, specified in Section 07 91 00 unless specified under other sections of these specifications.
- u. Fill all exterior thresholds with mastic and seal all metal door jambs at floor with rubber caulk as specified elsewhere.
- v. Installation of all connections of wood to metal not otherwise installed under other section.
- w. Forms, shoring and centering for masonry work.
- x. Installation of all metal ladders and ceiling access scuttles specified in sections 05 51 33.
- y. Installation of hollow metal frames in plastered, concrete and concrete block walls.
- z. Provide and install all required framing for installation of plaster expansion screeds.

## 1.03 RELATED WORK

- a. Concrete formwork and shoring is specified under "Concrete Work", Section 03 10 00.

- b. Miscellaneous Iron is specified under the "Structural Steel and Miscellaneous Iron" Section 05 12 00.
- c. Millwork is specified under Section 06 22 00.02.
- d. Finish hardware is supplied under Section 08 71 00.
- e. Expansion screeds and miscellaneous trim as specified under Section 09 21 01.

**PART 2 PRODUCTS**

**2.01 LUMBER**

- a. Grading, Size and Pattern: Lumber shall bear the official grade mark of the appropriate inspection agency on the wide face of each piece. Lumber shall be surfaced, milled or worked to patterns as indicated on the drawings. The Architect shall have the right to reject any lumber which in his opinion is unsuitable for the intended use, subject to the re-inspection procedure prescribed in Paragraph 700 of the "Standard Grading and Dressing Rules No. 16". Latest edition, published by the West Coast Lumber Inspection Bureau.
- b. Grades and Species: All framing lumber, unless otherwise specified, shall be well seasoned Douglas fir and shall comply with the requirements of "Standard Grading and Dressing Rules No. 17, latest edition, of the West Coast Lumber Inspection Bureau. Delivery to job site and installation of lumber with a moisture content of greater than 19% is not permitted. All lumber shall be "Grade Marked" KD or SD by a recognized lumber grading agency and 2x members shall be dried so that moisture content does not exceed 19 percent. All framing lumber shall be of the D.F. grades for use as specified below, unless otherwise indicated on the drawings.

Use	Grade
(1) Posts (5"x5" and larger width not more than 2" greater than thickness)	"No. 1 Structural" - Posts & Trimmers, 1200F-c, Para. 131-b.
(2) Beams, girders and truss members (5" and thicker, 6" and wider, width more than 2" greater than thickness)	"Select Structural" Beams & Stringers 1600F-b Para. 130-a.
(3) Joists and planks	"No. 1 S-Dry"

- c. Preservation of Wood Members in Contact with Concrete Floor Slabs or Foundations: "Pressure treated Douglas Fir or Hem Fir". Preservatives used shall meet the requirements of AWWA Standard P5. All treated lumber shall bear the factory applied AWWA Standard U1 grade mark for above ground use.

2.02 LVL STUDS

- a. Materials shall comply with NES Report No. NEQ-481, ICBO ES Report No. ER-4979 or CMC Report No 08675-R.
- b. Adhesives shall be of the waterproof type conforming to the requirements of ASTM D-2559.

2.03 PLYWOOD

Plywood shall be Douglas Fir conforming to U.S. Product Standard P.S. 1-83. Each sheet shall be grade marked by the American Plywood Association as follows:

Roofing Sheathing	" Structural 1", C-D
Wall Sheathing:	
Exposed to View or Weather	"A-C Exterior"
Concealed	"Structural 1", C-D
Floor Sheathing	"Group 1", touch sanded

All glue to be exterior type.

(1) Sturdifloor Interior APA, combined subfloor underlayment. See Structural Drawings for thickness.

Plywood Thicker than 3/8" shall have a minimum of five (5) plies.

2.04 BUILDER'S ROUGH HARDWARE

- a. Nailing: Nails shall be common wire nails of the sizes indicated on the plans. Nails for hangers and other special fastenings shall be those furnished by the manufacturer of the fastenings. See the drawings for Nailing Schedule. Stripping and subfloor nails - "Stronghold annular or ring shank nails" or equal.
- b. Bolting: Holes for bolts shall be bored true to line and one-sixteenth of an inch (1/16") larger in diameter than the bolt. Bolts shall be unfinished unless otherwise noted. Standard cut washers shall be installed under bolt heads and nuts that would otherwise bear on wood surfaces. Bolts and washers shall be furnished by the Miscellaneous Iron Contractor and installed by this Contractor. Where plate washers or malleable iron washers are specified on the plans, the following sizes shall be provided. Retighten nuts/bolts prior to close-in.

Bolt Size	M.I.	Washer	Steel Plate Washers
1/2"	2-1/2"diam. x 1/4"	2"	square x 1/4"
5/8"	2-3/4"diam. x 5/16"	2-1/2"	square x 1/4"
3/4"	3" diam. x 3/8"	2-3/4"	square x 5/16"
7/8"	3-1/2" diam. x 7/16"	3-1/4"	square x 3/8"
1"	4" diam. x 1/2"	3-3/4"	square x 3/8"

- c. Lag Screws shall be screwed and not driven into predrilled holes. The pre-drilled holes shall be 0.75 times the diameter of the screws.
- d. Miscellaneous Fasteners: Light-gauge fasteners, including joist hangers, clips, etc., shall be manufactured by the Simpson Company or equal.
- d. Power Driven Fasteners shall be "Ramset", "Hilti" or equal and shall be used only where indicated on the plans.



2.05 EXPANSION BOLTS  
ITW/RAMSET Red Head.

2.06 INSULATING BUILDING BOARD  
Specified in the insulation section.

2.07 CORRUGATED AND FLAT TRANSITE  
One-fourth inch (1/4") thick as manufactured by Johns-Manville Corp.

2.08 DRYPACK  
Drypack shall be composed of one (1) volume of portland cement and three volumes of fine aggregate and only enough water to set the mixture (no free water and no slump). Drypack shall be tamped into place.

### **PART 3 EXECUTION**

#### **3.01 GENERAL REQUIREMENTS**

- a. Nailing: Nails shall not be driven closer together than their required penetration; nor closer to the edge of timber than one-half (1/2) their required penetration. Where necessary, wood shall be pre-drilled to prevent splitting. All framing shall be strongly nailed, bridged, blocked and trussed to make a rigid structure. Where structural wood members have been split and/or otherwise changed to the extent as to materially impair their strength, they shall be removed and properly replaced.
- b. Work and Relations with Other Contractors: The Carpentry Contractor's responsibilities include:
  - (1) Notice to other Contractors, in ample time as not to delay the work progress, to place portions of their work as is embedded, built-in, attached to or supported by work being executed. Any cutting or patching necessitated by any subcontractor's failure or delay to comply with notice is subcontractor's responsibility.
  - (2) Major cutting or boring of rough carpentry and work affecting finish carpentry, for other contractors and trades. Other contractors will do their own minor cutting or boring for installation of pipe, conduits and ducts.
  - (3) Responsibility for proper placing of all work embedded in or related to concrete in proper time and manner. Assist and direct or place same.
  - (4) Responsibility for proper placing of all required backing for wall and ceiling plaster expansion screeds and miscellaneous trim.
- c. Framing: All framing shall be of sizes and lengths as indicated on the drawings with anchoring and bolting where shown.
  - (1) Exposed Lumber and wood finish shall be surfaced, cleaned, sandpapered and left free from hammer marks and ready for paint. All interior plywood shall be fully protected from the sun.
  - (2) Unexposed Lumber may be left rough except where sizing is necessary.
- d. Joists and Rafters:
  - (1) All joists and rafters shall be of sizes noted on plans, laid with crowning edge up and shall be supported firmly from below.
  - (2) All bearing surfaces on which wood structural members are to rest shall be finished so as to give a true and even support.

- e. Studding
- (1) All studs throughout building shall be of sizes as called for on the drawings and spaced at sixteen inches (16") on center, except where called for otherwise.
  - (2) All bearing walls and partitions shall have plates at bottom and top as detailed. All plates shall be spiked together. Mud sills shall have solid bearing to bed of dry pack. All double plates, corners and/or intersections shall be lapped.
  - (3) Stud partitions or walls containing plumbing, heating or other pipes shall be so framed and the joists underneath so spaced as to give proper clearance for the piping. Pipes exceeding one-third (1/3) of the plate width shall not be placed in partitions used as bearing or shear walls unless completely furred clear of the studs. Pipes shall be placed in the center of the plates using a neat hole; no notching shall be allowed. *(In any case, pipes shall not pass through plates less than five and one-half inches (5-1/2") in width.)*
  - (4) Wood stud walls resting on masonry or concrete shall have wood base plates or sills. Sills under exterior, bearing or shear walls shall be bolted to the masonry or concrete with not smaller than 5/8" x 12" bolts spaced at not more than four foot (4'-0") centers. There shall be a bolt within nine inches (9") of each end of each piece of sill. Where sills are bored or notched exceeding one-third (1/3) of the sill width, extra bolts shall be required as given for ends of sill pieces. Sills under non-bearing interior partitions shall be anchored at not more than four feet (4'-0") on center with 5/8" x 12" bolts or two feet eight inches (2'-8") on center with Ramset #3348 or Hilti NK72. No powder bolts allowed on curbs or edges of slabs.
  - (5) The width of sills shall be not less than the width of the studs and their nominal thickness less than two inches (2"). (Sills shall be completely bedded in one inch (1") of dry pack so as to obtain a continuous bearing.)
- f. Furring, Stripping, Ground and Backing:
- (1) All wood furring, stripping, blocking, bucks and grounds shall be furnished and installed by the Contractor where shown or noted on the drawings and/or these specifications except stripping for acoustic tile. All pipes and ducts shall be furred in wherever shown.
  - (2) Furring as noted sixteen inches (16") on center shall be provided for pipes, conduits and where necessary to form off-setting around structural features.
  - (3) Horizontal and vertical backing for nailing all joints of wall finish materials shall be provided wherever needed through the building. Horizontal and vertical backing shall also occur at center of all wall board and ceiling board materials, at counter heights, wainscot heights and for securing all fixtures, cabinet work, shelving and all other items of work that require support from the wall. Install solid backing for plumbing fixtures as directed by the Architect, except where plumbing fixture hangers are specified under Plumbing Section.
  - (4) Furnish and set all grounds for sheet metal and other trades. Grounds shall be of proper size and spacing for the installation of work as noted under the various headings.
  - (5) All blocks, grounds, etc., which are embedded in concrete shall be dipped in creosote after being cut to size and after nails are driven which are to hold them in concrete.
  - (6) Stripping for Ceilings Applied to Bottom of Wood Joists shall be laid flat and at right angles to joists, with 16d Stronghold nails at each end and each bearing. Holes for nails at ends shall be pre-drilled.

- (7) Three-eighths inch (3/8") thick x two inch (2") (nom.) stripping shall be furnished and installed on all interior structural plywood, which is to receive plaster. See Drawings if plywood is let-in or surface applied to studs.
- g. Cutting of Framing: No cutting of wood framing other than furring shall be done without the express approval of the Architect or his representative and the Division of the State Architect.
- h. Finish: Exterior and interior trim shall be straight and true with uniform reveals around frames and openings. Miter at corners and re-entrant-entrant angles. Nail with staggered nailing where possible to prevent splitting and with sufficient nailing to hold trim snug and true to line.
- i. Cleaning Site: All wood, including stumps, form lumber, casual lumber, shavings, sawdust, rubbish and debris shall be cleaned from the building and building site. Upon completion of the building, the building and grounds shall be left broom clean and in an orderly and acceptable condition.
- j. Cleaning: Clean glass, hardware, plumbing fixtures, light fixtures, switch plates, service outlets and grilles upon completion of the work and leave in a clean, acceptable condition.

### 3.02 SPECIAL REQUIREMENTS

- a. Laying Out Buildings The foundation plan shall be followed in laying out the building; however, it shall be checked against the floor plan and all dimensions shall be verified.
- b. Wood Sheathing: Lay tight with full bearings over supports.
- c. Drypacking:
- (1) Wash with clean water all areas over which drypacking is to be applied.
  - (2) Sills shall be properly leveled with the bottom face to one inch (1") above the foundation.
  - (3) Space under sill shall be filled with drypacking solidly tamped.
  - (4) Trowel edges smooth and keep drypacking continuously moist for three (3) days or seal with watersealer.
- d. Millwork and Hardware: All doors, windows and casework hardware shall be installed so that they may operate freely but not loosely, without sticking or binding, without hinge-bound conditions and with all hardware properly adjusted and functioning. All millwork shall be neatly installed with any necessary bolting and scribing. No hammer tracks shall be allowed. All trim shall be put on in full lengths without piecing except where the use of single lengths would be impracticable or impossible. In general, butt end (where pieced) shall be beveled. All exterior angles shall be mitered and the interior angles of the molded parts coped. All nails shall be set for putty. Anchor securely to wall and floor.
- e. Damage: The Contractor shall protect this work from damage of any kind until completion and acceptance of the building.
- f. Scaffolds: This Contractor shall provide, install, maintain and remove any and all fixed scaffolding, either exterior or interior, required for the proper and satisfactory execution of this work in such a manner as will comply with the Rules and Regulations of the Industrial Accident Commission of the State of California. Movable scaffolds and the planking of scaffolds will be provided by the subcontractors of their respective trades.
- g. Protection of Exposed Interior Lumber: All exposed interior lumber shall be fully protected from sun and weather.
- h. Pitch Pockets: Pitch pockets shall be cut out of exposed mullions and beams.

- I. Machine Applied Nailing: Satisfactory installation shall be demonstrated on the job and the acceptance of the field representative of the Division of the State Architect and the Architect and/or Structural Engineer shall be obtained before the use of machine-applied nails can be approved. Approval is subject to continued satisfactory performance.

### 3.03 USE OF POWDER DRIVEN CONCRETE FASTENERS IN SCHOOL CONSTRUCTION

- a. Shot pins may be used for shear loads and they may be used in tension to support loads less than 100 pounds for minor loads like acoustical ceilings, duct work, conduit, etc. Any shot anchors must have ICBO approval for the type of concrete used on the job. Shot pins may not be used in concrete curbs.
- b. The allowable loads shall be 100 pounds or 80% of ICBO approved values, whichever is less. Qualification for use of all power-actuated tools must meet ANSI A10.3 standard as required by the manufacturer and all OSHA requirements.
- c. TESTING - The operator, tool, and fastener shall be prequalified by the project inspector. He shall observe the testing of the design load shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random tests under the project inspector's supervision shall be made of approximately 1 in 10 pins. If any pin fails testing, test all pins of the same category not previously tested until twenty-(20) consecutive pass, then resume the initial testing frequency.

END OF SECTION  
07/18/2022

**MILLWORK AND CABINETS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section shall include all labor and material for the fabrication and installation of all the work shown on the drawings and/or specified hereunder. Delivery to the building is considered as part of this contract.

1.02 WORK INCLUDED

- a. All finish woodwork, moulds, trim, casings, facings, base and base shoe, including all interior and exterior trim and exterior fascias (redwood).
- b. All casework, counters, cabinets, drawers and shelving, including all trim, poles and doors for same.
- c. All plastic tops, splashes, shelves, counter fronts and ends.
- d. All sliding drawer hardware and adjustable shelf hardware.

1.03 TYPICAL INCLUSIONS

Sink cabinets; wall cabinets; storage cabinets; wardrobes; pullman cabinets; counters; booths; display cases; built-up shelving; shelves installed on adjustable wall mounted standards; plywood or solid stock sub-tops for metal covered tops; special purpose tops for cabinets other than metal, such as chemical resistant plastic, epoxy resin countertops, sinks, splashes etc.; high-pressure laminated plastic or hardboard facings, coverings and surfaces; glass and mirrors which are a part of the cabinet; chalkboards and tackboards which are a part of the cabinet, with necessary trim and trays; rough and finish hardware which is a part of the cabinet; metal brackets and fittings necessary to properly secure the cabinet to the building structure; finish trim and moldings necessary for a finished cabinet installation; cut-outs for sinks, cup sinks, electrical boxes, and columns or similar units; linoleum, leather, vinyl, or resilient covering which is a part of the cabinet; tote trays and easel trays of plastic or metal; high-pressure laminate caps and panels for rails; gates; filler panels and scribe strips; cleaning of cabinets at completion of installation.

1.04 TYPICAL EXCLUSIONS

Plumbing and electrical fixtures, and fitting and installation of same; metal tops; tile tops; any work not directly associated with the casework; metal brackets and fittings that are a part of the building structure; furring, stripping, blocking, grounds and stub wall of structural materials; furnishing and installation of sink rims or similar items; special equipment to be housed in the cabinets, such as drafting boards, etc.; furnishing or installation of plastic laminate wall covering; vinyl topset base at fixed cabinets.

**1.05 RELATED WORK**

- a. Installation of Millwork is specified under Section 06 10 00.
- b. Furnishing and installation of finish hardware is specified under Finish Hardware, Section 08 71 00.
- c. Painting and priming is specified under Painting, Section 09 91 00.
- d. Metal doors & frames are specified under Section 08 11 00.

**1.06 GENERAL REQUIREMENTS**

- a. **Workmanship:** Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first class workmanlike manner and shall be subject to the approval of the Architect or his representative.
- b. **Approvals:** An approval for all brands of materials not mentioned herein shall be obtained in writing from the Architect.
- c. **Protection:** The Contractor shall protect his work from damage of any kind and deliver same to the building undamaged.

**1.07 PLAN AND SPECIFICATION REQUIREMENTS**

- a. All items that are required to be Architectural Woodwork Standards (A.W.S) Laminated Plastic Covered Casework::
  - (1) The A.W.S. grade or grades desired. Grades shall be Custom (C) unless otherwise indicated on the plans and/or designated in Supplementary Section as follows:
    - (a) Economy (E)
    - (b) Custom (C)
    - (c) Premium (P)
    - (d) Laboratory (L)
  - (2) The type of countertop desired shall be Laminated Plastic (LPT) unless otherwise indicated on the plans as follows:
    - (a) Laminated Plastic (LPT)
    - (b) Hardwood Lumber (HLT)
    - (c) Hardboard (HBT)
  - (3) The type and size of sinks desired shall be indicated on the plans or specified.
  - (4) A.W.S. Certified Compliance Grade labels and Certificates are required.
  - (5) In rooms designated as utility, storage, or closet, Economy Grade casework will be furnished unless specifically specified otherwise.
  - (6) If a A.W.S. grade is not specified, Custom Grade will be furnished, except as provided in (6) above.
  - (7) If type of counter top is not specified, a Laminated Plastic counter top will be furnished.
  - (8) The brand of laminated plastic shall be optional with the manufacturer and in accordance with Paragraph 3.04 below, unless a special brand is specified.
  - (9) If the provisions for the A.W.S. grade specified are in conflict with or modified by the plans and specifications, the modification shall govern.

## 1.08 GRADES

- a. Economy: This grade establishes a standard to meet the requirements of lower cost residential and commercial construction where economy is the principal factor, and for use in storage and utility areas.
- b. Custom: This grade includes all the requisites of high quality casework and is suitable for all normal uses in high grade construction, such as higher quality construction for residential, school, medical facilities and commercial buildings.
- c. Premium: This grade of casework is intended primarily to be used for library shelving, display cases, and casework with visible interiors that require a more decorative appearance.

## 1.09 DEFINITIONS

- a. Exposed portions of casework shall include all surfaces visible when doors and drawers are closed; visible edges only of shelves and divisions in open cases; tops of cabinets less than 6'-0"\* from the floor; bottoms of wall-hung cabinets over 4'-0" above floor and exterior faces and backs of movable cabinets.
- b. Semi-exposed portions of casework shall include shelves; divisions; interior faces of ends, backs, bottoms and doors; drawer sides, backs, sub-fronts, and bottoms; bottom of wall-hung cases between 2'-6" to 4'-0" above floor; tops of cases over 6'-0" above the floor; and similar members.
- c. Concealed portions include sleepers, webs, bust panels, toe space and other surfaces not normally visible.

## 1.10 SHOP DRAWINGS AND SUBMITTALS

- a. Shop drawings, per Section 01 33 00, shall be submitted to the Architect prior to fabrication. Drawings shall show each cabinet, with sufficient special details to clearly indicate all unusual features of construction.
- b. Samples of the proposed laminate, together with currently available colors, shall be submitted to the Architect for selection.
- c. Shop drawings shall bear the Woodwork Institute Certification (W.I.C.)

## 1.11 PROTECTION

The Contractor shall protect his work from damage of any kind and deliver same to the building undamaged.

**PART 2 PRODUCTS**

## 2.01 MATERIALS (All finish materials shall be kiln dried)

- a. All millwork shall be manufactured in accordance with the standards established in the latest edition of the Architectural Woodwork Standards in the grade or grades herein specified or as shown on the drawings.
- b. Before delivery to the jobsite, millwork supplier shall issue a W.I. Certificate of compliance indicating the millwork products for this job fully meet the requirements of the grade or grades specified.

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1 Cabinet tops above 6'-0" and visible from upper floor levels shall be considered exposed portions.

- c. Exterior Finish shall be Clear All Heart Redwood, A.W.S. Custom Grade for opaque finish for moulds, trims, casings, facings, S4S.
- d. Interior Finish shall be A.W.S. Custom Grade for opaque finish.
  - 1. Clear Douglas fir shall be used for frames and stops for doors, clothes poles, all work bench tops and locker room benches.
  - 2. A.W.S. Custom Grade shall be used for moulds, trim, facings and casings.
  - 3. Casework - Softwood (All casework except where noted on Drawings) shall be W.I. Custom Grade for opaque finish.
    - (a) Drawer fronts, backs and sides.
    - (b) Backs - 1/4" plywood, Douglas Fir plypanel A-D.
    - (c) Ends and Divisions - 5/8" plywood Douglas Fir Interior A-B.
    - (d) Bottoms - 3/4" plywood, Douglas Fir plypanel A-D.
    - (e) Shelves - 3/4" plywood, Douglas Fir Interior A-D with Ponderosa Pine edge banding for shelves not to exceed 3'-0" in length. Shelves longer than 3'-0" shall not be less than one inch (1") net in thickness - Douglas Fir plywood edge banded.
    - (f) Counter tops for formica - 3/4" 1M3 I.G.P. core
    - (g) Doors - Type 10 -3/4" thick per Architectural Woodwork Standards.
- e. Casework - Hardwood (where indicated on Drawings):
  - 1. All Exposed Exterior Surfaces: A-1 or A-2 birch veneer plywood, opaque finish. See Paragraph 2.01 d.. (3) for thickness.
  - 2. Doors: 3/4" with hardwood veneer and hardwood edge banded 1M3 I.G.P. core as per Type 1 of Architectural Woodwork Standards.

**NOTE:** *These casework standards shall be followed unless otherwise noted on detail. Apply finish hardware to I.G.P. with Type "A" self-tapping sheet metal screws.*

- f. Material Standards:
  - 1. High-pressure decorative laminates (H.P.D.L.) shall conform to requirements established in NEMA LD-3 Grade II, 1985, or latest revision thereof.
  - 2. Low pressure decorative laminates (L.P.D.L.) shall conform to requirements established in ALA Grade III, 1988 or latest revision thereof.
  - 3. Softwood plywood shall be rotary cut Douglas Fir, and shall conform to the requirements of P.S.1-83 and UBC Standards 23-2. Hardwood plywood I shall be the species specified and conform to the standards established by ANSI-HPMA-83 (Section 6).
  - 4. MDF shall be of 1/4" minimum thickness, with minimum density 50 lbs. per cubic foot. The board shall conform to ANSI A208.2.
  - 5. Industrial grade particleboard (I.G.P.) shall meet the requirements of UBC Standards 23-4 and ANSI A208.1-87, type I, Grade I-M-3 which meet the following requirements. The following is a partial summary of these requirements:
 

Minimum density	45 lbs. per cubic foot;
Thickness Tolerance	+ 0.010 max.
Modulus of Rupture	2,400 psi, min.
Modulus of Elasticity	400,000, min.
Internal Bond	80 psi, min.
Hardness	500 lbs., min.
Linear Expansion	0.35% Max.
Screw Holding: Face	250 pounds, min.
Edge	225 pounds, min.
  - 6. Cores for (H.P.D.L.) shall be (I.G.P.) or close grained hardwood plywood, a minimum of 11/16", with finished thickness of .735" (47/64"), including laminates.
  - 7. Cores for (L.P.D.L.) shall be (I.G.P.) with finished thickness of 3/4".
  - 8. Edge Bands shall be the following, and applied after face laminate:



- (a) .028" (H.P.D.L.) self-edge, the same as front exposed face.
9. Adhesive: Laminate and core materials shall be securely glued with Type II adhesive applied as recommended by the adhesive manufacturer and shall conform to the standards established by HPMA.
- g. Finish Hardware:
1. Hardware shall be furnished and installed as required to provide a complete casework installation.
  2. Hardware shall be USS 26D finish unless specified otherwise.
  3. Locks shall be installed as shown on the plans and will be master keyed
  4. The following hardware is listed to establish a quality of product.
    - (a) Hinges -Stanley HT-1592 or Rockford Process Control- B-851.
    - (b) Door and drawer pulls – Stanley 4483-1/2 34-8225 26D.
    - (c) Magnetic Catches - Amerock V-9765, Epco No. 591 or equal.
    - (d) Elbow catches - Ives SP2A92-AL, Amerock 3675, or equal.
    - (e) Cabinet Door Locks – Schlage CL777R with strike and 626 Finish or approved equal.
    - (f) Drawer locks – Schlage CL888R with strike and 626 Finish, or approved equal.
    - (g) Drawer guides –
      - File Drawers – Accuride 4034, full extension, 150 lb load capacity or approved equal.
      - All other drawers – Accuride 3832, full extension, 100 lb load capacity or approved equal
    - (h) File Followers - Hardware Specialty No. 11485-FWZ, National 61-080, or equal. For card files, Capital 521 with 523 plate or equal.
    - (i) Adjustable shelf standards - K.V. 255, Garcy U373, Grant 125, gangdrilled or equal.
    - (j) Adjustable shelf clips – Hettich, Shelf Support Universal 1, #1 005 767 or equal.
    - (k) Adjustable shelf standards for back or wall mount - K.V. 80, Grant 130, or approved equal.
    - (l) Adjustable shelf knife brackets - K.V. 180, Grant 125, or equal.
- h. Countertops:
1. The fabricator shall furnish and install the type of tops indicated on the plans and in conformance with the provisions set forth below. If other requirements are desired, they may be specified.
  2. Laminated Plastic Countertops: Cabinet tops shall have self-edge, rolled, or bull-nose edges and coved splashes where splashes are indicated. All tops shall conform to the requirements of Custom Grade set forth in Section 11 of the Architectural Woodwork Standards, and ANSI A161.2 and shall be furnished in accordance with those provisions. Finish material shall be NEMA Type GP50, .050" min. thickness (H.P.D.L.) or NEMA Type PF42, .042" min. thickness (H.P.D.L.) at post-formed tops, i.e., coved splashes, etc.
- i. Glass and Glazing:
1. Glass and glazing for doors shall be not less than 1/4" minimum thick, clear front glass ASTM C1036 Type I transparent flat quality q3 glazing select.

**PART 3 EXECUTION****3.01 SPECIAL REQUIREMENTS**

- a. Lengths: Moulds, trim, casings and facings of shapes detailed on drawings shall be furnished in lengths of not less than 16'-0".
- b. Frames shall be built to detail with applied stops. All rabbeted joints shall be set in white lead paste with all members securely nailed.
- c. Milling:
  - 1. Run all finish lumber to patters as shown with clear cut profiles and free from machine imperfections
  - 2. Interior trim shall be flat face drum sanded.
- d. Casework: All casework shall be mill built by skilled cabinet makers and shall conform to the latest edition of the Manual of Woodwork and/or the latest amendments, Woodwork Institute of California - Custom Grade. It shall be complete units or in sections as large as possible for access to intended locations.
- e. Plastic: All plastic shall be self-edged and/or as detailed. All plastic shall be pressure bonded with a resin type adhesive Urac 185 or equal. Balancing sheets shall be used where necessary to prevent warpage or high water absorption.
- f. All wood doors, jambs and trim shall have all corners eased by sanding.

**3.02 ASSEMBLY**

- a. All casework and counter tops shall be fabricated and installed in conformance with the W.I. Standards and Details of the grade specified or shall conform to the specifications and details shown on the plans.
- b. Each cabinet shall be completely fabricated as a modular unit in the mill.
- c. Cabinet style, unless noted otherwise, shall be Style A frameless "Flush Overlay".

**3.03 DETAILS OF CASEWORK**

Cabinet sectional details as illustrated in W.I. Manual of Woodwork Standards are the minimum requirements for casework construction. Alternate methods shown are optional with the manufacturer, unless plans indicate specific construction requirements. All construction shall conform to the A.W.S. standards established for custom casework, unless specified or indicated otherwise.

**3.04 INSTALLATION**

- a. All installation shall be done by experienced craftsmen. All fixed cabinets shall be plumb, level, and securely attached to the wall or floor using established methods, which will meet all legal requirements.
- b. Filler panels and scribe strips or moldings, as required, shall be properly scribed to adjacent work and securely attached to the cabinets.
- c. The entire installation shall present a workmanlike appearance, without open joints, tool marks or other blemishes.
- d. Cabinets shall be thoroughly cleaned and checked for mechanical operation.

**3.05 CONSTRUCTION REQUIREMENTS - GRADE RULES**

- a. Material requirements as defined in the following paragraphs apply to all grades except as modified hereinafter.
- b. Custom Grade:
  - (1) Exposed Portion's Finish (See Paragraph 1.06a for definition). Finish for exposed portions shall be NEMA Type GP28, .028" minimum thickness

- (H.P.D.L.). If woodgrain pattern is used, the grain shall run and match vertically.
- (2) Semi-exposed Portion's Finish See Paragraph 1.0-6b for definition):
- (a) Finish for semi-exposed portions, except as listed otherwise, shall be polyester or melamine (L.P.D.L.) and conforming to ALA 1988 standards.
  - (b) Finish for interior faces of hinge doors and exposed ends shall be NEMA Type CL20, .020" (H.P.D.L.) "cabinet liner".
  - (c) Finish for (M.D.F.) drawer bottoms and cabinet backs shall be "baked-in" acrylic, color to match cabinet interior, conforming to ANSI 135-5-1988 finish standards, or latest revision thereof.
- (3) Concealed Portions: Material for concealed portions of casework may be of any sound, dry solid stock, plywood, particleboard, or any combination thereof.
- (4) Visible Edges:
- (a) All exposed or semi-exposed edges of ends, tops, bottoms, shelves, partitions, divisions, etc., shall be banded per 2.01i.
  - (b) Only the front edge of adjustable shelves is required to be banded.
- (5) Ends and Divisions:
- (a) Material for cabinet ends and divisions shall be (I.G.P.) a minimum of 11/16" with .735" finished thickness with laminates.
  - (b) The visible top edges of the ends of cabinets 6'-0" or more from the floor do not require an edge band\*, but shall have all voids filled and sanded.
- (6) Shelves shall be (I.G.P.) with (L.P.D.L.) finish each side, a minimum of 3/4" finished thickness. Adjustable shelves with unsupported spans over 30" in length shall be a minimum of 1" in thickness. Fixed shelves in excess of 30" in length between vertical members of the cabinet body shall be a minimum of 1" in thickness.
- (7) Tops and Bottoms:
- (a) Tops and bottoms shall be a minimum of 3/4" in thickness.
  - (b) Bottoms of upper cabinets in excess of 3'-6" between vertical members of the cabinet body shall be a minimum of 1" in thickness I.P.G. or 3/4 plywood.
- (8) Web Frames shall be a minimum of 3/4" in thickness and 2" in width and shall be either solid stock, or (hardwood 5-ply) plywood. A solid (full cabinet length and depth or height) piece of plywood or (I.G.P. a minimum of 3/4" in thickness may be used in lieu of a web frame.
- (9) Backs shall be plywood or (M.D.F.), a minimum of 1/4" in thickness, with color to match cabinet interior. Exposed backs shall be 1/2" min. thickness.
- (10) Cabinet Doors:
- (a) Doors shall be 11/16" minimum thickness (I.G.P.) core. Finished doors shall be a minimum of .735" in thickness with laminates. All four edges shall be banded per 2.01i, with joints for "T-type" at hinge points only.
- (11) Drawers:
- (a) Finished drawer fronts shall be a minimum of .735", with laminates, in thickness and shall be faced on the inside with NEMA Type CL20, .020" minimum thickness (H.P.D.L.) "cabinet liner". Drawer fronts shall be banded four edges per 2.01f9 with the joint in the center of the bottom edge for "T"-type banding.
  - (b) Drawer bottoms shall be M.D.F.

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1\*Unless visible from upper floor levels.

- (c) Drawer sides, backs and sub-fronts shall be a minimum of 1/2" in thickness of either custom grade hardwood solid stock or (I.G.P.) with (L.P.D.L.) finish.
- c. Economy Grade: Material requirements shall be the same as Custom Grade, except all exposed portions shall be melamine overlay.
- d. Premium Grade: Material requirements shall be the same as Custom Grade, except all semi-exposed portions behind glass or in open cases and the inside face of hinged cabinet doors shall be faced with .030 minimum thickness decorative high-pressure thermoplastic laminate of the same material as adjacent exposed face.

### 3.06 CONSTRUCTION REQUIREMENTS - - ALL ARCHITECTURAL WOODWORK STANDARD GRADES (A.W.S.)

- a. Construction requirements shall be the same for all A.W.S. grades. The differences in the grades are based on the use of different materials for exposed and semi-exposed surfaces.
- b. Joinery:
  - (1) All cabinet members shall be securely fastened together.
  - (2) All exposed and semi-exposed joints shall be tight and true.
  - (3) All exposed joints shall be securely glued.
- c. Web Frames shall be provided at 2'-6" maximum spaced intervals when banks of drawers operate on metal side slides and shall be dadoed into ends and divisions. When pairs of drawers occur above a door or open compartment, there shall be a web frame provided beneath the drawers.
- d. Cabinet ends shall be lockjointed or dadoed, securely glued, and blind nailed or screwed to the tops, web frames, and bottoms at not-to-exceed 6" on center; or tops, sub-tops, webs, and bottoms may be tenoned full width into ends, securely glued, and blind nailed or attached with a reinforcing screw cleat.
- e. Fixed Shelves, web frames, bottoms and vertical or horizontal divisions shall be dadoed or tenoned into adjoining members.
- f. Screw-type leveling devices, when specified, shall be placed at each corner of floor mounted cabinets over 16" in depth and shall be a maximum of 72" on centers, and shall permit adjustment from within the cabinet. The floor contact area of the leveling device shall be not less than 12 square inches, and shall provide a minimum of 4 square inches of floor contact area for each square foot of cabinet base area.
- g. Cabinet Bases may be constructed with either separate or integral bases. Bases shall be fabricated of 1-1/2" solid stock, laminated plywood, or particle board, k1-1/2" thick, min., reinforced at the corners with a 1-1/2" thick supporting block or a two-piece steel bracket assembly. Sleepers shall be provided at maximum of 36" o.c..
- h. Backs shall 1/4" minimum and be securely nailed or stapled to the case body and intermediate members, and braced at 36" maximum centers each way and at tops and bottoms of cabinets with 1/2" x 2-1/2" anchor strips (plywood, I.G.P., or solid stock) securely attached to the case\*.
- i. Adjustable shelves shall be adjustable on 1" or 32 mm maximum centers. Surface or recess mounted metal shelf standards or drilled holes with metal shelf supports shall be used.
- j. Drawers:
  - (1) Drawer sides shall be blind dovetail dadoed and securely glued into the front, unless a sub-front is used.

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\*A Anchor strips not required at 1/2" thick cabinet backs.

- (2) Drawers may have a finished front securely attached to a sub-front with No. 12 x 1" sheet metal screws a maximum of 1-1/2" from the perimeter of the finished drawer front at not less than 8" on centers.
  - (3) Drawer sides shall be multiple dovetailed, or lockjointed and nailed to the backs and sub-fronts.. Drawer sides, fronts or sub-fronts, and backs shall be plowed to receive bottoms and shall be securely glued or glue blocked to form a rigid unit.
  - (4) All the above types of joints shall be securely glued.
  - (5) Drawers shall be supported on metal side slides with nylon ball bearing rollers, and provision made to stop the drawer in both in and out position without impact on the drawer front. Drawer slides shall have a capacity of 75 pounds.
  - (6) File drawers shall have a slotted or split bottom and shall be provided with a follower mechanism or hanging file hardware (verify with Owner which type is desired), and shall be supported on full extension drawer slides with a capacity of 75 pounds.
  - (7) Drawers shall show a maximum of 1/8" maximum clearance between adjacent drawers or doors and 1/4" maximum between adjacent cabinet doors or drawers.
- k. Doors:
- (1) Hinged doors up to 40" in height shall be equipped with two (2) hinges. Doors 40" to 60" in height shall be equipped with three (3) hinges. Doors 60" to 80" in height shall be equipped with four (4) hinges. Doors over 80" shall have five (5) hinges. Doors over 60"H or 30"W shall be 1" minimum thick.
  - (2) Doors shall show a maximum of 1/8" clearance between adjacent doors or drawers.

**3.07 FINISH FOR PLASTIC LAMINATE CASEWORK**

- a. All unfinished materials used for backs, self-edge backing, stripping and other concealed portions shall be finished with water repellent sealer.
- b. All wood surfaces of drawers, trays and similar semi-exposed portions shall be finished with two coats of sanded sealer and one coat of clear gloss lacquer.
- c. Exposed wood surfaces shall be tone colored to harmonize with the adjacent laminate, and finished with one coat of sanded sealer and two coats of clear gloss lacquer.

END OF SECTION  
07/19/2022

## FLUID APPLIED WATERPROOFING

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

### PART 1 GENERAL

#### 1.01 SCOPE OF WORK

- a. The work of this Section includes application of fluid applied waterproofing where shown on the drawings and elsewhere as required to provide a positive barrier against passage of moisture.

#### 1.02 RELATED WORK

- a. Concrete finishing
- b. Drains, cleanouts and pipe sleeves
- c. Railings and post
- d. Caulking and sealants
- e. Roofing (reglets and sheet metal)
- f. Backfilling

#### 1.02 LOCATION OF WORK

On all surfaces as indicated on the drawings.

#### 1.03 REFERENCES

ASTM C 836

#### 1.04 QUALIFICATIONS OF APPLICATOR

Applicator shall have at least 10 years experience in installing fluid applied membrane waterproofing and shall have successfully completed at least 8 projects of similar magnitude and complexity.

#### 1.05 SUBMITTALS

- a. Product Data: Manufacturer's data sheet reporting results of test on cured specimens as per ASTM C 836.
- b. Certificate: Affidavit from independent testing laboratory that products meet the requirements of ASTM C 836.
- c. Instructions: Manufacturer's standard instructions covering surface preparation and installation.

#### 1.06 DELIVERY AND STORAGE

Deliver products to jobsite in original, unopened containers, each bearing manufacturer's name, and product designation. Store so as to prevent damage or contamination in a cool, dry environment.

**1.07 ENVIRONMENTAL REQUIREMENTS**

Do not install fluid applied membrane to a damp or frosty surface or when ambient temperature is below 40 deg. F.

**1.08 PRE-INSTALLATION CONFERENCE**

Contractor shall convene a pre-installation conference (approximately) one week prior to commencing work of this section. Require attendance of parties directly affecting work of this section. Review conditions, installation procedures, schedules and coordination with related work.

**1.09 WARRANTY**

Provide a written warranty for a period of five years, signed by Contractor and Applicator, agreeing, during that period to promptly make replacement of defective work without additional cost to owner. The following types of failures shall be adjudged as defective work:

- a. Loss of waterproof integrity.
- b. Adhesive or cohesive failure
- c. Harden beyond Shore A Durometer per ASTM Specification.
- d. Become brittle, or crack as the result of a crack in the substrate providing that such crack is not greater than 1/16" wide.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

Materials specified are those manufactured by the Vulkem Division of RPM Mameco International, Cleveland, Ohio. Equivalent products of other manufacturers will be considered upon submittal of complete supporting technical data (per paragraph 1.5 above) and job references, a maximum of 30 days after the bid date.

**2.02 PRIMER**

As recommended by fluid applied membrane manufacturer.

**2.03 FLUID APPLIED MEMBRANE**

Acceptable products: TREMproof 250GC or TREMproof 250 GC 5L, self leveling grade membrane or Vulkem 201H (one-part) or Vulkem 222H (two-part), high viscosity, roller grade membrane.

**2.04 MEMBRANE FORMER**

For cants, coves or fillets: Vulkem 201T (trowel grade), polyurethane membrane former.

**2.05 SEALANT**

Shall be Vulkem 922 or Vulkem 227 Sealant.

**2.06 JOINT BACKUP**

Shall be flexible, rod type, closed cell polyethylene. Backer Rod shall have no adherence to sealant and water absorption shall be no greater than 1% by weight. Backer Rod shall be resistant to hydrocarbons. Backer Rod shall be 1/8" to 1/4" diameter larger than joint width. Acceptable products: Dow "Ethafoam"; Nomaco "Green Rod" or approved equal.

**2.07 PROTECTION COURSE**

Tremco-TREMDrain, Multi-Composite Drainage and Protection board or other suitable material, applicable to jobsite conditions, to protect membrane. Shall be approved by membrane manufacturer for compatibility.

**PART 3      INSTALLATION**

**3.01 ACCEPTANCE**

Inspect all surfaces to be coated. Do not commence work until any defects, which may harmfully affect work of this Section, have been corrected or accepted by Architect, in writing. Starting of work shall be construed as acceptance of the surface and conditions.

**3.02 PREPARATORY WORK**

- a. Concrete shall be in place 14 days (minimum), water cured and shall have a light steel trowel, followed by a fine hair broom finish. Concrete shall be sound, dry, clean and free of any contamination, which may harmfully affect the adhesion of the membrane.
- b. Block or brick walls shall be grouted flush with the surface.
- c. Where pipes project through a slab, watertight sleeves shall be provided and extend above the finished surface.
- d. Drains shall be watertight and have a integral flange for bonding the waterproofing membrane. Weep holes in drain shall be set level with structural slab surface.
- e. Grind off all high spots, remove splatters, fill voids or spalled areas with non shrink grout.
- f. Metal surfaces shall be cleaned (wire brush or mechanical etched) and primed per manufacturer's instructions.
- g. At the juncture of horizontal and vertical surfaces, install a 1/4" Backer Rod. Use Membrane Former to form a 1" cant over the backer rod.
- h. Treat joints and cracks and install detail coats in accordance with manufacturer's instructions.

**3.03 PRIMING**

Prime per manufacturer's instructions.

**3.04 FLASHING**

At points of potentially high movement, provide a neoprene sheet flashing, 1/16 inch thick. Install per fluid applied membrane manufacturer's instructions.



**3.05 APPLICATION**

- a. Wipe all cured detail coats with a rag, which has been wet with xylene solvent.
- b. Apply a uniform coat of membrane waterproofing material, 60 mils thick, per fluid applied membrane manufacturer's instructions.
- c. In the event the entire area cannot be completed in one day, prior to start up on the next working day clean an area 6" wide along the terminating edge of the membrane with xylene solvent. The new work shall overlap the existing work by six inches.

**3.06 FLOOD TEST (Horizontal Surfaces):**

- a. Allow fluid applied membrane to cure for 36 hours (minimum).
- b. Notify Architect and manufacturer's representative at least 48 hours in advance of the test.
- c. Plug all drains and provide necessary barriers to contain flood waters.
- d. Flood surface with a 1 inch head of water for 24 hours. Detect and repair any leaks, which may be found. Re-test if any repairs are made.

**3.07 PROTECTION COURSE**

Install manufacturer's approved protection course over fluid applied membrane waterproofing as soon as membrane has cured or immediately following flood test. In the event the flood test is delayed, install a temporary covering to protect membrane from other trades.

**3.08 CLEANING**

Promptly remove any primer or membrane material from adjacent surfaces. Leave work area in broom clean condition.

END OF SECTION  
02/05/2020

## INSULATION

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

### PART 1 GENERAL

#### 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment, transportation and services necessary to completely furnish and install all insulation shown on the drawings and/or described herein, including all nails, clips, fasteners, tape and scaffolding necessary to complete the work specified and/or shown.

#### 1.02 WORK INCLUDED

- a. Insulation of all ceilings over all rooms including room walls adjacent to attic spaces.
- b. Wire staples and accessories for installation of insulation.
- c. Insulation of all walls.
- d. Insulation batts.
- e. Rigid insulation.

#### 1.03 RELATED WORK

- a. Any and all insulation specified or shown on the drawings for the Heating, Ventilating and Air-conditioning or Plumbing Sections of the work.

#### 1.04 WORK NOT INCLUDED

- a. No ceiling insulation in eaves and open corridors.

#### 1.05 REFERENCES

- a. ASTM C-665, Type III, Class A . Category I
- b. Factory Mutual (FMRC Standard 4880) for rigid insulation

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- a. Thermal and acoustical insulation located on or within floor-ceiling and roof-ceiling assemblies, crawl spaces, walls, partitions and insulation on pipes and tubing shall comply with this Section. Duct insulation and insulation in plenums shall conform to the requirements of the California Mechanical Code.

**Exception:** Roof insulation shall comply with C.B.C. Section 1504 for required testing materials only.

- b. All insulation materials including facings, such as vapor barriers or breather papers installed within floor-ceiling assemblies, roof-ceiling assemblies, walls, crawl spaces or attics, shall have a flame-spread rating of 25 or less and a smoke density not to exceed 450 when tested in accordance with U.B.C. Standard No. 8-1. All thermal insulation specified herein shall be as manufactured by Johns Manville Thermal FSK-25 Flame Resistant Fiber Glass Commercial insulation or approved equal in quality, utility and thermal properties. Batts shall be fiberglass with vapor seal backing on one side with projecting flanges for stapling. R-values shall be minimum resistance of R-30 for ceilings and R-19 for walls unless noted otherwise.
- c. Rigid insulation shall be "1.0" Flat Energy 3 " polyisocyanurate insulation boards or equal, with a thermal resistance of R-8 unless noted otherwise and a minimum compressive strength of 25 p.s.i. with factory applied foil face on each side. All materials, including foil facings to have smoke development rating of 450 or less and a flame spread of 25 or less when tested in accordance with UBC Standard 8-1.
- d. Wire Staples: "Bostitch" or approved equal with 1/4" staple legs.

## 2.02 SUBSTITUTIONS

See Section 10, Article 19.

## 2.03 EQUALS

John Manville, U.S. Gypsum, DOW, Owens-Corning, Certainteed, GAF.

# PART 3 EXECUTION

## 3.01 INSTALLATION

- a. Insulation shall be installed to form a complete barrier against the passage of heat and/or sound to the full extent of the thickness of the material and type of material specified. Holes, gaps, tears and other evidence of inferior installation will be cause for rejection. Batt insulation shall be stapled to face of supports at six inch (6") intervals. Where rafters are spaced at 48" o.c., two (2) 24" batts shall be laid on top and perpendicular to the ceiling stripping. All batts shall be butted tight and/or lapped so that there are no spaces between the batts or rafters. Staple side of batt adjoining rafter at six inch (6") centers.
- b. Insulation Laid over Suspended Plaster Ceiling System: Insulation shall be installed progressively to form a complete barrier against the passage of heat and/or sound to the full extent of the thickness of the material and type of material specified. Insulation shall be laid continuous over the tops of walls or adjacent rooms. At all ceiling access tiles and ceiling access scuttles insulation shall be neatly fitted around these openings and securely fastened to the top of these access units to allow for operation of same.
- c. Below slab, insulation shall be applied in strict conformance with the manufacturer's recommended installation procedures (latest edition).
- d. Roof insulation shall be placed up tight against roof deck and fixed in place with 18-gauge taut wire system or stapled per NFPA 13.

END OF SECTION  
08/09/2023

**ROOF BOARDS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SUMMARY

- A. Section Includes: Fiberglass-mat faced gypsum roof boards for application directly under roof membrane systems.

## 1.02 REFERENCES

- A. ASTM International (ASTM):
  1. ASTM C209 Standard Test Method for Cellulosic Fiber Insulating Board
  2. ASTM C472 Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete.
  3. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
  4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  5. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  6. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
  7. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
  8. ASTM E108 Standard Test Methods for Fire Tests of Roof Coverings
  9. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 C.
  10. ASTM E661 Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads.
- B. Underwriters Laboratories (UL): UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
- C. [Florida Approvals: Roof boards shall have Florida Product Approval and Miami-Dade County Product Control Approval.]

## 1.03 SUBMITTALS

- A. Product Data and Installation Instructions: Submit manufacturer's product data including installation instructions and substrate preparation recommendations
- B. Sample warranty: Submit a sample warranty identifying the terms and conditions of the warranty as herein specified.

## 1.04 QUALITY ASSURANCE

- A. Inspection: Where applicable, allow for inspection and moisture testing and reporting prior to installation of roof boards.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. All components used in roofing systems, including DensDeck® Roof Boards, shall be protected from exposure to moisture before, during and after installation.
- B. Remove any plastic packaging from roof boards immediately upon receipt of delivery. Failure to remove plastic packaging may result in entrapment of condensation or moisture, which may cause application problems that are not the responsibility of manufacturer
- B. Any protective, plastic factory packaging that is used to wrap roof boards for shipment is intended to provide temporary protection from moisture exposure during transit only and is not intended to provide protection during storage after delivery.
- C. Roof boards stored outside shall be stored level and off the ground and protected by a waterproof covering. Provide means for air circulation around and under stored bundles of DensDeck® Roof Boards. Use adequate supports to keep the bundles flat, level and dry.
- D. Care should also be taken during installation to avoid the accumulation of moisture in the system. Roof boards shall be covered the same day as installed. Avoid application of roof boards during rain, heavy fog and any other conditions that may deposit moisture on the surface, and avoid the overuse of non-vented, direct-fired heaters during winter months.

## 1.06 FIELD CONDITIONS

- A. Application standards where applicable are in accordance with design assembly specifics, system manufacturer requirements and the DensDeck® Technical Guide.
- B. Do not install DensDeck® Roof Board that is moisture damaged. Indications that panels are moisture damaged include, but not limited to, discoloration, sagging, or irregular shape.
- C. Installed DensDeck® Roof Boards shall be dry, with free moisture content of less than 1% using a moisture meter that has been set to the gypsum scale, before applying adhesive, asphalt or membrane.
- D. All components used in roofing systems, including DensDeck® Roof Boards, shall be protected from exposure to moisture before, during and after installation.

**PART 2 PRODUCTS**

## 2.01 MANUFACTURERS:

- A. Georgia-Pacific Gypsum LLC products as specified herein.

## 2.02 FIBERGLASS-MAT FACED GYPSUM ROOF BOARDS:

- A. Fiberglass Mat Faced Gypsum Roof Board:
  1. Acceptable Product: GP Gypsum, DensDeck® Roof Boards.
  2. Thickness: 1/2 inch.
  3. Width: 4 feet.
  4. Length: [8 feet].
  5. Weight: 2.0 lb/sq. ft.
  6. Surfacing: Fiberglass Mat.
  7. Flexural Strength, Parallel (ASTM C473): 80 lbf, minimum.
  8. Flute Span (ASTM E661): 5 inches.
  9. Permeance (ASTM E96): Greater than 35 perms.
  10. R-Value (ASTM C518): 0.56.
  11. Water Absorption (ASTM C473): Less than 10 percent of weight.
  12. Surface Water Absorption (ASTM C473): Nominal 2.5 grams.
  13. Compressive Strength (Applicable Sections of ASTM C472): Nominal 900 pounds per square inch.
  14. Flame Spread/ Smoke Development (ASTM E84): Not more than 0 Flame Spread, 0 Smoke Development
  15. Combustibility (ASTM E136): Noncombustible
  16. Fire resistance rating (UL 790 and ASTM E108): Class A
  17. Mold Resistance (ASTM D3273): Scored a 10

**PART 3 EXECUTION**

## 3.01 INSTALLATION

- A. Apply only as many roof boards as can be covered by a roof membrane system in the same day.
- B. Board edges and ends shall be butted tightly together; do not gap edges or ends.

**Specifier Note:** Select installation type from installation types below:

- C. Adhesive Installation over Thermal Insulation, under Single-Ply Roofing Systems:
  1. Stagger roof board end and edge joints minimum 12" over installed insulation layers.
  2. Stagger roof board end and edge joints minimum 6".
  3. Adhere roof boards over installed insulation using adhesive as recommended by roofing system manufacturer's product data.
  4. Apply overall pressure to ensure full adhesion. Do not slide into place.

- D. Hot-Mopped Installation over Thermal Insulation, under Modified Bitumen Roofing Systems:
1. Stagger roof board end and edge joints minimum 12" over installed insulation layers.
  2. Stagger roof board end and edge joints minimum 6".
  3. Prior to hot-mopping the roof boards to the substrates, ensure that the roof boards are dry, with free moisture content less than 1% by weight using a moisture meter that has been set to the gypsum scale.
  4. Maximum asphalt application temperatures shall be 425°F (218°C) to 450°F (232°C). Application temperatures above these recommended temperatures may adversely affect roof system performance. Consult and follow roofing system manufacturer's specifications for full mopping applications and temperature requirements.
  5. Follow accepted roofing industry guidelines for full mopping applications such as EVT temperature guidelines, brooming and proper application rates of asphalt.
  6. DensDeck® Prime Roof Boards may be flood mopped to a substrate followed by a flood mopped application of membrane using these guidelines:
    - a. Roof boards and substrate shall be dry.
    - b. Asphalt used to install roof boards should be allowed to cool prior to mopping base sheet to top of DensDeck® Prime Roof Boards.
    - c. Allow base ply to cool before mopping additional plies or cap sheet to limit the amount of direct heat that is applied to boards.

### 3.02 PROTECTION

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

### END OF SECTION

08/09/2023

**FIBERGLASS ASPHALT SHINGLE ROOFING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material and appliances required to complete all the work shown on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- a. Fiberglass asphalt shingles
- b. Sheet metal flashings

## 1.03 SUBSTITUTIONS

See Section 10 of these specifications.

## 1.04 GUARANTEE AND BOND

- a. All work specified herein shall be guaranteed in accordance with guarantee provisions included in Section 10, Article 14, Section 10; however, period of guarantee shall be extended to two years.
- b. The roofing contractor shall provide a roofing manufacturer's roof guarantee for a period of Twenty (20) years.

## 1.05 THE ROOF ASSEMBLY SHALL MEET UNDERWRITERS LABORATORIES, INC. OR ASTM REQUIREMENTS FOR FIRE RETARDANT CLASS A.

Fiberglass asphalt - ICC ESR-1475  
 ICC ESR-3267 (AC438)

**PART 2 PRODUCTS**

## 2.01 MATERIALS

- a. Fiberglass Asphalt Shingles:
  1. Underfelt: 2 layers of 15 lb. asphalt saturated fiberglass reinforced felt of shingle underlayment, as manufactured by G.A.F. or approved equal for slopes up to 4 in 12. Over 4 in 12, only one lay is required. G.A.F. "Shingle Mate" or equal.
  2. Shingles: Timberline HDZ fiberglass asphalt fire rated Class A shingles, color as selected, size 13-1/4" x 39-3/8", approximately 235 lbs. per square, weather exposure 5-5/8", as manufactured by G.A.F. or approved equal.
  3. Hip and Ridge Shingles: Timberline "Timbertex," or approved equal.
  4. Nails: 1-1/4" long galvanized large head composite roofing nails with annular or ring shank and large 7/16" diameter integral head i.e. (Stronghold nail).



**PART 3 EXECUTION****3.01 GENERAL REQUIREMENTS**

- a. Workmanship: Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first class workmanlike manner and shall be subject to the approval of the Architect or his representative.
- b. Approvals: An approval for all brands of materials not mentioned herein shall be obtained in writing from the Architect ten days prior to bidding.
- c. Environmental Conditions: Work shall be performed under temperature and climactic conditions recommended by the manufacturer of the materials.
- d. Fire Resistive Requirements: Roofing shall be rated fire-retardant in accordance with requirements of CCR Title 24. Roofing shall be rated Class A by U.L.
- e. Coordination: Coordinate start and execution of roofing application with all other related and adjacent work.
- f. Preparation of Surfaces: The entire roof are shall be swept clean, and knot holes shall be covered with tin and nailed to the sheathing. Applicator shall check all surfaces and report any conditions that will affect roofing application or the final results required. Inspect roof to ensure that the existing roof is dry and no moisture is being trapped. Remove all existing hip and ridge cap shingles.
- g. Cooperation: Roofers, sheet metal men and other tradesmen shall cooperate to assure a complete watertight and perfect job. In the event of a dispute as to the responsibility of any defect, which might develop, the decision of the Architect shall be final and binding on all parties.
- h. Preparation: Contractor shall assure himself that all decks are complete, metal fittings, vents and similar items affecting roofing are in place, all surfaces are free from rough spots and sharp projections, and that the deck is in proper condition to receive the roofing work. The roof deck shall be fine broom clean.
- i. Cleaning Work: Upon completion of this work, the contractor shall clean all roofs and leave same in an acceptable condition.
- j. Cleaning Site: Clean the building and building site of all debris and rubbish caused by the work of this trade.
- k. Samples of each type of roofing material used in the project shall be submitted to Architect for approval upon request. Each sample shall be labeled with manufacturer's name, product name, and applicable ASTM, federal or other specification designation. Test data necessary to substantiate the quality of products shall be submitted when requested by Architect.

**3.02 APPLICATION OF FIBERGLASS SHINGLES**

- a. Asphalt Shingles may be install directly over existing asphaltic shingles. If during the pre-roofing inspection damaged shingles or decking is required to be replaced, replace the damaged decking to match existing, apply two (2) layers of 15 lb. fiberglass reinforced felt by lacing into existing shingles and place shingles to replace the damaged shingles., .
- b. Install underlayment, where required do to damage, by first applying the eave drip flashing and then applying horizontally a 19" strip of felt along the eaves. Non-corrodible metal drip edging shall be used at both the eaves and the rakes; it shall extend back from the edge of the roof 4 inches and be secured with appropriate nails spaced 8" to 10" apart. The 19" starter strip of felt shall overhang the metal drip edge 1/4" at the eaves. Over the felt starter strip, apply a 36" wide strip, this course overhanging the eaves drip edge as the starter strip. Continue with 36" wide strips of felt, each course lapping 19" over the lower course; where end joints meet, lap them 4". Lap the felt 6" from both side over all hips and ridges. Metal drip edging shall be applied at the rakes after

- the underlayment felts are in place. Nail underlayment sufficiently to hold in place.
- c. Shingles shall be applied by first laying, or bridging, a full shingle with 6" trimmed off the butt edge as a starter course, these shingles to project 1/4" to 3/8" over the eaves and rakes. As the first course of field shingles shall be laid directly over the starter course starting at the intersection of eave and rake with a 6" shingle, breaking joints with those below. Start second course so as to leave a 5-5/8" exposure using side lap notches and align butts to top of cut outs in the course below 5-5/8" exposure. Use 4 nails per shingle located 5/8" above the top of the cut out. Place nails 1" and 12" from each end of the shingle. All nailing shall be with 1" length composite nails with annular shank and large flat 7/16" min. diameter head. Along the rake edges, cement shingles to deck and each other with plastic asphalt roof cement.
  - d. Hips and Ridges: Start hip or ridge with a triple thickness of pre-cut hip and ridge shingles. Continue application with double thickness, nailing 5-1/2" back from exposed end of H & R shingle and 1" from bottom of H & R shingle.

### 3.03 PROTECTION

The Contractor shall protect all woodwork and other surfaces against damage by roofers in completing all work of this trade. Heavy concentrations of roofing materials on roof deck are prohibited.

### 3.04 GENERAL WORKMANSHIP

- a. The Roofing Contractor shall cooperate in the installation of all roof jacks, sheet metal aprons, flashing around roof drains, drainage boxes, scuppers and other sheet metal work furnished by heating and ventilating and plumbing trades and specified to be embedded in or between roofing felts. All flashings, jacks, etc shall be lead free.
- b. All roofing felts shall be turned up approximately 4" on all vertical surfaces and flashed as per details.
- c. All roof drains and outlets are applied by others in cooperation with roofing contractor, but are specified under Plumbing and Sheet Metal Sections of the Specifications. All flashings, jacks, etc shall be lead free.
- d. Shingles shall be cut accurately and neatly where cutting is necessary.
- e. Shingles shall be nailed carefully to avoid leaving hammer marks on surface of shingles.
- f. Any application details not specifically detailed herein shall be done in accordance with manufacturer's recommendations.

### 3.05 PRODUCT HANDLING

Materials shall be delivered in original unopened containers and properly protected during delivery to the site. Delivered materials shall be kept in safe dry storage at temperatures above 50 degrees F., but below temperatures that may affect composition of the materials. Prior to installation, materials shall be kept at temperatures suitable for installation and as recommended by the manufacturer.

END OF SECTION  
07/13/2023

**TPO SINGLE PLY ROOFING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1****1.01 RELATED DOCUMENTS**

- A. It is the intent of the following specification to set forth the performance criteria and design parameters for the roofing products and accessories for this facility. Where brand names and/or models are described it is for the purpose of establishing a quality standard, and not to exclude the products of other manufacturer's that comply with these specifications.

**1.02 SCOPE**

Installation of an adhered TPO single ply roofing system.

**A. SECTION INCLUDES**

1. Thermoplastic TPO Membrane Roofing.
2. Membrane Flashings.
3. Metal Flashings.
4. Walkway Pads.

**1.03 RELATED WORK**

- A. Section 06 10 00 - Rough Carpentry: Roof blocking installation and requirements.
- B. Section 07 22 20 – Roof Boards
- C. Section 07 60 00 - Sheet Metal Flashing and Trim: Metal flashing and counter flashing installation and requirements.
- D. Section 22 00 00 - Plumbing Specialties: roof drains, scuppers, gutters and downspout installation and requirements.

**1.04 REFERENCES**

- A. American Society of Civil Engineers (ASCE) - ASCE 7 - Minimum Design Loads for Buildings and Other Structures, Current Revision.
- B. ANSI/SPRI WD-1 "Wind Design Standard for Roofing Assemblies".
- C. ASTM International (ASTM):
  1. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  2. ASTM D 1079 - Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.
  3. ASTM D 4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

4. ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
  5. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- D. Factory Mutual (FM Global):
1. Approval Guide.
    - a. Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.
    - b. Loss Prevention Data Sheets 1-29.
- E. California Building Code (CBC):
- F. National Roofing Contractors Association (NRCA) - Low Slope Roofing and Waterproofing Manual, Current Edition.
- G. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- H. Underwriters Laboratories (UL):
1. TGFU R1306 - "Roofing Systems and Materials Guide".
  2. UL-790 - Standard Test Method for Fire Tests of Roof Coverings.
- I. ANSI/ASHRAE/IESNA Standard 9.1 (2007): Energy Standard for Buildings Except Low-Rise Residential Buildings.

## 1.5 DESIGN CRITERIA

- A. Wind Uplift Performance:
1. Roof system is designed to withstand wind uplift forces of 143psf per ESR-1463 Table 4 when used with Dens Deck Prime on a combustible or non combustible deck.
  2. Fire/Windstorm Classification: FM Class 1A-90
- B. Fire Resistance Performance:
1. Roof system will achieve a UL Class A rating when tested in accordance with UL-790 or ASTM E 108 or FM 4470
- C. Drainage: Provide a roof system with positive drainage where all standing water dissipates within 48 hours after precipitation ends.
- D. Building Codes: Roof system will meet the requirements of all federal, state and local code bodies having jurisdiction.

## 1.6 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations.
  2. Storage and handling requirements and recommendations.

3. Installation methods.
- C. Samples for Verification: For the following products:
1. Manufacturer's standard sample size of sheet roofing, of color specified including T-shaped side and end lap seam.
  2. Manufacturer's standard sample size of walkway pads or rolls.
  3. Manufacturer's standard sample size of metal termination bars.
  4. Manufacturer's standard sample size of cover board.
  5. Manufacturer's standard sample size of insulation board.
  6. Insulation fasteners of each type, length and finish.
  7. Roof cover fasteners of each type, length and finish.
  8. Fasteners of each type, length and finish used for complete roofing installation.
- D. Detail Drawings:
1. Submit approved plan, section, elevation or isometric drawings which detail the appropriate methods for all flashing conditions found on the project.
    - a. Flashings and membrane terminations.
    - b. Sheet layout with perimeter and corner defined.
  2. Coordinate approved drawings with locations found on the Contract Drawings.

## 1.2 QUALITY ASSURANCE

- A. Installer Qualifications:
1. All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
  2. Installer must be approved, authorized or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the manufacturer's NDL warranty.
- B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing systems identical to that used for this project.
- C. Testing Agency Qualifications: An independent testing agency with experience and capability to conduct the testing indicated, as documented according to ASTM E 548.
- D. Test Reports:
1. Roof drain and leader test or submit plumber's verification.
  2. Core cut (if requested).

- E. Source Limitations: Obtain all components from a single source roofing manufacturer.
- F. Fire-test response characteristics: provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
- G. Preliminary Roofing Conference: Before starting roof deck construction, conduct at project site. Comply with requirements for preinstalling conferences in Division 01 section "project management and coordination." Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
  3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
  4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  5. Review structural loading limitations of roof deck during and after roofing.
  6. Require that all complimentary trades be present at conference. Including, but not limited to: Electrical, plumbing, HVAC, and framing contractors.
  7. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  8. Review governing regulations and requirements for insurance and certificates if applicable.
  9. Review temporary protection requirement for roofing system during and after installation to protect from damage during construction.
  10. Review roof observation and repair procedures after roofing installation.
- H. Pre-installation Conference: Conduct conference at Project site. Comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.

2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirement for roofing system during and after installation to protect from damage during construction.
9. Review roof observation and repair procedures after roofing installation.

### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacturer, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacture's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
- E. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
- F. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- G. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.

### **1.8 PROJECT CONDITIONS**

- A. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the

work to proceed in accordance with the manufacturer's requirements and recommendations.

- B. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage.
- C. Provide protection, such as  $\frac{3}{4}$  inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- D. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- E. New roofing shall be complete and weather tight at the end of the workday.
- F. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

## **PART 2 PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Carlisle TPO
- B. Johns Manville TPO Roofing System
- C. Garland Kee-Stone FB 60 Versico TPO Roofing System.

### **2.2 SCOPE / APPLICATION**

- A. Roof System: Provide a waterproof roof system, capable of withstanding uplift forces as specified in the Design Criteria article of this section.
  - 1. Install a tapered insulation board, hot mopped to concrete deck.
  - 2. Adhere Fleeceback TPO in water-based adhesive to the cover board.
- B. Base Flashing: Provide a waterproof, fully adhered base flashing system at all penetrations, plane transitions and terminations.
- C. Install Securedge or equal ES-1 Pre-manufactured metal edging per manufacturer's design and specs.
- D. Pipe penetrations, flash per Carlisle design and specs.
- E. Install all drain details per Carlisle design and specs.
- F. All sleepers must be replaced with a separation sheet placed under between the roofing membrane and the support.
- G. All membrane terminated on curbs or parapets must be installed per Carlisle design and specs.
- H. Install walk pad per plans and as needed.



**2.3 MEMBRANE**

- A. Furnish Sure-Weld 115-mil reinforced TPO Membrane. Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal .024-mil or thicker.
- B. Membrane with white color shall have an initial SRI (solar reflectance index) not less than 86 in accordance with ASTM E 1980.
- C. Required Membrane Properties and Testing Results

<u>ASTM</u>	<u>Test Standard</u>	<u>Carlisle Sure Weld TPO Properties</u>
ASTM D 751	Thickness	.115
ASTM D 751	Breaking Strength	450 lbf
ASTM D 751	Elongation at Break	25%
ASTM 3045	Heat Aging- 56 days @ 176 F	Pass
ASTM D 751	Tearing Strength	100 lbf
ASTM G 154	Accelerated Weathering (5000 hours Xenon Arc)	No cracking or erosion
ASTM D 570	Water Absorption (166 hours)	2%
ASTM D 5602	Static Puncture	Exceeded Standards
ASTM D 5635	Dynamic Puncture	22.5
ASTM C 1549	Solar Reflectance	.79
ASTM C 1371	Thermal Emittance	.90
ASTM E 408	Thermal Emissivity	.94
ASTM E 1980	Solar Reflectance Index (SRI)	99

**2.4 FLASHING ACCESSORIES**

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld membrane or Sure-Weld reinforced membrane. Sure-Weld non-reinforced membrane can be used for flashing pipe penetrations, Sealant Pockets, and scuppers, as well as inside and outside corners, when the use of pre-molded accessories is not feasible.

- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.
- C. CCW 200v- a non-woven polypropylene mat used as a cushion/ break layer when substrate surface is rough and/or consists of material that is incompatible with installed membrane.

## 2.5 CLEANERS, PRIMERS, ADHESIVES AND SEALANTS

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

- A. **Fast Adhesive:** A low-rise, two-component, insulating polyurethane.
- B. **Cav-Grip:** Is a multi-purpose contact adhesive/primer for priming unexposed asphalt.
- C. **Water Cut-Off Mastic:** Used as mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).
- D. **Universal Single-Ply Sealant:** A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counter flashing, coping, and scupper details.
- E. **1168 Low VOC Bonding Adhesive:** A contact adhesive for adhering TPO membrane. Can be used for adhering base flashings at parapet walls and curbs.
- F. **Hydrobond:** A water based adhesive for adhering fleece back membranes and PVC membranes. It is a one-sided dispersion adhesive.
- G. **TPO LOW VOC Membrane Cleaner:** Used to prepare membrane that has been exposed to the elements for approximately 7 days prior to heat welding or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

## 2.6 EDGINGS AND TERMINATIONS

- A. Sure-Weld Coated Metal: 4 foot by 10 foot coated metal sheets made from 24 gauge galvanized steel with a minimum .035 inch (0.9mm) thick non- reinforced Sure-Weld laminate. Sure-Weld membrane can be welded directly to the Sure-Weld Coated Metal in accordance with the manufacturer's detail. Color to match membrane.
- B. SecurEdge – ES 1 certified metal edging for fascia and coping metals.
- C. Sure -Seal Termination Bar: 1 inch (13 mm) wide, .098 inch (2.5mm) thick extruded aluminum bar pre-punched 6 inches (152 mm) on center with sealant ledge to support Lap Sealant.

**PART 3 EXECUTION****3.1 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.

**3.2 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.

**3.3 INSULATION INSTALLATION**

- A. Install insulation or membrane underlayment in multiple layers over the substrate with boards butted tightly together with no joints or gaps greater than 1/4 inch (6 mm). Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure insulation to the substrate with the required mechanical fasteners or insulation adhesive in accordance with the manufacturer's current application guidelines.
- C. Do not install wet, damaged or warped insulation boards.
- D. Stagger joints in one direction unless joints are to be taped. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch (6 mm). Fill all gaps in excess of 1/4 inch (6 mm) with same insulation material.
- E. Wood nailers must be at least 3 1/2 inches (89 mm) wide or 1 inch (25 mm) wider than adjacent metal flange. Thickness must equal that of insulation but not less than 1 inch (25 mm) thickness.
- F. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.
- G. Do not install any more insulation than will be completely waterproofed each day.

**3.4 MEMBRANE PLACEMENT AND ATTACHMENT**

- A. Position Sure-Weld fleece back TPO membrane over the acceptable substrate.

1. Apply Carlisle's Hydrobond adhesive in accordance with the manufacturer's published instructions, to the corresponding substrate area. Roll the membrane into the adhesive on the substrate while wet.
  2. Roll membrane with a weighted roller, into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
- B. Position adjoining sheets to allow a minimum overlap of 2 inches.

### 3.5 SEAM WELDING

- A. Clean seam areas, overlap roofing membrane and Hot-air weld membrane using an Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's current guidelines. At all splice intersections, roll the seam with a silicone roller to ensure a continuous hot air welded seam.
- B. Overlay all splice intersections with Sure-Weld T-Joint Cover.
- C. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
- D. Repair all seam deficiencies the same day they are discovered.

### 3.6 FLASHING

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld reinforced membrane or prefabricated accessories. Sure-Weld non-reinforced membrane may be used for flashing pipe penetrations, Sealant Pockets, and scuppers, as well as inside and outside corners, when the use of pre-molded or prefabricated accessories is not feasible.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

### 3.7 WALKWAYS

- A. Install Carlisle – Sure-Weld TPO Walkways (Color: White) at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the Contract Drawings.
- B. Hot-air weld walkway pads to the membrane in accordance with the manufacturer's current application guidelines.
- C. Roof-Paver Walkways: Install walkway roof pavers according to manufacturer's written instruction in locations indicated, to form walkways. Leave 3 inches of space between adjacent roof pavers.
- D. Walkways are not to be installed over membrane seams.

### 3.8 DAILY SEALS

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the workday, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

**3.9 CLEAN UP**

- A. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

**3.10 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof inspection: Arrange for roofing system manufacturer's inspector to inspect roofing installation on completion and submit report to the Architect.
- C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

**3.11 PROTECTION**

- A. Protect installed products until completion of project from damage and wear during remainder of construction period.
- B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

12/02/2020

**SHEET METAL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this section shall include all fabrication, labor, material, appliances and transportation required to complete the work indicated on the drawings and/or specified hereunder.

1.02 WORK INCLUDED

- a. All galvanized sheet metal work, such as flashing

1.03 SUBSTITUTIONS

See Div. 0, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

1.04 WORKMANSHIP

- a. Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first class workmanlike manner and shall be subject to the approval of the Architect or his representative. The contractor shall report to the Architect any improper or defective surfaces and shall not commence work until defective surfaces are corrected.

1.05 COOPERATION

Sheet metal men, and other trades, shall cooperate to obtain a completely watertight and perfect job. In the event of a dispute as to the responsibility of any defect, which might develop, the decision of the Architect shall be final and binding on all parties. The contractor shall consult the various tradesmen whose work adjoins his work, and he shall be responsible for the proper alignment and working of all the various details. The Sheet Metal Sub-contractor shall cooperate with contractor to ensure a watertight installation of all flashing and other sheet metal work furnished under this section to ensure issuance of manufacturer and contractor guarantees and warranties.

**PART 2 PRODUCTS**

2.01 GALVANIZED SHEET STEEL

Galvanized sheet steel shall be as manufactured by BMG Metals, Inc. Cal Strip Industries or approved equal, in quality and utility. All material shall be 24-gauge minimum or called for in the Specifications. All material shall be copper bearing and heavily galvanized. Sheet metal shall be 1.25 oz./sq. ft., hot dipped galvanized coating conforming to standards as set forth in ASTM A-653/653M Equals: Galvanized sheet steel conforming to ASTM A-653/653 M G90 or better hot dipped galvanized coating.

2.02 SOLDER

Solder shall be lead free.

2.03 NAILS

Nails shall be galvanized and selected for their intended use.

2.04 SCREWS

Screws shall be cadmium plated oval head sheet metal screws.

2.05 WASHERS

Washers shall be 4# lead washer 1" diameter.

2.06 RIVETS

Rivets shall be soft annealed non-corrosion metal.

2.07 MASTIC

No. 204 Henry's Plastic Roof Cement.

**PART 3 EXECUTION**

3.01 PRACTICE

Procedures and methods recommended by "National Association of Sheet Metal Contractors" shall be followed insofar as they do not conflict with the requirements of the Uniform Building Code Standards and Title 24, Part 2 C.B.C. 2022 edition. Work shall be accurately formed to sizes, shapes and dimensions indicated and detailed; with all angles and lines in true alignment, straight sharp, erected plumb, level and in proper plane without bulges or waves. Pipe or flange intersections to accurately fit and solder together.

3.02 MEASUREMENTS

The Contractor shall take measurements at the building site and verify the dimensions indicated on the drawings.

3.03 ACCURACY AND TOLERANCE

All sheet metal work shall be accurately worked to shape and sizes indicated on the drawings and/or as required by the Architect. The allowable tolerance on detailed sheet metal work shall not exceed 1/16" in ten feet (10'-0")

3.04 COMPLETENESS

The Contractor shall form, fabricate and erect all sheet metal work to perform satisfactorily and to be watertight and weather tight.

**3.05 EXPOSED EDGES**

All exposed edges shall be turned back and hemmed 1/2" wide.

**3.06 EXPANSION AND CONTRACTION**

Provisions shall be made in all cases for expansion and contraction.

**3.07 NAILS**

All nails in connection with galvanized sheet metal shall be galvanized.

**3.08 FLASHING AND COUNTERFLASHING**

24 gauge galvanized iron in lengths in general of ten feet (10'-0") with no longitudinal joints. The joints in flashing and counter flashing generally shall not be soldered but shall be set in mastic so that expansion and contraction may occur without buckling. Wall type counter flashing over mopped or composition roofing at walls shall be removable counter flashing except roof flashing specified under individual roofing section of the Specifications. Internal and external angle returns shall be one piece extending twelve inches (12") each way from the corner.

**3.09 MISCELLANEOUS**

The contractor is referred to plans and detail drawings for all miscellaneous sheet metal work not specifically called for in these specifications, but shown and detailed, and he shall furnish and install same. The contractor shall flash vent pipes and provide and install co-related vents and ductwork in cooperation with other trades as specified in other sections of these Specifications.

END OF SECTION  
08/05/2022



**SPRAYED ON FIREPROOFING**

DIVISIONS 0 AND 1 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

- a. Work under this section consists of the furnishing of all labor, materials and equipment necessary for and incidental to the complete and proper installation of all sprayed fireproofing and related work as shown on the drawings or specified herein, and in accordance with all applicable requirements of the Contract Documents.
- b. The material and installation shall conform to the applicable building code requirements, and the requirements of all authorities having jurisdiction.

## 1.02 WORK INCLUDED

Work shall include all direct application of sprayed fireproofing to all structural steel and steel decks. Surfaces shall be approved for fireproofing by contractor, licensed by the fireproofing materials manufacturer.

## 1.03 RELATED WORK SPECIFIED ELSEWHERE

- a. Clips, hangers, supports, sleeves, and other attachments to the fireproofing bases, as covered under other sections of the specifications, are to be placed by other trades prior to the application of the fireproofing material, when such installations can be anticipated in advance.
- b. Ducts, piping, conduit or other suspended equipment that could interfere with the uniform application of the sprayed fireproofing are to be positioned after the application of the sprayed fireproofing, unless fireproofing applicator agrees to their installation prior to fireproofing.

## 1.04 QUALITY ASSURANCE

- a. Sprayed-on fireproofing work shall be performed by a firm having experience in the installation of similar materials to those specified herein in projects comparable to this project. The firm shall be licensed or otherwise approved to apply the specified material by the manufacturer of said materials. Minimum fireproofing thickness needed to achieve required fire-resistance rating of each structural component and assembly.
- b. Before proceeding with fireproofing work, approvals of the proposed materials, densities and thicknesses shall be obtained from the architect and other necessary authorities.
- c. Fire-Endurance Ratings: All products shall have been tested in accordance with ASTM 119 (or OUR 263, ANSI A2.1 or NFPA 251) for fire-resistance and rated by U.L. or other agencies referenced in 1.05 of this Section.

## 1.05 REFERENCES/TESTS

- a. ASTM Standards:  
E 119: Fire Tests of Building Construction and Materials.

- E 736: Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- E 759: Effect of Deflection of Sprayed Fire-Resistive Material Applied to Structural Members
- E 760: Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members.
- E 761: Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members.
- E 605: Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members.
- E 84: Surface Burning Characteristics of Building Materials
- E 136-73: Non-Combustibility of Elementary Materials
- E 859: Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members
- E 937: Corrosion of Steel by Sprayed Fire-Resistive Material Applied to Structural Members.
- b. Underwriters Laboratories, Inc.: (U.L.) Fire Resistance Directory.
- c. AWCI Publication: Inspection Procedure for Field-Applied Sprayed Fire Protection Materials.
- d. IBC International Building Code-Chapter 17 Structural tests and Special Inspections, Section 1705 Special Inspections

#### 1.06 SUBMITTALS

- a. Manufacturer's Data: Submit manufacturer's specifications, and include certification from materials manufacturer as may be required to show material compliance with Contract Documents. Include certification from manufacturer, signed by an officer of the firm, stating that the proposed material is totally free of all forms of asbestos, including actinolite, armosite, anthophyllite, chrysotile, crocidolite and tremolite.
- b. Test Data: Laboratory test results for sprayed fire proofing shall be submitted for the following, upon request.
  - 1. Corrosion Resistance per ASTM E 937
  - 2. Deflection per ASTM E 759.
  - 3. bond impact per ASTM E 760.
  - 4. Compressive Strength per ASTM E 761.
  - 5. Bond Strength per ASTM E 736.
  - 6. Air Erosion per ASTM E 859.
  - 7. Surface Burning Characteristics per ASTM E 84.
- 8. Non-Combustibility per ASTM E 136-73.
  - c. Submit laboratory test reports and/or engineering studies in accordance with ASTM E 119, indicating fire endurance as required to satisfy codes or other requirements. Extracts of classified listings of such tests performed by Underwriter's Laboratories, Inc. (U.L.I.) of Northbrook, Illinois.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- a. Deliver materials to project site in manufacturer's unopened containers or packages, fully identified as to trade name, type, grade or other identifying data, and bearing the UL label where required. Store materials above ground, indoors, in a dry location, which shall be protected from weather.
- b. Damaged packages found unsuitable for use will be rejected and shall be removed from the jobsite.

#### 1.08 ENVIRONMENTAL CONDITIONS

- a. When the prevailing outdoor temperature at the building is less than 40°F (4°C), substrate and ambient temperature of 40°F (4°C) shall be maintained for 24 hours before, during and 24 hours after application of sprayed fireproofing. If necessary for job progress, provide enclosers with heat to maintain temperatures.
- b. Provide necessary ventilation to properly dry the sprayed fireproofing during and subsequent to its application.

#### 1.09 SEQUENCING/SCHEDULING

- a. Work under this section shall be properly coordinated with other trades.
- b. The Contractor shall cooperate in the coordination and scheduling of the Work of this Section to avoid delays in job progress.

### PART 2 PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

Products shall meet the requirements of 1.04 of this specification and produced by one of the following manufacturers.

- a. Cafco Brand, by Isolatek International, Netcons, N.J.
- b. Grefco Inc., Los Angeles, CA.
- c. Mandoval Vermiculite Products, Inc., Houston, Tx.
- d. Johns-Manville Corp., Denver, CO.
- e. American Energy Products Corp., Covina, CA
- f. Grace Construction Products-Monokote

#### 2.02 MATERIALS

Sprayed fireproofing shall be either sprayed mineral fiber, or a sprayed on cementitious aggregate fireproofing system. (Both shall be certified "asbestos free".)

The fire-resistance design as indicated on drawings is based on CAFCO 300 Series and is tested in accordance with ASTM E 119/UL263. All steel members are to be considered unrestrained unless specially noted otherwise.

- a. Sprayed mineral fiber systems shall be equal to "CAFCO 300 Series" or "Blaze-shield II" as manufactured by Isolatek.
- 1. Mineral Fiber System:
  - (a) Material shall meet requirements of Federal Specification SS-S-1118. Type II, factory mixed mineral fibers with integral inorganic binders, except as modified herein and having the following characteristics:
    - (1) Minimum average applied density of 13 lbs/ft. (208 kg/m<sup>3</sup>) for Type II materials, or as otherwise stated in applicable test criteria [15 lbs./ft. (240 kg/m<sup>3</sup>) Federal Spec. only.]
    - (2) Deflection: Material shall not crack or delaminate when the backing to which it is applied is subjected to a downward deflection of 1/120th of the span when tested in accordance with ASTM E 759.
    - (3) Bond Impact: Material subject to impact tests in accordance with ASTM E 760 shall not crack or delaminate from the surface to which it was applied. The test shall consist of a 60 lb. (27.3 kg) sand bag dropped from a height of 4'-0" (1.2m) onto the test specimen.

- (4) Bond Strength: Material applied over uncoated or galvanized steel shall be air dried to equilibrium and have a minimum average bond strength of 150 pounds per square foot (7.18kPa) when tested in accordance with ASTM E 736.
- (5) Density: Not less than 15lb/cu ft (240 kg/cu m) as specified in the approved fire resistance design according to ASTM E 605.
- (6) Thickness: As required for fire resistance design indicated measured according to requirements of the fire resistive design.
- (7) Corrosion Resistance: Duplicate sets of bare, shop coated and galvanized steel sheets shall be coated with the sprayed fire protection material and tested in accordance with ASTM E 937.
- (8) Air Erosion: Material shall not be subject to losses from the finished application greater than 0.025 g/ft. (.269 g/m<sup>2</sup>) when subjected to a tangential air stream when tested in accordance with ASTM E 859.
- (9) Compressive Strength: Material shall be subjected to a crushing load normal to the surface of a sample specimen in accordance with ASTM E 761, and shall have a minimum compressive strength of 1,440 lb./ft. (68.9kPa) when compressed to a deformation of 10% or when ultimate load is reached, whichever occurs first.
- (10) Non-Combustibility: Material to be applied shall be noncombustible when tested in accordance with ASTM E136.
- (11) Surface Burning Characteristics: Test samples, when tested in accordance with the ASTM E84 tunnel test, shall exhibit the following surface burning characteristics:

Flame Spread . . . . . 10  
Smoke Developed . . . . . 0

- (b) Sprayed-On Cementitious Aggregate System shall be equal to "Mandoval Vermiculite Products, Inc. Sprayed-On Cementitious Aggregate Fireproofing (So-Ca-Fpr): Perlite or Vermiculite Aggregate, inorganic cement, and manufacturer's asbestos-free fiber reinforcement, fillers and additives for spray-on application, mixing with water and with air at the spray nozzle. For forming a rigid, porous, noncombustible covering of uniform density and thickness as indicated, applied in one or more courses to provide fire endurance rating required, and passing ASTM E 136 test, and ASTM E 84, flame spread 5, smoke developed 0. Either system shall meet or exceed the minimum requirements of all tests listed in 1.05 of this Section and shall be applied in the density and thickness required for the following hourly rating requirements:

Beams	3 hour
Purlins	2 hour
TS Cols	3 hour
Main Roof Deck	1 hour
Roof Well	2 hour

**PART 3 EXECUTION**

3.01 PREPARATION

- a. All surfaces to receive fireproofing shall be free of oil, grease, loose mill scale, dirt, paints/primers, or other foreign materials, which would impair satisfactory bonding to the surface. Any cleaning of surfaces to receive sprayed fireproofing shall be the responsibility of the General Contractor or Steel Erector, as outlined in the structural steel or steel deck section.

- b. Clips, hangers, supports, sleeves, and other attachments to the substrate are to be placed by others, prior to the application of sprayed fireproofing.
- c. The installation of ducts, piping, conduit, or other suspended equipment shall not take place until the application of sprayed fireproofing is complete in an area.

### 3.02 APPLICATION

- a. Equipment, mixing, and application shall be in accordance with the manufacturer's written application instructions.
- b. Sprayed fireproofing shall not be applied to steel floor decks prior to the completion of concrete work on that deck.
- c. The application of sprayed fireproofing to the underside of roof deck assemblies shall not commence until the roofing is completely installed and tight, and after roof, traffic has ceased.
- d. Provide masking, drop cloths or other suitable coverings to prevent overspray from resting on surfaces not intended to be sprayed.
- e. Adhesive (Cafco Bond Seal) shall be applied as per the appropriate UL fire resistance design and manufacturer's recommendation to the surface of roof deck (without concrete).
- f. The application of sprayed fireproofing shall not commence until certification has been received by the General Contractor indicating that surfaces to receive sprayed fireproofing have been inspected by the applicator and are acceptable to receive sprayed fireproofing.

### 3.03 REPAIRING AND CLEANING

- a. All patching of and repair to sprayed fireproofing, due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage.
- b. After the completion of the work of this section in an area, equipment shall be removed from that area, and all surfaces not to be sprayed shall be cleaned of all deposits of sprayed fireproofing material. All floor areas shall be broom cleaned.

### 3.04 INSPECTION AND TESTING

- a. The sprayed fireproofing shall be tested for thickness and density in accordance with one of the following procedures:
  - 1. ASTM E805 - Standard Test method for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
  - 2. AWCI - Inspection Procedure for Field-Applied Sprayed Fire Protection Materials.
  - 3. IBC International Building Code-Chapter 17 Structural tests and Special Inspections, Section 1705 Special Inspections

### 3.05 GUARANTEE

- a. Special Project Guarantee: Submit written guarantee, executed by Contractor, agreeing to repair/replace fireproofing work of this section, which has cracked, flaked, dusted excessively, peeled or fallen from substrate, or otherwise deteriorated to a condition where it would not perform effectively as intended for fireproofing purpose; due substantially to defective materials or workmanship and not due to abuse by occupants, improper maintenance, nonforseeable ambient exposures, or other causes beyond anticipated conditions and

Contractor's/Installer's control. Guarantee period is 2 years after date of substantial completion.

END OF SECTION  
05/22/2024

## CAULKINGS AND SEALANTS

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

### PART 1 GENERAL

#### 1.01 SCOPE OF WORK

- a. The work of this Section includes caulking and sealing all joints where shown on the drawings and elsewhere as required to provide a positive barrier against passage of moisture.
- b. Related work described elsewhere: Adhere strictly to the caulking and sealant details shown on the drawings.

#### 1.02 WORK INCLUDED (But not limited to the following):

- a. Caulking as specified hereafter except for those items specifically mentioned under another section.
- b. Caulking of all exterior cracks, and joints in, metal, flashing, to provide a watertight and weatherproof seal.
- c. Polyurethane sealants in conjunction with expansion joints.
- d. Joint filler material.
- e. Backing rod materials.
- f. Surface preparation and priming.
- g. Mixing.
- h. Application and curing.

#### 1.03 RELATED WORK

- a. Flashing and Sheet Metal:

#### 1.04 REFERENCES

- a. ASTM C-920: Recommended Practices for Use of Elastomeric Joint Sealants.
- b. ASTM C-804: Recommended Practice for Use of Solvent-Release Type Sealants.
- c. ASTM D-1056: Flexible Cellular Materials - Sponge or Expanded Rubber.
- d. ASTM D-1565: Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open Cell Foam).
- e. FS TT-S-227: Sealing Compounds, Polyurethane Base, Multi Component, Chemically Curing.
- f. FS TT-S-230: Sealing compounds synthetic - rubber base, single component, chemically curing.

#### 1.05 GUARANTEE

Contractor shall guarantee to maintain all caulking in a watertight condition for a period of two (2) years and remove and replace sealants, which fail due to a loss of adhesion or cohesion or incomplete cure, bubbling, etc.

#### 1.06 SUBMITTALS

- a. **Manufacturer's Data:** Submit the following for review by the Architect, per Section 01301:
  - 1. A complete materials list showing all items proposed to be furnished and installed under this Section.
  - 2. Sufficient data to demonstrate that all such materials meet or exceed the specified requirements.
  - 3. Specifications, installation instructions, and general recommendations from the materials manufacturers showing procedures under which it is proposed that the materials will be installed.

**1.07 PRODUCT HANDLING**

- a. **Delivery and Storage:** Deliver all materials of this Section to the job site in the original unopened containers with all labels intact and legible at time of use. Store only under conditions recommended by the manufacturers. Do not retain on the job site any material, which has exceeded the shelf life recommended by its manufacturer.
- b. **Protection:** Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.
- c. **Replacements:** In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Architect and at no additional cost to the Owner.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- a. Sika Corporation
- b. Tremco Commercial Sealants
- c. BASF Corporation
- d. Georgia Pacific Company
- e. P.P.G. Industries
- f. Approved Equals

**2.02 SEALANTS**

- a. Provide the following materials manufactured by Products Research & Chemical Corporation, or equals approved by the Architect, where indicated and where otherwise required for a complete and proper installation:

	<u>Material</u>	<u>Location of Use</u>
1.	Sikaflex 150 Vulkem Dymonic 100 Masterseal NP 100	Throughout the Work, except where other sealant is specified, where anticipated joint movement will be 50% or less;
2.	Sikaflex 1a Vulkem 116 Masterseal NP 1	Throughout the Work, except where other sealant is specified, where anticipated joint movement will be 25% or less;
3.	Sikaflex 2cSL Sonneborne MP2 Vulkem 445 SSL Masterseal SL1/2	Horizontal joints exposed to pedestrian and vehicular traffic, and all joints subject to immersion



4. Sikaflex 150                      Vertical and horizontal joints subject to extreme movement;  
Masterseal NP100  
Spectrem 800
5. Gyproc 90 Fire Halt            Pipes and conduits penetrating fire separations;  
PR-812 Firewall sealant
6. Polyethylene backer rod where required to prevent 3-point adhesion.
  - a.     For other services, provide products especially formulated for the proposed use and approved by the Architect.
  - b.     Colors:
    1.     Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturer.
    2.     Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.
    3.     In concealed installations, and in partially or fully exposed installations where so approved by the Architect, use standard gray or black sealant.

#### 2.03 PRIMERS

Use only those primers, which have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

#### 2.04        BACKUP MATERIALS

Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, and which are nonabsorbent and nonstaining.

#### 2.05 BOND PREVENTIVE MATERIALS

Use only one of the following as best suited for the application and as recommended by the manufacturer of the sealant used.

- a.     Polyethylene tape, pressure sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated.
- b.     Aluminum foil conforming to MIL-SPEC-MIL-A-148E.
- c.     Wax paper conforming to Fed. Spec. UU-P-270.

#### 2.06 MASKING TAPE

For masking around joints, provide masking tape conforming to Fed. Spec. UU-T-106c.

#### 2.07 OTHER MATERIALS

All other materials, not specifically described, but required for complete and proper caulking and installation of sealants, shall be first quality of their respective kinds, new, and as selected by the Contractor subject to the review by the Architect.

**PART 3 EXECUTION****3.01 INSPECTION**

Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

**3.02 QUALITY ASSURANCE**

- a. **Qualifications of Manufacturers:** Products used in the work of this section shall be produced by manufacturers regularly engaged in manufacture of similar items with a history of successful production acceptable to the Architect.
- b. **Qualifications of Installers:**
  - 1. Proper caulking and proper installation of sealants require that installers be thoroughly trained and experienced in the necessary skills and thoroughly familiar with the specified requirements.
  - 2. For caulking and installation of sealants throughout the work, use only personnel who have been specifically trained in such procedures and who are completely familiar with the joint details shown on the drawings and the installation requirements called for in this section.

**3.03 PRODUCT HANDLING**

- a. **Delivery and Storage:** Deliver all materials of this section to the job site in the original unopened containers with all labels intact and legible at time of use. Store only under conditions recommended by the manufacturers. Do not retain on the job site any material, which has exceeded the shelf life recommended by its manufacturer.
- b. **Protection:** Use all means necessary to protect the materials of this section before, during, and after installation and to protect the work and materials of all other trades.
- c. **Replacements:** In the event of damage, immediately make all repairs and replacements necessary to the satisfaction of the Architect and at no additional cost to the Owner.

**3.04 PREPARATION**

- a. All surfaces in contact with sealant shall be dry, sound, and well brushed and wiped free from dust.
- b. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
- c. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing
- d. Remove all laitance and mortar from joint cavities.
- e. Where joint filler is required, insert the approved backup material in the joint cavity to the depth required to provide required width/depth ratio.

**3.05 INSTALLATION OF BACKUP MATERIAL**

Use only joint filler material recommended by the manufacturer of the sealant and reviewed by the Architect for the particular installation, compressing the backup material

25% to 50% to secure a positive and secure fit. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock. Use semi rigid filler material with minimum shore hardness of at least 80 for control joint filler, type.

### 3.06 PRIMING

Use only the primer recommended by the manufacturer of the sealant and reviewed by the Architect for the particular installation. Apply the primer in strict accordance with the manufacturer's recommendations as reviewed by the Architect.

### 3.07 BOND BREAKER INSTALLATION

Install a bond breaker where recommended by the manufacturer of the sealant and where directed by the Architect, adhering strictly to the installation recommendations as reviewed by the Architect.

### 3.08 INSTALLATION OF SEALANTS

- a. Prior to start of installation in each joint, verify the joint type and verify that the required proportion of width of joint to depth of joint has been secured.
- b. Equipment: Apply sealant under pressure with hand or power-actuated gun or other appropriate means. Guns shall have nozzle of proper size and shall provide sufficient pressure to completely fill joints as designed.
- c. Masking: Thoroughly and completely mask all joints where the appearance of sealant on adjacent surfaces would be objectionable.
- d. Installation of Sealant: Install the sealant in strict accordance with the manufacturer's recommendations as reviewed by the Architect, thoroughly filling all joints to the recommended depth, typically flush with surface.
- e. Tooling: Tool all joints to the profile shown or as directed by Architect.
- f. Cleaning Up:
  1. Remove masking tape immediately after joints have been tooled.
  2. Clean adjacent surfaces free from sealant as the installation progresses. Use solvent or cleaning agent as recommended by the sealant manufacturer.
- g. Provide temporary protection/cover for caulking/sealant as required to prevent debris from becoming fouled in material.

END OF SECTION  
06/27/2012

**METAL DOORS AND FRAMES**

DIVISIONS 00 & 01 ARE A PART OF THIS SECTION

**PART 1 - GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, and appliances required to complete the metal door and framework indicated on the drawings and specified hereunder .

## 1.02 WORK INCLUDED

1. Hollow Metal Frames.
2. Hollow Metal Doors.
3. Hollow Metal Window Frames.

## 1.03 RELATED SECTIONS

1. Section 08 14 20 - Wood Doors
2. Section 08 71 00 - Finish Hardware.
3. Section 08 81 00 – Glass and Glazing.
4. Section 09 91 00 - Painting.

## 1.04 REFERENCES:

- A. ASTM E152, Fire Tests of Door Assemblies.
- B. ASTM A525, specification for Steel Sheet, Zinc Coated.
- C. ANSI/SDI 100, Recommended Specifications for Standard Steel Doors and Frames.
- D. ANSI/SDI 119, Performance test Procedures for Steel Door Frames and Anchors.
- E. NFPA 80, Standard for Fire Doors and Windows.
- F. NFPA 101, Life Safety Code.
- G. ANSI A151.1, Test Procedure, and Acceptance Criteria for Physical Endurance, Steel Doors, and Frames.
- H. ANSI A224.1, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
- I. SDI 107, Hardware on Steel Doors, Reinforcement Application.
- J. Applicable model building code.
- K. California Title 24.
- L. L/L IOC Standard for positive pressure fire test.
- M. UBC 7-4, Fire Tests of Window Assemblies.

## 1.05 SUBSTITUTIONS &amp; SUBMITTALS:

- A. Shop Drawings: Submit six copies. Indicate door and frame elevations, sections, materials, gauges, finish, fabrication/erection details, locations of hardware and vision lites and louvers.
- B. Certification of Compliance: Provide letter of certification that all materials comply with these Specifications.

- C. Samples: Submit as requested by Architect. Samples shall be returned after review.
- D. Substitutions: Make substitution requests in accordance with Article 19, Section 10. Architect reserves the right to access an hourly fee to review and evaluate substitutions.

1.06 QUALITY ASSURANCE:

- A. Steel Door and Frame Supplier: direct factory supplier who employs a Certified Door Consultant (CDC) or person with equivalent experience, available at reasonable times during course of Work, for consultation to Owner, Architect, and Contractor.
- B. Label Construction: A physical label or approved marking shall be affixed to the fire door or fire door frame at an authorized facility as evidence of compliance with procedures of the labeling agency.

1.07 DELIVERY, STORAGE, AND HANDLING:

- A. Delivery: coordinate delivery to the appropriate locations (shop or field) for installation.
- B. Storage of Doors: Doors shall be stored in an upright position under cover. Place the units on at least 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately. Provide a 1/4" (6.35 mm) space between the doors to promote air circulation.
- C. Storage of Frames: Frames shall be stored under cover on 4" (101.6 mm) wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters, which create a humidity chamber and promote rusting. Assembled frames shall be stored in a vertical position, five units maximum in a stack. Provide a 1/4" (6.35 mm) space between frames to promote air circulation.
- D. Inspect delivered items for damage. Minor damage may be repaired provided repaired items are equal to new Work and accepted by the Architect. Provide new items when directed. Comply with VOC regulations when repairing damage.

1.08 SEQUENCING AND SCHEDULING

- A. Deliver doors and frames to the jobsite in a timely manner so not to delay progress of other trades.
- B. Issue purchase orders to suppliers so as not to interfere with normal quoted delivery times.

- 1.09 WARRANTY
  - A. Steel doors and frames supplied with a one (1) year warranty against defects in materials and workmanship.

- 1.10 ENVIRONMENTAL
  - A. Packaging and Disposal: package in biodegradable packs, paper, or cardboard boxes. Dispose of non-biodegradable packs, plastic, styrofoam, polystyrene, and polyurethane to a licensed or authorized collector for proper disposal. Comply with the applicable standards and laws for VOC.

**PART 2 - PRODUCTS**

- 2.01 ACCEPTABLE MANUFACTURERS
  - A. Steelcraft Manufacturing Co., Cincinnati, Ohio
  - B. Ceco Corp., Oakbrook, Illinois
  - C. Or Approved Equal

- 2.02 MATERIALS:
  - A. Steel requirements: doors and frames manufactured of commercial quality, stretcher leveled flatness, cold rolled steel per ASTM A366 and A568 general requirements. Galvanized doors and frames to A60 minimum coating weight. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM A569.
  - B. Coating Materials:
    - 1. Primer: Manufacturer's standard rust inhibiting primer to ANSI A224.1.
  - C. Core Materials
    - 1. Doors: non-toxic honeycomb, manufactured of hot rolled, pickled and oiled steel per ASTM A569.
    - 2. Fire labeled doors with temperature rise rating: mineral fiber core, temperature rating per code.
  - D. Glass Light Frames: flush with door face, fabricated of 18 ga. steel.

- 2.03 FABRICATION
  - A. Doors
    - 1. Classification: SDI 100.

GRADE	MODEL	GAUGE	DESCRIPTION	CYCLES
III	1	16	Extra Heavy Duty, Full Flush	1,000,000

- 2. Vertical lock edges:
  - (1) Beveled 1/8 inch in 2 inches.
  - (2) Manufacturers standard interlocking and glued edge.

3. Top and bottom channels:
    - (1) Not less than 16 gauge, flush or inverted.
    - (2) Welded to the face sheets.
    - (3) Exterior doors: flush steel top channel. Seal top channel.
  4. Astragals: flat security type or Z type per details.
- B. Frames
1. Construction:
    - (1) 16 gauge cold rolled steel.
  2. Corner Construction: face weld, grind smooth and re-prime.
  3. Provide temporary shipping spreaders to help protect frames from damage during transit and handling. Remove spreaders prior to setting frame.
- C. Frame Anchors
1. Attachment to Masonry Construction:
    - (1) Galvanized
    - (2) Adjustable, flat, corrugated or perforated T shaped with leg not less than 2 inches wide by 10 inches long, or wire type, not less than 3/16 inches in diameter.
  2. Attachment to Drywall Construction:
    - (1) Steel or Wood Stud type to accommodate frame jamb depth and face dimension on welded or standard knock-down type frame.
  3. Provide one anchor for every 30 inches of jamb or fraction thereof.
  4. Floor Anchor: angle clip type.
    - (1) 16 Gauge.
    - (2) Two fasteners per jamb.
    - (3) Weld to bottom of each jamb.
  5. Existing Masonry or Concrete
    - (1) 3/8 inch countersunk flat head bolt and expansion shields.
    - (2) Locate 6 inches from top and bottom and maximum 24 inches on center.
    - (3) Weld pipe spacers or other type of spacers, per manufacturers standard design, in back of frame soffit.
- D. Preparation for Hardware
1. Reinforce per SDI 107.
  2. Lock and Closer reinforcement: box type.
  3. Door Hinge reinforcement: 7 gauge or equivalent, manufacturer's standard.
  4. Punch strike jambs to receive three silencers; double leaf frames to receive manufacturer's standard preparation.
  5. Hardware locations per "Recommended Locations for Builders' Hardware for Standard Steel Doors and Frames".
  6. Provide welded in place guards for all hardware cutouts in frame.

**PART 3 EXECUTION**

3.01 SETTING FRAMES

- A. Set frames in accordance with SDI 105.
- B. Set welded frames in place prior to construction of adjacent partition work. Properly brace frame until permanent anchors are set.

3.02 DOOR INSTALLATION

- A. Clearances:
  - 1. Per SDI and NFPA 80.

3.03 ADJUSTMENT AND CLEANING

- A. Remove dirt and excess sealants, mortar, or glazing compounds from exposed surfaces.
- B. Adjust moving parts for smooth operation. Use shims as required.
- C. Fill dents, holes, etc. with metal filler and sand smooth and flush with adjacent surfaces. Paint to match adjacent surface.

**END OF SECTION**

08/05/2022



**WOOD DOORS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, equipment, and appliances required to complete all the wood door work shown on the drawings and specified hereunder.

1.02 WORK INCLUDED

- a. Provide all wood doors, including labeled fire doors.
- b. Provide and install all glass and glazing of light openings in wood doors.
- c. Provide and install all metal or wood louvers in wood doors.

1.03 RELATED WORK

- a. Finish hardware is specified in, Section 08 71 00.
- b. Installation of finish hardware and hanging of doors is specified in, Section 06 10 00.
- c. Painting of doors is specified in, Section 09 91 00.

1.04 SUBSTITUTIONS

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

1.05 SHOP DRAWINGS/SUBMITTALS

Blueprints of shop drawings shall be submitted to the Architect for approval per Sections 10, Article 14, and 01 33 00 prior to fabrication.

**PART 2 PRODUCTS**

2.01 APPROVED MANUFACTURERS

- a. Marshfield Door Systems, Inc. formerly the Door Division of Weyerhaeuser
- b. VT. Industries
- c. Vancouver Door
- d. Graham
- e. Or approved equal

2.02 MATERIALS

- a. Wood doors:
  - 1. Interior: (Refer to Door Schedule, for door sizes and type designations. 3'.0" x 7'.0" min. size unless noted otherwise.)

- (a) Solid Core Door: Shall be Marshfield Door System formerly the Door Division of Weyerhaeuser, flush, particle board core, premier architectural door conforming to NWWDA Industry Standards I.S. 1 Series, AWI Quality Standards for type PC-5 and WIC Section 20 Doors, or an approved equal door. Door shall be model #DPC-1, 1-3/4" thick, with a plain sliced, AWI Grade-I, facing veneer of book-matched white birch.
  - (b) Fire Door: Shall be Marshfield Door Systems, Inc. formerly the Door Division of Weyerhaeuser mineral core, architectural fire doors conforming to VBC7-2 and VC10. Flush door with plain sliced, AWI grade-I, facing veneer of book-matched white birch. Door shall bear the U.L. or Warnock Hersey label designating the fire rating. Edge Construction to be solid wood veneer face edge.
  - (c) Finishing: Refer to Finish Schedule on Architectural Drawings. When doors are to have natural (glazed) or stained finish they shall be finished with, color as selected by Architect under Specification Section 09 91 00, Painting. When doors are to have a painted finish, door-facing veneer shall be AWI Grade III in lieu of Grade I, see section 09900.
  - (d) Guarantee: (Life of original installation for solid core interior doors, 5 yrs. for interior hollow core doors). The door manufacturer will repair, replace, or make a fair allowance for above listed premium quality door that fails to perform in accordance with this guarantee. It will pay reasonable costs of field finishing and installation of the replacement, except when defects should have been apparent upon reasonable inspection prior to working, finishing, or installation.
- b. Light Openings:
- 1. Metal Stopped: All light openings in rated wood doors shall be factory cut and shall be factory supplied with steel stops as per Marshfield Door Systems, Inc. formerly the Door Division of Weyerhaeuser's #109 Beveled Frame or Air Louvers Inc. #VLF-B1 or approved equal with thru-bolting as per the requirements of Underwriters Laboratories Inc. (U.L. rating). Door light opening shall not exceed 1,296 sq. in. for 45 and 20 min. doors, 100 sq. in. for 90 and 60 min. doors or be closer than 6" to door edge or morise cut-outs.
  - 2. Wood Stopped: All light openings in 20 min. or unrated wood doors shall be wood stopped as per Marshfield Door Systems, Inc. formerly the Door Division of Weyerhaeuser Standard Door Molding W-3 or W-3 20 min.
  - 3. Glass: All wood doors with light openings shall be glazed with 1/4" thick 'Misco' or 'Boroque', wire glass with parallel strand Type II U.L. approved, Class I mesh of woven stainless steel wire of 1/2" grid size, manufactured by Pilkington Glass Company or glazing may be 1/4" thick tempered, clear or tinted. Door lights shall be 1" thick dual glazed at exterior doors. Exterior door lights shall have aluminum sill flashing type. u.n.o.
- c. Door Louvers: All louvers in rated wood doors shall be Model 1900-A, prime coated, for 1-3/4" thick doors as manufactured by Air Louvers or approved equal. Opening sizes shall not exceed the maximum allowable for the U.L. rating of the door. All louvers in non-rated wood doors shall be Model 1100-A, prime coated, for 1-3/4" thick doors as manufactured by Aire Louvers Inc. or approved equal.

- d. Intumescent seals: Furnish fire-labeled opening assemblies complete and in full compliance with UL10C/UBC-7-2. Furnish flush with door edge type intumescent seals, exposed at top rails and veneer covered at stiles. Surface applied adhesive seals will not be accepted. Use alternative door core materials as needed to allow use of flush with door edge type seals. Coordinate frame fabrication to allow use of kerfed in frame type seals options.

**PART 3 EXECUTION**

**3.01 MANUFACTURER'S SPECIFICATION**

- a. All materials shall be applied in accordance with the manufacturer's printed directions.
- b. Doors and frames shall be installed in accordance with W.I.C. "Manual of Millwork", Section 26 and W.I.C. Technical Bulletin 420R, conforming to requirements of fit tolerances, and be adjusted for smooth and balanced movement, see Section 06 10 00.

**3.02 PROTECTION**

The Contractor shall cover all his work as necessary to protect from damage until completion and acceptance of building.

END OF SECTION  
08/10/2023

**OVERHEAD ROLLING GRILLES**

DIVISIONS 00 AND 01 A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

- a. The work of this section includes all labor, materials and equipment as required to provide and install the overhead rolling grilles as described in this section and as shown on drawings.

## 1.02 WORK INCLUDED

- a. Provide and install all tube steel supports, anchors and fittings as required for installation of the overhead rolling grilles.

## 1.03 RELATED WORK

- a. Finish Hardware, Section 08 71 00
- b. Painting, Section 09 91 00
- c. Wall, ceiling and floor finishes adjacent to and around opening.

## 1.04 SYSTEM DESCRIPTION

- a. Design Requirements:
  - 1. Cycle Life:
    - a. Design grilles of standard construction for normal use of up to 5 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the grille.
    - a. Design grilles of special construction for high cycle use. Expected cycles of up to 5 per day.
  - 2. Safety:
    - a. Chain operated doors shall be designed so that the door immediately stops upward or downward travel and is maintained in a stationary position when the hand chain is released by user.

## 1.05 SUBMITTALS

- a. Reference Section 01 33 00 Submittals; submit the following items:
  - 1. Product Data.
  - 2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
  - 3. Quality Assurance/Control Submittals:
    - a. Provide proof of manufacturer ISO 9001:2015 registration.
    - b. Provide proof of manufacturer and installer qualifications - see 1.06 below.
    - c. Provide manufacturer's installation instructions.
  - 4. Closeout Submittals:
    - a. Operation and Maintenance Manual.
    - b. Certificate stating that installed materials comply with this specification.

## 1.06 QUALITY ASSURANCE

- a. Qualifications:
  1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing grilles of the type specified.
  2. Installer Qualifications: Manufacturer's approval.

## 1.07 DELIVERY STORAGE AND HANDLING

- a. Follow manufacturer's instructions.

## 1.08 WARRANTY

- a. Standard Warranty: Two years from date of shipment against defects in material and workmanship.
- b. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

**PART 2 PRODUCTS**

## 2.01 ACCEPTABLE MANUFACTURERS

- a. Cookson – 1901 South Litchfield Rd, Goodyear, AZ 85338. Telephone: (800) 294-4358. Underwriters Laboratories, Inc. (UL), ISO 9001:2015 Registered.
- b. Cornell
- c. Overhead Door
- d. Or approved equal

## 2.02 MATERIALS

- a. Overhead Rolling Grilles Model # ESG10 as manufactured by Cookson is being used to set the standard required for this project.
- b. Curtain:
  1. Vision Aire - ESG10 Straight Pattern
    - a. Horizontal Rods: Solid 5/16 inch (8 mm) diameter, AISI 300 series stainless steel
      1. Vertical Spacing: 2 inches (50.8 mm) on center.
    - b. Vertical Chains: Grommetted stainless steel links, 3/4 inch (19 mm) wide, positioned by E-rings on 9 inch (228.6 mm) centers. Provide double E-rings on horizontal bars on both sides of end chains to retain curtain in guides.

2. Bottom Bar: 2 x 3-1/2 inch (50.8 x 88.9 mm) extruded aluminum tubular section reinforced with 3 x2 x 3/16 inch (76.2 x 50.8 x 4.76 mm) aluminum angle(s).
3. Finish:
  - a. Stainless Steel Curtain with Aluminum Bottom Bar:
    1. Curtain: Factory polished.
    2. Bottom Bar: Mill finish
- c. Guides, Wall Mounted: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners and polypropylene pile runners on both sides of curtain. Provide steel mounting angle as required for face of wall installation.
- d. Guides, Tube Mounted: Heavy duty extruded aluminum sections with snap-on cover to conceal fasteners and polypropylene pile runners on both sides of curtain. Provide aluminum tubes, floor saddles and hardware as recommended by manufacturer to support grille.
  1. Finish, Aluminum Guide Components:
    - a. Mill finish.
- e. Counterbalance Shaft Assembly:
  1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
  2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of grille to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.
- f. Brackets: Fabricate from minimum 3/16 inch (4.76 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
  1. Finish:
    - a. Zirconium treatment followed by a light gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.
    - a. Zirconium treatment followed by a corrosion inhibitive baked-on zinc-rich gray polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness.
    - a. ASTM A 123, Grade 85 zinc coating, hot-dip galvanized after fabrication.
- g. Hood and Fascia: 24 gauge stainless steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
  1. Finish:
    - a. Stainless Steel: No. 4 finish.

### 2.3 ACCESSORIES

- a. Locking:
  1. Manual Push-Up: Keyed cylinder locking into both jambs operable from both sides of curtain.
  2. Manual Crank Hoist: Keyed cylinder locking into both jambs operable from coil side of curtain.

**2.4 OPERATION**

- a. Manual Control Gard Chain Hoist: Provide chain hoist operator with endless steel chain, chain pocket wheel and guard, geared reduction unit, and chain keeper secured to guide. Chain hoist to include integral brake mechanism that will immediately stop upward or downward travel and maintain the door in a stationary position when the hand chain is released by the user.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

- a. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- b. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- b. Commencement of work by installer is acceptance of substrate.

**3.2 INSTALLATION**

- a. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.
- b. Follow manufacturer's installation instructions.

**3.3 ADJUSTING**

- a. Following completion of installation, including related work by others, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

**3.4 CLEANING**

- a. Clean surfaces soiled by work as recommended by manufacturer.
- b. Remove surplus materials and debris from the site.

**3.5 DEMONSTRATION**

- a. Demonstrate proper operation to Owner's Representative.
- b. Instruct Owner's Representative in maintenance procedures.

**END OF SECTION**

07/19/2022

**ALUMINUM ENTRANCES AND STOREFRONTS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

All labor, materials, tools, equipment, facilities, transportation and services necessary for and reasonably incidental to furnishing, fabrication, delivery and installation of storefront entrance doors and window units as shown and noted on drawings, and as specified herein.

**1.02 WORK INCLUDED (But not limited to the following):**

- a. Provide and install aluminum storefront sections.
- b. Provide and install storefront entrance doors, including hardware specified in this Section.
- c. All caulking work required in this Section in accordance with Section 07 91 00.

**1.03 RELATED WORK**

- a. All glass and glazing is specified in Section 08 81 00.
- b. Structural supports and framing are specified in Sections 05 12 00 and 06 10 00.
- c. Section 08 71 00 Hardware supplier shall coordinate with storefront manufacturer.
- d. Contract Closeout per Specification Section 10, Article 54.

**1.04 SUBSTITUTIONS**

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

**1.05 SHOP DRAWINGS**

- a. Submit drawings of installation details for wall and entrance units to Architect for approval as specified in Section 01 33 00. Submittals shall include Structural Calculations by a licensed California Engineer for all components and connections required.



- b. Installation of aluminum entrances and storefronts shall not be started until detailed plans and specifications are approved by the Division of the State Architect.

#### 1.06 PROTECTION

All exposed surfaces of aluminum shall be protected until final acceptance of the work in a manner sufficient to prevent damage or discoloration. Any work damaged or discolored in any way before final acceptance of the work shall be replaced without additional cost to the Owner.

#### 1.07 SHOP PAINTING

All ferrous metal work shall be given a coat of Rust-Oleum #1386 gray primer.

#### 1.08 REPLACEMENTS AND CLEANING

At completion of work, all glass, and aluminum, work shall be free from cracks, scratches, and other defects. Any defective work that may appear before acceptance, or within one year warranty period that is a direct result of manufacturing, transporting or performance of this Contractor, shall be removed and replaced with new work without cost to Owner. Remove from site all boxes, crates, containers and other debris used for this work.

### PART 2 PRODUCTS

#### 2.01 APPROVED MANUFACTURERS/SYSTEMS

- a. Kawneer Company Inc. - TRIFAB V.G. 451 - Center Set-Inside Glazing
- b. U.S. Aluminum Corp. - IT451
- b. Approved equal

#### 2.02 MATERIALS

- a. Storefront Window Units:
  - (1) Work Required: Storefront material shall be as detailed on the drawings and the glazing contractor shall furnish all necessary material, labor and equipment for the complete installation of storefront division and corner bar; sill and jamb trim; bulkheads; aluminum frame sections and doors.
  - (2) Materials: Storefront sections shall be Kawneer TRIFAB V.G. 451 (4 1/2" x 2"), extruded of 6063-T5 aluminum alloy and temper, per ASTM B-221-88. Formed sections (break metal) where indicated shall be .050" aluminum alloy of shape as shown on the drawings. Fasteners, where exposed, shall be stainless steel or zinc plated steel, per ASTM A-164-88. Perimeter anchors shall be coated steel sheet metal screws, #12x2-1/2" at 16" o.c. max. Glazing gaskets shall be elastomeric extrusions. Single acting entrance frame weathering shall be a non-porous, polymeric material.

- (3) Finish: All exposed framing surfaces shall be free of scratches and other serious blemishes. Aluminum extrusions shall be given a caustic etch followed by an anodic oxide treatment to obtain a Class I color anodic coating conforming to Aluminum Association's Standard #AA-M12-C22-A42/44, Kawneer's #40 Dark Bronze.
- b. Entrance Doors: Shall be Series #500 wide stile doors as manufactured by Kawneer Co., Inc.
- (1) Sections: Shall be extruded 6063-T5 aluminum alloy and temper, per ASTM B-221-88. Major tubular portions of door stiles and rails shall not be less than .125" in thickness and glazing moldings not less than .050" in thickness.
- (2) Workmanship: Entrance units shall be complete factory assemblies including specified hardware. Corners of doors shall be accurately joined and fitted with a flush hairline joint. Door corner shall consist of mechanical clip fastening, sigma deep penetration and fillet welds. Glazing stops of doors shall be snap-in type without exposed screws with vinyl glazing gaskets. All cutouts, recesses, mortising or milling operations required for hardware shall be accurately made and reinforced with backing plates as required to insure adequate strength of the connections. Door sills shall be 10" high sheet aluminum kick plates edgemilled and interlocked at bottom tubing and upper rail.

### **PART 3 EXECUTION**

#### **3.01 FABRICATION AND INSTALLATION**

- a. Storefront and entrance unit construction assemblies are described in brief outline to indicate in addition to the drawings, the general design and details desired. Work of this section shall be done only by craftsmen regularly engaged in this type of work.
- b. Construction: All necessary methods of construction, parts, etc., required to cause work of this section to function as indicated shall be supplied and included though not shown on drawings or mentioned in these specifications, where such materials are clearly a part of this work.
- c. All welds: Shall be ground flush and smooth and shall be of same texture as adjoining metals before finish is to be applied.
- d. All setting: Shall be so designed to allow for natural expansion and contraction of glass and to counteract shocks and vibrations.
- e. Erection: All items shall be set in their correct locations as shown on the details; shall be set level, plumb, square, and at their proper elevations and in alignment with all work. All joints between metal and adjoining work shall be tightly caulked to prevent leakage. All metal shall be secured in place with fasteners as recommended by the manufacturer. At all points where moldings are joined, they should be accurately cut and neatly fitted to result in a tightly closed joint. After erection, the General Contractor shall adequately protect all exposed portions of the metal work from damage by grinding and polishing machines, plaster lime, acid, cement, paint or other harmful materials.
- f. Setting blocks and spacer shims: Shall be fabricated from neoprene or treated hardwood. Shape to the required sizes and thickness. Material used for blocks

and spacers must be compatible with type of compounds and sealants used and shall not cause staining or discoloration of the sealant or the frame. Shore durometer hardness for setting block and shim material shall be 70 to 90 points for setting blocks and 40 to 50 points for spacer shims, unless otherwise recommended by compound or sealant manufacturer.

- g. Preparation of Glass and Rabbets: Clean the sealing surfaces at perimeter of glass and sealing surfaces of storefront. Use only the approved solvents and cleaning agents recommended by the compound manufacturer.
- h. Positioning Glass: Center in glazing rabbet to maintain specified clearances at perimeter on all four sides. Maintain centered position of glass in rabbet and provide the required sealer thickness (1/8" minimum) on both sides of glass. Whenever glass dimensions are larger than 50 inches, provide setting blocks at sill and spacer shims on all four sides; locate setting blocks one quarter way in from each end of glass.

### 3.02 CLEANING

The contractor shall be responsible for removal of protective materials and cleaning of the aluminum. All aluminum shall be thoroughly cleaned with plain water and soap. No abrasive or caustic agents shall be used.

END OF SECTION  
08/05/2022

**FINISH HARDWARE**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 - GENERAL**

1.1 SUMMARY

A. Section Includes:

1. Door Hardware.

B. Related Sections:

1. Section 06 20 00 - Finish Carpentry: Finish Hardware Installation
2. Section 07 90 00 - Joint Sealers – exterior thresholds
3. Section 08 10 00 - Metal Doors and Frames
4. Section 08 20 00 - Wood Doors

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.

1. Windows.
2. Cabinets, including open wall shelving and locks.
3. Signs, except where scheduled.
4. Toilet accessories, including grab bars.
5. Installation.
6. Rough hardware.
7. Access doors and panels, except cylinders where detailed.

1.2 REFERENCES:

Use date of standard in effect as of Bid date.

- A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- B. BHMA – Builders Hardware Manufacturers Association
- C. DHI – Door and Hardware Institute
- D. NFPA – National Fire Protection Association
  1. NFPA 80 – Fire Doors and Windows
  2. NFPA 105 – Smoke and Draft Control Door Assemblies
  3. NFPA 252 – Fire Tests of Door Assemblies
- E. UL – Underwriters Laboratories
  1. UL10C – Positive Pressure Fire Tests of Door Assemblies.

- 2. UL 305 – Panic Hardware
- F. WHI – Warnock Hersey Incorporated
- G. State of California Building Code
- H. Local applicable codes
- I. SDI – Steel Door Institute
- J. WI – Woodwork Institute
- K. AWI – Architectural Woodwork Institute
- L. NAAMM – National Association of Architectural Metal Manufacturers

**1.3 SUBMITTALS & SUBSTITUTIONS**

- A. **SUBMITTALS:** Submit six copies of schedule per Section 01330. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
  - 1. Type, style, function, size, quantity and finish of hardware items.
  - 2. Use BHMA Finish codes per ANSI A156.18.
  - 3. Name, part number and manufacturer of each item.
  - 4. Fastenings and other pertinent information.
  - 5. Description of door location using space names and numbers as published in the drawings.
  - 6. Explanation of abbreviations, symbols, and codes contained in schedule.
  - 7. Mounting locations for hardware.
  - 8. Door and frame sizes, handing, materials, fire-rating and degrees of swing.
  - 9. List of manufacturers used and their nearest representative with address and phone number.
  - 10. Catalog cuts.
  - 11. Manufacturer’s technical data and installation instructions for electronic hardware.
  - 12. Date of jobsite visit.
- B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.
- C. **Deviations:** Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.

## SECTION 08 71 00

- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
- F. Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.
- G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

### 1.4 QUALITY ASSURANCE:

- A. Qualifications:
- B. A recognized architectural door hardware supplier with warehousing facilities in the Project's vicinity that has a record of successful in-service performance for supplying door hardware that is similar in quantity, type, and quality to that specified for this Project, and who employs an experienced architectural hardware consultant who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.
- C. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- D. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- E. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
  - 1. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
  - 2. See 2.6.E for added information regarding resilient and intumescent seals.
- F. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

### 1.5 DELIVERY, STORAGE AND HANDLING:

- A. Delivery: coordinate delivery to appropriate locations (shop or field).

## SECTION 08 71 00

1. Permanent keys and cores: secured delivery direct to Owner's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

### 1.6 PROJECT CONDITIONS AND COORDINATION:

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
  1. Location of embedded and attached items to concrete.
  2. Location of wall-mounted hardware, including wall stops.
  3. Location of finish floor materials and floor-mounted hardware.
  4. Manufacturer templates to door and frame fabricators.
- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation. Do not order hardware until the submittal has been reviewed by the frame and door suppliers for compatibility with their products.
- D. Prior to submittal, carefully inspect existing conditions at each opening to verify finish hardware required to complete Work, including sizes, quantities, existing hardware scheduled for re-use, and sill condition material. If conflict or incompatibility between the specified/scheduled hardware and existing conditions, submit request for direction from Architect. Include date of jobsite visit in the submittal.
  1. Submittals prepared without thorough jobsite visit by qualified hardware expert will be rejected as non-compliant.

## 1.7 WARRANTY:

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:
- |    |                |             |
|----|----------------|-------------|
| 1. | Locksets:      | Three years |
| 2. | Exit Devices:  | Three years |
| 3. | Closers:       | Ten years   |
| 4. | Other Hardware | Two years   |

## 1.8 COMMISSIONING:

- A. Conduct these tests prior to request for certificate of substantial completion:
1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.

## 1.9 REGULATORY REQUIREMENTS:

- A. Locate latching hardware between 34" to 44" above the finished floor, per California Building Code, Section 1010.2.3 and 11B-404.2.7.
1. Locate panic hardware between 36" to 44" above the finished floor.
- B. Handles, pull, latches, locks, other operating devices: readily openable without tight grasping, tight pinching, or twisting of the wrist to operate. California Building Code 1010.2.2 and 11B-309.4.
- C. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.
- D. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per California Building Code Section 11B-404.2.8.1.
- E. Smooth surfaces at bottom 10" of push sides of doors, facilitating push-open with wheelchair footrests, per California Building Code Section 11B-404.2.10.
- F. Door opening clear width no less than 32", measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 34" and the hardware projects no more than 4". California Building Code Section 11B-404.2.3, 11B-404.2.4, and 1010.1.1.
- G. Door opening height shall not be less than 80 inches. Doors closers and door stops shall be permitted to be 78 inches minimum above the floor. California Building Code Section 11B-404.2.3 and 1010.1.1.1.



**SECTION 08 71 00**

- H. Thresholds: floor or landing no more than 1/2" below the top of the threshold of the doorway. Change in level between 1/4" and 1/2": beveled to slope no greater than 1:2 (50 percent slope). California Building Code Section 11B-404.2.5.
- I. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls..
- J. Pairs of doors: limit swing of one leaf to 90 degrees to protect persons reading wall-mounted tactile signage.
- K. New Buildings on a K-12 Public School campus shall be provided with locks which allow the doors to classrooms and any other room with an occupant load of five or more persons to be locked from the inside. Locks shall conform to the specification and requirements of Section 1010.1.11. Exceptions include doors that are normally locked from the outside, relocatable moved within the same campus, and reconstruction projects.

## PART 2 PRODUCTS

## 2.1 MANUFACTURERS:

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:
Hinges	(IVE) Ives	Bommer
Continuous Hinges	(IVE) Ives	Pemko
Key System	(SCH) Schlage	Facility Standard
Locks	(SCH) Schlage	Facility Standard
Exit Devices	(VON) Von Duprin	Facility Standard
Closers	(LCN) LCN	Facility Standard
Auto Flush Bolts	(IVE) Ives	Trimco
Coordinators	(IVE) Ives	TYrimco
Silencers	(IVE) Ives	Rockwood
Kickplates	(IVE) Ives	Rockwood
Stops & Holders	(IVE) Ives	Rockwood
Overhead Stops	(GLY) Glynn-Johnson	None available
Thresholds	(ZER) Zero	NGP
Seals & Bottoms	(ZER) Zero	NGP

## 2.2 HINGING METHODS:

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

## SECTION 08 71 00

- C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
  - 1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
  - 2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.
- D. Continuous Hinges:
  - 1. Pinned steel/stainless steel type: continuous stainless steel, 0.25-inch diameter stainless-steel hinge pin.
    - a) Use engineered application-specific wide-throw units as needed to provide maximum swing degree of swing, advise architect if required width exceeds 8 inches.

### 2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

- A. Mortise Locksets and Latchsets: as scheduled.
  - 1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
  - 2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
  - 3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
    - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
  - 4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
  - 5. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
  - 6. Deadbolts: stainless steel 1-inch throw.
  - 7. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
  - 8. Scheduled Lock Series and Design: Schlage L series, 06A design.
  - 9. Certifications:
    - a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
    - b) ANSI/ASTM F476-84 Grade 31 UL Listed.
  - 10. Comply with CBC Section 11B-309.4.
- B. Extra Heavy Duty Cylindrical Locks and Latches: as scheduled.
  - 1. Chassis: cylindrical design, corrosion-resistant plated cold-rolled steel, through-bolted.

## SECTION 08 71 00

2. Locking Spindle: stainless steel, integrated spring and spindle design.
3. Latch Retractors: forged steel. Balance of inner parts: corrosion-resistant plated steel, or stainless steel.
4. Latchbolt: solid steel.
5. Backset: 2-3/4" typically, more or less as needed to accommodate frame, door or other hardware.
6. Lever Trim: accessible design, independent operation, spring-cage supported, minimum 2" clearance from lever mid-point to door face.
7. Electric operation: Manufacturer-installed continuous duty solenoid.
8. Strikes: 16 gage curved steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
9. Lock Series and Design: Schlage ND series, "Rhodes" design.
10. Certifications:
  - a) ANSI A156.2, 1994, Series 4000, Grade 1.
  - b) UL listed for A label and lesser class single doors up to 4ft x 8ft.
11. Comply with CBC Section 11B-309.4.

### 2.4 EXIT DEVICES / PANIC HARDWARE

#### A. General features:

1. Independent lab-tested 1,000,000 cycles.
2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
3. 0.75-inch throw deadlocking latchbolts.
4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
5. No exposed screws to show through glass doors.
6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
7. Releasable in normal operation with 5-lb. maximum operating force per California State Fire Marshal Standard 12-10-3, and with 32 lb. maximum pressure under 250-lb. load to the door.
8. Exterior doors scheduled with XP-series devices: Static load force resistance of at least 2000 pounds.

## SECTION 08 71 00

9. Where devices span over door lite frame and the face of the selected lite manufacturer's frame is raised from the face of the door, furnish panic hardware manufacturer's fitted shims or glass-bead kits at no additional cost to the project.
10. Comply with CBC Section 11B-309.4.

### 2.5 CLOSERS

#### A. Surface Closers:

1. Full rack-and-pinion type cylinder.
2. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
3. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
4. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
5. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
6. Non-flaming fluid, will not fuel door or floor covering fires.
7. Pressure Relief Valves (PRV) not permitted.

### 2.6 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
- C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- D. Door Stops: Provide stops to protect walls, casework or other hardware.
  1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
  2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
- E. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.

## SECTION 08 71 00

1. Proposed substitutions: submit for approval.
  2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
  3. Non-corroding fasteners at in-swinging exterior doors.
  4. Fire-rated Doors, Resilient Seals: UL10C compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
- F. Thresholds: As scheduled and per details. Comply with CBC Section 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Exteriors: Seal perimeter to exclude water and vermin. Use Dow Corning 795 Silicone or approved equal. Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
- G. Exposed Through-Bolts: Do not use SNB, grommet nuts, sleeve nuts or other such clamping type fasteners, intent is for minimal exposed hardware. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.
- H. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.
- 2.7 FINISH:
- A. Generally BHMA 626 Satin Chromium.
    1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
  - B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
  - C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

## 2.8 KEYING REQUIREMENTS:

- A. Key System: Schlage Primus utility-patented keyway, interchangeable core throughout. Key blanks available only from factory-direct sources, not available from after-market keyblank manufacturers. For estimate use factory GMK charge. Initiate and conduct meeting(s) with Owner to determine system keyway(s), keybow styles, structure, degree of physical security and degree of geographic exclusivity. Furnish Owner's written approval of the system.
  - 1. Existing master key system.
  - 2. Construction keying: furnish temporary keyed-alike cores. Remove at substantial completion and install permanent cylinders/cores in Owner's presence. Demonstrate that construction key no longer operates.
  - 3. Temporary cylinders/cores remain supplier's property.
  - 4. Furnish 10 construction keys.
  - 5. Furnish 2 construction control keys.
  - 6. Key Cylinders: furnish 6-pin solid brass construction.
- B. Cylinders/cores: keyed at factory of lock manufacturer where permanent records are maintained. Locksets and cylinders same manufacturer.
- C. Permanent keys: use secured shipment direct from point of origination to Owner.
  - 1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
  - 2. For estimate: VKC stamping plus "Do Not Duplicate".
- D. Bitting List: use secured shipment direct from point of origination to Owner at completion.

## PART 3 - EXECUTION

## 3.1 ACCEPTABLE INSTALLERS:

- A. Can read and understand manufacturers' templates, suppliers' hardware schedules and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

## 3.2 PREPARATION:

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  - 1. Notify Architect of code conflicts before ordering material.

## SECTION 08 71 00

2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 34 inches to 44 inches above the finished floor, per CBC Section 11B-404.2.7.
  3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.
- C. Overhead stops: before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

### 3.3 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
  2. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
  3. Replace fasteners damaged by power-driven tools.
  4. Drawings typically depict doors at 90 degrees, doors will swing to maximum allowable. Install door closers to maximum allowable swing in conjunction with door stops.
- B. Locate floor stops no more than 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- D. Drill pilot holes for fasteners in wood doors and/or frames. Centerpunch hole locations before using self-drilling type screws to prevent skating. Replace screws that are not centered in their holes.
- E. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

### 3.4. ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
1. Hardware damaged by improper installation or adjustment methods: repair or replace to Owner's satisfaction.



**SECTION 08 71 00**

2. Adjust doors to fully latch with no more than 1 pound of pressure.
3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
4. Adjust door closers per 1.9 this section.

3.5 DEMONSTRATION:

- A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING:

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.

HW SET: 01

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	CLASSROOM LOCK	LV9071T 06A	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	P7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS11X	626	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

HW SET: 02

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	CLASSROOM LOCK	L9077T 06A X L/OST X L283-150	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	SURFACE CLOSER	P7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

RE-USE EXISTING DOOR STOP

**SECTION 08 71 00**

HW SET: 03

3	EA	HINGE	5BB1HW 4.5 X 4.5	630	IVE
1	EA	CLASSROOM SEC LOCK	ND95TD RHO	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 04

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	LV9080T 06A	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	7500BF	689	NOR
1	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

HW SET: 05

2	EA	CONTINUOUS HINGE	700	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A X L/OST X L283-150	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	COORDINATOR	COR X FL X MB	628	IVE
1	EA	ASTRAGAL BY DOOR MANUFACTURER			
2	EA	SURFACE CLOSER	P7500HBF	689	NOR
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
2	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

UNEQUAL PAIR

**SECTION 08 71 00**

HW SET: 06

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	STOREROOM LOCK	L9080T 06A X L/OST X L283-150	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	SURFACE CLOSER	P7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

RE-USE EXISTING DOOR STOP

HW SET: 07

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	ND40S RHO	626	SCH
1	EA	SURFACE CLOSER	7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401CCV	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 08

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	ND91TD RHO	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401CCV	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

## SECTION 08 71 00

## HW SET: 09

6	EA	HINGE, SWING CLEAR	5BB1HWSC 5 NRP	630	IVE
1	EA	PANIC HARDWARE	CD9827EO	626	VON
1	EA	PANIC HARDWARE	CD9827NL-OP	626	VON
1	EA	RIM CYLINDER	20-057-ICX (SPECIFY A, B OR C)	626	SCH
2	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 (DOGGING)	626	SCH
3	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910DT	630	IVE
1	EA	DOOR PULL	VR910NL	630	IVE
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	ROD & LATCH GUARD	RG-27-3	630	VON
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
2	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER
1	SET	METING STILE SEAL	8194	AL	ZER

RE-USE EXISTING DOOR STOP

## HW SET: 10

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	ND91TD RHO	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	OVERHEAD STOP	100S	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HW SET: 11

2	EA	CONTINUOUS HINGE	700	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1	626	IVE
1	EA	STOREROOM LOCK	L9080T 06A X L/OST X L283-150	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
1	EA	COORDINATOR	COR X FL X MB	628	IVE
1	EA		ASTRAGAL BY DOOR MANUFACTURER		
2	EA	SURFACE CLOSER	P7500BF	689	NOR
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	SET	SEALS	188S HEAD AND JAMBS	BLK	ZER
2	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	545A MSLA-10	AL	ZER

RE-USE EXISTING DOOR STOP

**SECTION 08 71 00**

## HW SET: 12

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM SEC LOCK	ND95TD RHO	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	P7500BF	689	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
3	EA	SILENCER	SR64	GRY	IVE

## HW SET: 13

1	EA	CONTINUOUS HINGE	112XY	313	IVE
1	EA	CLASSROOM LOCK	LV9071T 06A	643E	SCH
2	EA	PRIMUS CORE ONLY	20-740	613	SCH
1	EA	SURFACE CLOSER	P7500BF	695	NOR
1	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
1	EA	DOOR SWEEP	39D	DUR	ZER
1	EA	THRESHOLD	545D MSLA-10	DUR	ZER

PERIMETER SEALS BY DOOR MANUFACTURER

END OF SECTION  
08/10/2023

**GLASS AND GLAZING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, materials, scaffolding, equipment and appliances necessary to complete all the work indicated on the drawings and/or specified hereunder.
- b. See Details on drawings.

1.02 WORK INCLUDED

- a. Glass and glazing of all aluminum sash in aluminum glazing clips and/or all steel sash with putty or in continuous metal glazing angles, including back putty.
- b. Glass and glazing of all fixed glass.
- c. Glass and glazing of all metal doors.
- d. All metal stop molds for fixed glass, except in hollow metal doors.
- e. All caulking in connection with this work and in strict accordance with Section 07 91 00.

1.03 RELATED WORK

- a. Glass and glazing of wood doors is specified under Wood Doors, Section 08 14 20.
- b. Cleaning is specified under Carpentry Specification Section 06 10 00.
- c. Glass and glazing of Storefront Entrance Units, Section 08 41 13.

**PART 2 PRODUCTS**

- a. L.O.F.
- b. Pittsburgh Plate Glass Co.
- c. Downey Glass
- d. Nippon Electric Glass
- e. Pilkington

## 2.02 MATERIALS

- a. Clear Glass: Clear D.S.B. quality.
- b. Float Glass: 1/4" min. thick ASTM C1036, Type I transparent flat, Class 1 clear, quality q<sup>3</sup> glazing select.
- c. Fire Rated Glass: 5/16" FireLite Plus<sup>®</sup> as manufactured by Nippon Electric Glass Company, Ltd., and distributed by Technical Glass Products, 8107 Bracken Place SE, Snoqualmie, WA 98065, voice 1-800-426-0279, fax 1-800-451-9857,
- d. Obscure Glass: 7/32" Burlap, smooth side out.
- e. Solar Grey: 1/4" PPG Solarban 60 (2) Solargray, "Low-E" glass.
- f. Luxite Coolite: 1/4", glare reducing.
- g. Wire Coolite: 1/4", glare reducing.
- h. Heavy Sheet Glass: 3/16" Float Glass, B grade.
- i. Metal Sash Putty shall conform to specifications, Federal Symbol TT-G-00410a (GSA-FS) entitled "Putty and Elastic compound for Metal Sash Glazing.
- j. Aluminum Sash Putty: Blue Ribbon Aluminum Putty (Fed. Spec. Type 2) as manufactured by DAPS.
- k. Gray Plate Safety Glass: 1/4" gray laminated safety glass, 12% light transmission, Twi-lite 12 as manufactured by Amerada Glass Corp., 3301 South Prairie Ave., Chicago, Illinois, or approved equal.
- l. Metal Stop Molds: Northrop Stop #20-023 Aluminum Molds - 5/8" x 1/2".
- m. Safety (Tempered) Glass shall be ASTM C1048, Kind FT, fully tempered with horizontal tempering condition A uncoated, Type 1 transparent flat, Class 1 transparent, Quality q<sup>3</sup> glazing select, conforming to ANSI Z97.1.
- n. Insulated (Double Pane) Glazing:
  - (1) Non-Tempered shall be P.P.G. Industries; 1/4" Solarban 60 (2) Solargray at exterior and 1/4" clear glass at interior, with a sealed airspace between.
  - (2) Tempered shall be P.P.G. Industries; 1/4" Solarban 60 (2) Solargray glass at exterior and 1/4" Clear Tempered glass at interior, with a sealed air space between.

## 2.03 SUBSTITUTIONS

See Section 10, Article 19.

## 2.04 STANDARD OF QUALITY

- a. Comply with T24, Part 2, Chapter 24 and:
  - (1) UBC Standard No. 24-1, Glass Standard Specification
  - (2) UBC Standard No. 24-2, Safety Glazing

- b. Fire Rated Glass: Fire rating listed and labeled by UL for fire rating scheduled at opening locations on drawings, when tested in accordance with [ASTM E2074-00 and ASTM E2010-01] [ULC Standards CAN4 S-104 and CAN4 S-106] [NFPA 252 and NFPA 257] [UL 9, UL 10B and UL 10C].

### **PART 3 EXECUTION**

#### **3.01 GENERAL REQUIREMENTS**

- a. Workmanship: Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first-class workmanlike manner and shall be subject to the approval of the Architect or his representative.
- b. Grading, Labeling and Certification:
  - (1) All glass shall be graded in accordance with these specifications.
  - (2) Each piece of glass shall be labeled showing the name of the manufacturer and the grade of quality thereof. The label shall be intact after installation.
- c. Time of Application: All glass shall be set after the general work is completed, but shall be set in ample time for the putty work to thoroughly set before painting is started.

#### **3.02 SPECIAL REQUIREMENTS**

- a. Glazing: All glass in steel sash shall be set with metal clips. Putty shall be forced into place with a knife to secure a full and solid fill, which shall be run to a straight and true line.
- b. GLAZING COMPOUND FOR FIRE-RATED GLAZING MATERIALS
  - (1) Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent. Glass panels that exceed 1,393 sq. inches for 90-minute ratings must be glazed with fire-rated glazing tape supplied by manufacturer or,
  - (2) Glazing Compound: DAP 33 putty or,
  - (3) Silicone Sealant: One-part neutral curing silicone, medium modulus sealant, Type S; Grade NS; Class 25 with additional movement capability of 50 percent in both extension and compression (total 100 percent); Use (Exposure) NT; Uses (Substrates) G, A, and O as applicable. Available Products:
    - (a) Dow Corning 795 - Dow Corning Corp.
    - (b) Silglaze-II 2800 - General Electric Co.



(c) Spectrem 2 - Tremco Inc.]

- (4) Setting Blocks: Neoprene, EPDM, or silicone; tested for compatibility with glazing compound; of 70 to 90 Shore A hardness.

END OF SECTION  
08/05/2022

## LATHING AND PLASTERING

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION.

### PART 1 GENERAL

#### 1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, scaffolding, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.
- b. See Details on Drawings.

#### 1.02 WORK INCLUDED

- a. Furnish and install all rough hardware, wiring, paper, mesh, metal lath, gypsum lath, screeds, beads, casings, metal trim, resilient clips and plaster.
- b. Furnish and install waterproof paper, metal lath, and scratch coat for the application of ceramic tile.
- c. Furnish and install exterior plaster finishing systems as specified in Section 09 25 13.

#### 1.03 RELATED WORK

- a. All head/jamb and sill window surrounds.
- b. All sheet metal window jambs that extend above or below window.
- c. Setting bed coat for ceramic tile.
- d. Installation of hollow metal door frames in plastered walls is by Carpentry.
- e. Installation of suspended wood framing system for plaster ceilings.

#### 1.04 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2022 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to demonstrate compliance with these regulations prior to beginning installation.

### PART 2 PRODUCTS

#### 2.01 APPROVED MANUFACTURERS

- a. U.S. Gypsum
- b. Blue Diamond
- c. Kaiser
- d. Gold Bond
- e. Approved equal

#### 2.02 PRODUCT REQUIREMENTS

Lathing and plastering shall conform to CBC Standards listed in Chapters 25 and 35 and Chapter 25A, Part 2 of Title 24, CCR.

- a. Plaster:
  - 1. Gypsum Plaster shall conform to the ASTM C-28 and UBC Standard No. 2502.
  - 2. Keenes Cement shall comply with ASTM C-61-40 and UBC Standard 25-3.
- b. Cement: Portland of an approved brand conforming to the tests proposed by the ASTM Year Book, latest edition.
- c. Hydrated Lime shall conform to the "Standard Specification for Hydrated Lime for Structural Purposes," ASTM Designation C-6-44.
- d. Lime Putty shall be made of quick lime or hydrated lime. Quick lime shall be prepared in an approved manner, stored and protected for an approved period of time.
- e. Sand shall be clean, sharp, well graded sand, free from loam, clay, etc., in excess of 5% of weight and shall be entirely free from vegetable or animal matter. Sand shall conform closely to ASTM latest specification for plastering sand.
- f. Water shall be clean, fresh water, free from alkalies or organic matter and shall be fit for drinking purposes.
- g. Wire: For exterior work, 18 gauge soft annealed galvanized wire.
- h. Plastic or Waterproof Cement shall comply with "Standard Specifications for Portland Cement, ASTM Designation C-150, Type I or II, except in respect to the limitation on insoluble residue air entrainment and additions subsequent to calcination.
- i. Paper Backing shall be weather resistant barrier backing as manufactured by "TYVEK" and shall be TYVEK stucco wrap. Product shall comply with ASTM E-1677, Type I air retarder and shall have a water vapor transmission greater than 50 perms per ASTM E-96-90 and shall have a water penetration resistance of 200 cm on Hydrostatic head in accordance with AATCC-127. Install per manufacturer recommendation's
- j. Mesh Netting: One inch (1") 18 gauge galvanized iron netting, or 1-1/2" 17 gauge.
- k. Metal Studs: USG Trussteel studs of truss design or approved equal.
- l. Metal Lath: USG Junior Diamond, Pennmetal, Milcor, Gold Bond, or approved equal.
  - 1. Copper bearing metal lath weighing not less than 3.4 pounds per square yard after expanding and painting with rust-inhibitive paint. Metal lath for exterior ceilings and soffits shall be galvanized.
  - 2. Self-furring lath 3.4 pounds per square yard. Copper bearing metal lath with rust-inhibitive paint. 1/4" dimple indentations spaced 1-1/2" on center.
  - 3. Rib lath shall be copper bearing metal not less than 3.4 pounds per square yard with rust-inhibitive paint. 3/8" "V" shaped ribs, used at soffits with spans between 16" and 24".
  - 4. Corner lath shall be 3.4 pounds copper bearing metal lath with two (2) four-inch (4") wings.
- m. Gypsum Lath shall be 3/8" thick 16.2 x 48" plain lath.
- n. Resilient Clips (For Gypsum Lath) shall be U.S. Gypsum Co. or approved equal. R-1 resilient clips for wood studs, R-2 resilient cops for corners and angles, R-3 resilient clips for suspended ceilings attached to furring channels and R-5 resilient clips for plywood sheathing on masonry walls.
- o. Resilient Furring Channels shall be galvanized steel Gold Bond RF channels.
- p. Nails and Staples:
  - 1. Roofing Nails: 7/8" 13 gauge galvanized, barbed, large head roofing nails for application of exterior papering.
  - 2. Furring Nails: 1-1/4" 12 gauge galvanized self-furring nails for application of exterior netting and interior lath over structural plywood.

3. Wall Lathing Nails: 6d common wire cut nails for application of metal lath on walls.
  4. Ceiling Lath Nails: 1-1/2" long 11 gauge steel wire with a 7/16" head for application of metal lath on ceilings. (Note ceiling lath also secured to ceiling striping as hereinafter specified).
  5. Gypsum Lath Nails: 1-1/8" 13 gauge 19/64" diameter head blued nails.
- q. Metal Trim: Approved manufacturers are: Milcor, Superior, Penmetal, U.S. Gypsum or approved equal.
1. Interior Corner Bead: Milcor #1 or U.S. Gypsum Cornerite 26 gauge expansion corner bead or approved equal.
  2. Exterior Corner Screed: U.S. Gypsum 2-A or approved equal.
  3. Casing: Superior #20, #21, #22 or U.S. Gypsum #66, 24 gauge for 1/2", 3/4" and 7/8" plaster.
  4. Base Screed: Milcor #3 or approved equal.
  5. Wainscot Screed: Milcor #3, or approved equal, 24 gauge for 1/2" and 3/4" plaster.
  6. Exterior Expansion Screeds: Superior #15 or approved equal, 26-gauge zinc galvanized steel, 3/4" wide.
  7. Exterior Soffit Vents: Superior #115 or approved equal, 26 gauge zinc galvanized steel one inch (1") wide, or Durasteel 931 Soffit Vent, 8" x 14" (stucco) 1/4" mesh hardware cloth or Superior "V" Type Ventilation Screed No. 120 (2" wide x 3/4").
- r. Ceiling Suspension Channels: VSG Cold-Rolled Channels 3/4" and 1-1/2".

### **PART 3 EXECUTION**

#### **3.01 GENERAL REQUIREMENTS**

- a. Metal Trim:
1. Metal trim shall be installed as indicated by the details and securely fastened to adjacent work. All corners shall be coped and fitted to a close joint and the entire work shall be made true to line, ready to receive metal lath. All exterior metal trim shall be installed over paper backing and wire netting.
  2. Where metal trim is applied to masonry, install a four-inch (4") strip of expanded metal lath secured to masonry. Lath to extend over full width of back flange of metal trim and lap over onto masonry.
  3. Where wood stud and plated walls or ceilings butt to concrete or masonry walls, provide Superior No. 21 casings to stop plaster at masonry walls. Where plaster is applied to masonry or concrete walls, use two (2) casings butted together at intersection of walls.
  4. All exposed plaster shall terminate into a metal plaster stop. In concealed areas such as above suspended ceilings or behind rubber base, a wood screed shall be used. This wood screed shall be supplied and installed as a portion of the Carpentry Section of these Specifications.
- b. Cutting and Patching shall be done by this Contractor as required for the work of other trades, or necessary for the proper completion of all work and he shall make good all damage, occasioned by cutting, and at the completion of the entire work, leave plastering in a finished state.
- c. Measuring: Materials shall be measured in calibrated boxes.
- d. Temperature: Precaution shall be taken to insure correct temperature of rooms while plastering is being done. Temporary heat by this Contractor. This Contractor shall provide heaters to maintain a dry, clean heat (oil burners not acceptable) at 70 deg. F. for a period required to completely cure all interior plastering.

- e. Curing: All interior and exterior plaster work shall be protected against intense sun and wind by use of tarpaulins or wet burlap until it has sufficiently hardened to permit sprinkling. All plaster work shall be protected from freezing.
- f. Sprinkling and Interval Between Coats: The exterior plaster scratch coat shall be kept continuously moist for a period of forty-eight (48) hours and the finish coat shall not be applied over brown coat for twenty-one (21) days. The brown coat shall be kept continuously moist during the twenty-one day curing period.
- g. Painting and Patching: Replacing or patching of plaster unnecessarily damaged by other contractors shall be done by this Contractor and shall be paid for by the contractors responsible for such damage. Point up around all trim and other set work after all other trades have finished their work and leave the job in complete and perfect condition.
- h. Replacement: Plaster cracks, blisters, pits, checks, discoloration and uneven surfaces will not be acceptable. In every case, the plastering throughout shall be delivered clean and perfect in every respect.
- i. Damage: This Contractor shall protect his work from damage until completion and acceptance of the building.
- j. Cleaning: Immediately upon completion of the plastering work, clean all floors, walls, windows, doors and other work that is to receive painter's finish. Cleaning shall be done in such a manner that other work is not damaged and so that other trades, may proceed with their work without delay.
- k. Substitutions: All substituted material shall be approved in writing from the Architect in accordance with Article 19, Section 10.
- l. Guarantee: This Contractor shall guarantee this work for a period of one (1) year from date of acceptance and shall make good any defects or imperfections, such as pops, cracks, rust stains, etc., which may develop within that time.
- m. Qualifications: All materials, unless otherwise indicated, shall be manufactured by an approved manufacturer (See Part 2, Paragraph 2.01) and shall be installed in accordance with its current printed directions.
- n. Delivery and Storage of Materials: All materials shall be in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.
- o. Environmental Conditions:
  - 1. In cold weather, all glazing shall be completed and the building heated to a minimum of 55 deg. F. Before plaster base installation, ventilation shall be provided to carry off excess moisture.
  - 2. When low humidity, high temperatures and rapid drying conditions exist during plaster base and plaster application, Durabond Joint Compound and Perf-A-Tape Reinforcement shall be used on all joints, internal corners, trim and corner beads and allowed to set and dry thoroughly before plaster application.

### 3.02 SPECIAL REQUIREMENTS

- a. Exterior Lathing on Stud Walls shall be Type SFB "Breather Paperbacking Self-Furred Paperback Lath, 1-1/2" mesh, 17 gauge keymesh with 18 gauge galvanized longitudinal wires woven into netting on 6" centers attached to 18 gauge galvanized wires laminated between high wet strength suction paper and Grade D paper, with continuous 1/4" deep furring crimps horizontally, spaced 6" vertically, following each 18 gauge longitudinal wire woven into the netting, wires in the continuous horizontal crimps painted red to mark proper attachment point. Weight 2.2 lbs. per square yard. End use - for backing and reinforcement for Portland Cement plaster applied direct to structural supports.

1. Install expansion screeds. All expansion screeds shall be independently backed on each side of the screed and shall be wired separately to the lath material on each side of screed. Special attention shall be given to proper location and true alignment.
- b. Lathing Over Exterior Plywood: Wire mesh or metal lath shall be applied over two layers of paper backing. Metal reinforcement shall be furred out from the backing at least one-fourth inch (1/4") by an approved furring method and shall be nailed with galvanized nails or approved furring devices driven to at least three-fourths inch (3/4") penetration which shall be spaced not more than six inches (6") apart vertically and sixteen inches (16") apart horizontally on each bearing. Metal reinforcement shall be lapped at least one full mesh at all joints. When no sheathing is used, all vertical joints shall be made at the studs, and horizontal joints where expanded metal or metal lath is used shall have at least one (1) tie between studs, made with No. 18 U.S. Steel wire gauge galvanized annealed tie wire.
1. Install expansion screeds. All expansion screeds shall be independently backed on each side of the screed and shall be wired separately to the lath material on each side of screed. Special attention shall be given to proper location and true alignment.
- c. Exterior Plastering on Stud Walls:
1. All walls over which paper and mesh netting have been applied shall be plastered with cement plaster finishing seven-eighths inch (7/8") thick. Finish shall be dashed. All expansion screeds shall be installed as noted above in paragraphs a.1 and b.1.
  2. Install expansion screeds. All expansion screeds shall be independently backed on each side of the screed and shall be wired separately to the lath material on each side of screed. Special attention shall be given to proper location and true alignment.
  3. First Coat (Scratch):  
One part (by volume) Portland Cement  
Two and one-half (2-1/2) parts (by volume) sand
  4. Second Coat (Brown):  
One (1) part (by volume) Portland Cement  
Three and one-half (3-1/2) parts (by volume) sand
  5. Third Coat: Refer to Section 09 25 13 Exterior Plaster Finishing System. This Section hereby incorporates Section 09 25 13 as a part of the Scope of Work of this Section.
  6. Special Condition for Exterior Plastering: Contractor shall plaster exterior surfaces from top of wall to bottom of wall, then move scaffold. (Finish coat only). Wall shall be dampened sufficiently and joint worked in to provide a professional looking job on hand applications.
- d. Exterior lathing of Exterior Ceiling Soffits:
1. Install expansion screeds. All expansion screeds shall be independently backed on each side of the screed and shall be wired separately to the lath material on each side of screed. Special attention shall be given to proper location and true alignment.
  2. Lath with metal lath, starting at corners. End laps shall be two inches (2") and side laps one inch (1"). Where plaster continues down onto walls, bend lath down on walls to form a six-inch (6") apron or drop down the wall. All exterior lath shall be galvanized. All metal lath shall be laced together with 18 gauge-galvanized wire. Nail the metal lath to each bearing (joints, stripping or ground) with 1-1/2" long, 11 gauge, barbed galvanized roofing nails with 7/16" heads or 1-1/4", 16 ga. staples with 3/4" crown straddling the lath ribs at 4-1/2" on center along the wood supports. Fasteners shall be driven to full penetration without injury to lath and shall

- be spaced not to exceed six inches (6") o.c. for nails and 4-1/2" o.c. for staples on each bearing. Nails shall be driven to full penetration without injury to lath and shall be spaced not to exceed six inches (6") o.c. on each bearing. In addition to the regular nailing, metal lath shall be fastened to horizontal wood supports 1-1/2", 9 gauge, zinc plated Stronghold staples, with 10d nails laid across each staple, at each support at one edge of each sheet of lath, per Section 2506A.3.2, C.C.R.
3. When spans exceed sixteen inches (16"), use 3/8" rib metal lath (3.4 lbs. per square yard).
- e. Exterior Plastering on Ceiling and Soffits: All areas so lathed shall be plastered with cement plaster finishing 3/4" thick. Proportions shall be same as specified for Plastering on Exterior Stud Walls and shall be textured as directed by the Architect.
  - f. All exterior plaster surfaces shall be divided by the use of screeds into sections with a maximum dimension of 10'-0" unless shown otherwise on the drawings.
  - g. Interior Lathing (Metal Lath):
    1. Application, Lapping and Tying of Sheets:
      - (a) Metal lath shall be attached to vertical wood supports with one inch (1") roofing nails with 7/16" diameter heads driven to a penetration of at least 3/4" and spaced not to exceed six inches (6") on center and sixteen inches (16") apart on bearing and clinch all nails upward. Common wire nails when used shall be bent over to engage at least three (3) strands of lath and shall be 4d blued driven to a minimum penetration of 3/4" at six inches (6") on center.
      - (b) Metal lath shall be attached to horizontal wood supports by 1-1/2", 11 gauge, barbed galvanized roofing nails with 7/16" heads driven home and spaced not to exceed six inches (6") on center. In addition to the regular nailing, metal lath shall be fastened with 10d nails over lath held with 1-1/2", 9 gauge zinc coated Stronghold staple at twenty-seven inches (27") on center at every joist, per Section 2505A.3.2, C.C.R.
      - (c) Lapping and Tying of Sheets: All metal lath shall be lapped at sides of sheets not less than one inch (1") and at ends of sheets not less than one inch (1"). If ends do not occur over supports, they shall be attached to each support and side laps shall be wired at intervals of not more than nine inches (9") between supports.
      - (d) Paper Backing: Apply one (1) layer of paper backing on wood studs before lathing for tile work only.
    2. Lathing on Ceilings: All ceilings to be plastered (see Room Finish Schedule) shall be lathed with metal lath. Lath shall be first applied to ceilings and sheets and shall be carried down two inches (2") on the wall or partitions, so that no joints occur at junction of ceilings or walls.
    3. Lathing on Stud Walls: All walls to be plastered (see Room Finish Schedule) shall be lathed with metal lath. Lath shall be started one (1) stud away from the corner, be bent at the corner and carried onto the abutting wall, where same is to be plastered.
    4. Reinforced Metal Lath Corners: Apply for ceramic tile work only.
  - h. Interior Plastering on Metal Lath:
    1. All walls and ceilings over which metal lath is applied shall be plastered as hereinafter specified, finishing 3/4" thick, measured from face of lath supports.
 

First Coat (Scratch):  
One (1) part (by volume) gypsum plaster  
Two (2) parts (by volume) sand

## Second Coat (Brown):

One (1) part (by volume) gypsum plaster

Three (3) parts (by volume) sand

This coat shall be darbied, rodded and scored for finish coat.

## Third Coat (Finish - Keene's Trowel Smooth):

Two (2) parts Keene's Cement

One (1) part lime putty

Add hardwall plaster to aid set

## Third Coat (Finish - Keene's Sand):

Four and one-half (4-1/2) parts No. 30 sand

One and one-half (1-1/2) parts Keene's cement

Two (2) parts lime putty

2. Metal Corner Bed and Expansion Screed: Apply in all rooms indicating plaster walls on Room Finish Schedule. All said metal trim shall be of one (1) length, or in as long lengths as procurable and shall be set plumb and true without splicing. Apply corner bead at junction of all stud and plaster partitions and ceilings to concrete and/or masonry walls.
- i. Interior Plastering on Concrete Block Walls: Plaster with cement plaster, finishing 1/2" thick. Two (2) coats same as brown and finish coats for exterior plastering. Prior to plastering, this Contractor shall apply by brush or roller, one (1) coat of A.C. Horn's Hornbond, 400 sq. ft./gallon or Maritime Concrete Bonder #5, applied as per manufacturer's directions.
- j. Interior Lathing and Cement Plastering for Stud Walls:
  1. Lath walls as per subparagraph 3.02 g., except use galvanized lath and apply two (2) layers of 30 lb. felt on studs before lathing.
  2. Plaster walls as per subparagraph 3.02 c.
- k. Interior Lathing and Cement Plastering on Ceilings:
  1. Lathing as per subparagraph 3.02 d.
  2. Plaster walls as per subparagraph 3.02 e.
- l. Interior Lathing (Plain Gypsum Lath) on Stud Walls: Plain gypsum lath shall be applied to face out with the long dimension at right angles to framing members and with end joints staggered and over framing members. Perforated gypsum lath shall be attached to framing members by means of R-1 resilient clips (U.S. Gypsum or approved equal) nailed to framing and placed at every intersection of perforated gypsum lath edges and at corners with R-2 resilient clips so that the perforated gypsum lath is secured by clips (R-1 and R-2) spaced sixteen inches (16") on center in both directions. Resilient clips shall be secured to framing with 13 gauge, 1/8" lathing nails. Under no circumstances shall perforated gypsum lath be attached directly to the framing. (Gypsum lath nailed directly to studs shall be applied strictly in conformance with manufacturer's recommendations.
- m. Interior Plastering on Plain Firecode Gypsum Lath:
  1. All walls over which perforated gypsum lath is applied shall be plastered as hereinafter specified, finishing 1/2" thick, measured from face of the perforated gypsum lath.
  2. Two-coat work shall be doubled back to bring the plaster out to grounds and straightened to a true surface and left rough to receive the finish coat.

## Base Coat:

One (1) part (by volume) gypsum plaster

Two (2) parts (by volume) sand

This coat shall be darbied, rodded and scored for finish coat.

## Finish Coat (Keene's):

Three (3) parts Keene's cement

One (1) part lime putty

Add hardwall plaster to aid set



## Finish Coat (Keene's - Sand):

Four and one-half (4-1/2) parts No. 30 sand

One and one-half (1-1/2) parts Keene's Cement

Two (2) parts lime putty

- n. Furnish and Install Metal Screeds at junction of plaster walls to ceilings when ceilings are of a material and finish other than plaster.
- o. Where plaster is used as part of required fire-resistive construction, it shall conform to Article 43, Title 19, Public Safety.
- p. Portland Cement Surfaces to Receive Ceramic Tile: See subparagraphs 3.02 i. and j. for specific requirements for cement plaster. Apply scratch coat only. Setting bed coat shall be applied under Section 09330.
- q. Resilient Furring System:
  - 1. Location: Refer to the drawings and Room Finish Schedule for walls and/or ceilings to receive resilient furring system.
  - 2. Installation (RCI Channels on One Side of Partition): Wood framing shall be erected in accordance with conventional procedure, studs 16" o.c., or 24" o.c. as noted on the drawings. A 1/2" x 3" shim strip of gypsum wallboard shall be nailed to the base plate and top plate continuously on the resilient side of the partition. RF channels shall be located horizontally, 24" o.c. maximum, and be secured through alternating flanges at each stud with 1-1/4" GWB-54 nails or Type W drywall screws. Abutting channel ends shall be located over studs, shall be gapped 3/8", and shall be fastened through both flanges. Gypsum wallboard shall be secured to RF channels with Type S drywall screws 12" o.c. Non-resilient side of partition shall be finished with gypsum wallboard in accordance with specifications for single or double layer wallboard application.
  - 3. Installation (RF Channels on Ceilings): Wood framing shall be erected in accordance with conventional procedure, 16" o.c., or 24" o.c. as noted on drawings. R.F. channels shall be installed perpendicular to joists, spaced 16" o.c., and a maximum of 6" from ceiling-wall line. Abutting channel ends shall be gapped 3/8" and shall be fastened through both flanges at each joist with Type W drywall screws.
  - 4. Caulking: Caulking material must be non-hardening, non-staining, and easily applied with a caulking gun. Caulking beads should be 1/4" diameter minimum but bead must be increased in size as necessary to assure positive seal. Caulking is recommended at the following locations:
    - (a) One serpentine bead under floor track or sole plate in all cases. (A single, straight bead under cent of track is acceptable if positive seal is accomplished.)

END OF SECTION  
12/23/2013

**EXTERIOR PLASTER FINISHING SYSTEM**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, scaffolding, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

Supply and install materials for an acrylic/cement based exterior plaster finish system.

## 1.03 RELATED WORK

- a. Plaster Substrate, see Section 09 21 01
- b. Concrete Substrate, see Section 03 10 00

## 1.04 QUALITY ASSURANCE

- a. The manufacturer of the system shall have:
  - 1. Marketed exterior insulation and finish systems in the United States for at least 10 years.
  - 2. Completed projects of the similar building type, size, and substrate types as this project.
- b. The Applicator/Contractor shall:
  - 1. Have been trained in the installation of the system,
  - 2. Possess a current certificate of training.
  - 3. Shall be experienced and competent in the installation of plaster-like materials.
- c. Substrate System (See Lathing & Plastering Section 09 21 01)
  - 1. Shall be engineered to withstand all applicable loads, including live, dead, positive, and suction wind, seismic, etc. Bond strength, fastener strength, and connection strength shall be analyzed and engineered. Appropriate factors of safety shall be used.
  - 2. The maximum deflection under positive or suction full design loads of the substrate system shall not exceed the following values:  $1/240^{\text{th}}$  of the span.
- d. Substrates: Application of the system shall be the following substrates only:
  - 1. Sound unpainted concrete.
  - 2. Sound, unpainted stucco.
  - 3. Substrates other than those listed above shall be approved by the Architect in writing prior to installation of the system.
  - 4. Sheathing substrates shall be oriented with their strong axis perpendicular to the supporting framing. Plywood and other structural wood panels shall follow APA spacing recommendations for edge, and end joints.
  - 5. The Contractor shall verify that the proposed substrate is acceptable to the applicable regulatory authorities prior to installation of the system.

- e. Expansion Joints: See Section 09 21 01.
- f. The manufacturer's latest published information shall be followed for standard detail treatments.
- g. Concrete and cement plaster substrates shall be flat within 1/4" within any 4' radius.

#### 1.05 SUBMITTALS

Samples: Two (2" x 4") samples of the system mounted on plaster over 3/8" plywood sheathing of each finish, texture and color, used on the project, shall be submitted to the Architect. Each sample shall be prepared using the same tools and techniques proposed for the actual installation by the Contractor.

#### 1.06 MAINTENANCE KIT

The following materials shall be delivered to the location where the system is being applied:

- a. For each finish and color, one can of finish
- b. One can of adhesive
- c. Twenty square feet of the reinforcing mesh used on this project.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- a. All materials shall be delivered to the location where they will be applied in the original, unopened packages with labels intact. Upon arrival, materials shall be inspected for damage and the manufacturer informed of any discrepancies. Unsatisfactory materials shall not be used.
- b. All materials shall be stored in a cool, dry location, out of sunlight, protected from weather and other damage and at temperatures not less than 40° F.
- c. All materials supplied by others such as substrates, framing, sealants, etc., shall be stored per manufacturers' instructions.

#### 1.08 JOB CONDITIONS

- a. The contractor shall provide access to electric power and clean, potable water at the area where the materials are installed.
- b. Environmental Conditions:
  - 1. The ambient air temperature shall be 40 ° F. or greater and rising at the time of installation of the materials and shall remain so for at least 24 hours thereafter.
  - 2. The materials shall not be applied to substrates that are at a temperature of 40 ° F. or less.
- c. Protection:
  - 1. Adjacent materials shall be protected from damage during the installation of the materials.
  - 2. The materials shall be protected from weather and other damage immediately after installation, including installation of sealants and flashings.
- d. Sequencing and Scheduling:
  - 1. Installation of the materials shall be coordinated with the other construction trades.

2. Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

#### 1.09 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2013 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to verify conformance with these regulations prior to beginning installation.

### PART 2 PRODUCTS

#### 2.01 APPROVED MANUFACTURERS

- a. Dryvit System, Inc.
- b. Parex Lahabra
- c. STO Corp
- d. Approved Equal

#### 2.02 MATERIALS

- a. Adhesive shall be a 100% acrylic-based product, Dryvit's Primus or equal. The bond strength to various substrates shall meet or exceed the following values when tested per ASTM D-897:
  1. Concrete: 160 psi
- b. Reinforcing Mesh:
  1. Shall be Dryvit's Hi-Standard Plus or approved equal
  2. Shall be an approved treated, open weave, glass fiber mesh
- c. Elastomeric Finish:
  1. Base coat shall be Dryvit - Color Prime, Omega - Akroflex Base Primer.
  2. Elastomeric Finish Top Coat shall be Dryvit-Weatherlastic, Omega Akrolastic
  3. Shall be Dryvit's Sandblast or equal. Texture shall be integral and final texture shall be determined by application technique.
  4. Shall be factory-mixed, 100% pure acrylic based and contain integral color and texture.
- d. Portland Cement: shall be Type I, II or III, meeting ASTM C-150, white or gray in color, fresh and free of lumps.
- e. Water shall be clean, potable and free of all foreign matter.
- f. Substrate shall be protected before, during and after the application of the system until the building is fully enclosed and watertight, including during the handling and shipping, using temporary methods such as tarps and plastic sheets as needed, to ensure that damage to the substrate does not occur.
- g. Sealant Systems: See Caulking and Sealants, Section 07 91 00.

#### 2.03 MIXING AND PREPARATION

- a. Adhesive:
  1. A clean container, free of foreign substances shall be used for mixing and preparation. Containers, which have come in contact with petroleum products, shall not be used.

2. The adhesive shall be stirred to obtain a homogeneous consistency using a Goldblatt Jiffler Mixer #15311H7 or equivalent, powered by a 1/2" drill at 400-500 rpm.
  3. A given weight of adhesive shall be measured into a container, and an equal weight of Portland cement measured into another container.
  4. While stirring the adhesive, small amounts of Portland cement shall be added in increments to obtain a final ration of one-to-one by weight. Stirring shall continue until the mixture is homogeneous.
  5. Small amounts of water may be added to the adhesive mixture to adjust workability. The mixture shall not be "watered down".
  6. A period of five minutes shall lapse after the initial mixing, then the mixture shall be tempered by stirring again.
  7. Mixture shall be used immediately after tempering. Pot life is the same as plaster-like materials and depends on ambient temperature and humidity conditions and substrate. Keep container closed when not in use.
  8. No additives, or materials of any kind, such as rapid binders, antifreeze, accelerators, fillers, pigments, etc. shall be added under any circumstances.
- b. "Sandblast" Finish:
1. The finish shall be thoroughly stirred with a clean high-speed mixer such as Goldblatt Jiffler Mixer #15311H7 or equivalent, powered by a 1/2" { 400-500 rpm drill, until a uniform workable consistency is obtained.
  2. A small amount of water may be added to adjust workability. The finish shall not be "watered down". The water must be clean and potable.
  3. No additives or materials of any kind, such as rapid binders, antifreeze, accelerators, fillers, pigments, etc. shall be added under any circumstances.
  4. The finish shall be used immediately after mixing. The container shall be kept closed when not in use. Pot life depends on ambient temperature and humidity conditions.
  5. The mixing tool shall be cleaned immediately after use.
- c. Reinforcing Meshes shall be "reversed-rolled" to remove the tendency of the mesh to curl.

## PART 3 EXECUTION

### 3.01 INSPECTION

- a. Prior to installation of the System, the substrate shall be examined by the Contractor as follows:
  1. The substrate shall be a type approved by the manufacturer.
  2. The substrate surface shall be free of foreign materials such as oil, dust, dirt, form-release agents, paint, wax, glazing, water, moisture, frost, etc.
  3. The substrate shall be examined for compliance with these contract documents.
  4. The substrate shall be examined for soundness, such as tightness of connections, crumbling or looseness of surface, voids and projections, etc.
  5. The substrate shall be examined for dimensional correctness per this specification.
- b. The Architect and Contractor shall be advised of all discrepancies. Work shall not proceed until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- a. Standard Base Coat:
  1. Using a stainless steel trowel, the adhesive mixture shall be applied to the surface of the substrate to a uniform thickness of 1/16".

2. The Hi-Standard II reinforcing mesh shall immediately be embedded into the wet adhesive mixture using a trowel. The surface of the adhesive mixture shall be smoothed with a trowel until the Standard Plus reinforcing mesh is fully embedded. The pattern of the Standard Plus reinforcing mesh shall not be visible beneath the surface of the adhesive mixture.
  3. The Standard Plus reinforcing mesh pieces shall be lapped a minimum of 2-1/2" on all sides, working from the center to the edge while smoothing out wrinkles.
  4. A period of 24 hours shall lapse to allow the base coat to form a positive bond. The base coat shall be protected from damage and weather while curing.
  5. Details of the installation of the base coat at the ends of walls, windows, panel edges, corners, etc. shall be in accordance with the manufacturer's latest published detailed installation instructions.
- b. Finish:
1. Finish shall be applied continuously and in one operation to the entire wall surface. A wet edge shall be maintained. The finish shall not be allowed to set up in a distinct area. Sufficient manpower, scaffolding and equipment shall be employed to ensure a continuous operation and a uniform appearance.
  2. Work shall proceed toward the joints and corners.
  3. A small amount of water may be used to adjust the workability of the finish. The water shall be clean and potable.
  4. Certain finishes can be spray-applied. Contact the manufacturer for specific information for this project.
  5. Until dry, the finish shall be protected from airborne contamination due to dust, soot, etc. and from weather and other damage.
  6. A tight coat of "Sandblast" finish shall be applied to the base coat. Leveling and texturing shall take place in one operation.
  7. The maximum thickness of the finish shall be no greater than that of the largest aggregate.

### 3.03 FIELD QUALITY CONTROL

- a. During construction, the jobsite shall be visited by a manufacturer's representative.

### 3.04 CLEAN UP

- a. Materials left over by the Contractor at the jobsite shall be removed.
- b. The Contractor shall clean adjacent materials and surfaces and the work area of foreign materials resulting from their work.

END OF SECTION  
12/16/2013

**VENEER PLASTER**

DIVISION 00 AND 01 ARE PART OF THIS SECTION

**PART 1 GENERAL**

1.01 STANDARD OF QUALITY

- a. The work of this Section shall include all labor, materials, equipment, and appliances required to complete all the work shown on drawings and or specified herein.
- b. Notwithstanding any reference in the specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number, such references shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition; and the contractor, in such cases, may, at his option use any article, device, product, material, fixture, form or type of construction which, in the judgment of the Architect, expressed in writing, is equal to that specified. All requests for substitutions shall be submitted per Article 19 of Specification Section 10.
- c. Any material or operation specified by reference to the published specifications of a manufacturer, institute, association, governmental agency, or other published standards, shall comply with the requirements of the current specification or standard listed. In case of conflicts between the referenced specification and the project specifications, the project specifications shall govern. In case of conflicts between the referenced specifications or standards, the one having the more stringent requirements, as interpreted by the Architect, shall govern.
- d. The Contractor, if requested, shall furnish an affidavit from the manufacturer, certifying that the materials or products delivered to the job meet the requirement specified; however, such certification shall not relieve the Contractor from the responsibility of complying with any added requirements specified herein.

1.02 WORK INCLUDED

- a. This section covers a non-load bearing, non-combustible fire-rated and sound rated Imperial Plaster as manufactured by United States Gypsum Company, complete.
- b. Installation of hollow metal jambs and metal glass frames in wood stud walls.

1.03 GENERAL REQUIREMENTS

- a. For the purpose of establishing a minimum acceptable construction standard, the following specifications are based on the product of U.S. Gypsum Co. Alternately, the products of Flintkote, Blue Diamond or Gold Bond will be considered equal under the terms of this specification providing the general intent is complied with and materials and finishes enumerated and supplied.
- b. All materials included herein shall be manufactured by the U.S. Gypsum Co., and shall be applied where indicated and as specified hereinafter. The installation of plaster partition materials shall be done by workmen experienced in this trade.

- c. Partition Thickness: The finished plaster partition system thickness shall be as indicated on the drawings. Stud sizes 2 x 4 or 2 x 6 or as noted on the drawings.

#### 1.04 CERTIFICATES OF COMPLIANCE

Prior to shipping any plaster partition material to the site, the Contractor shall submit to the Architect 5 copies of manufacturer's certificates showing compliance with the specified minimum material requirements for the completed plaster partition system and installation and workmanship instructions.

#### 1.05 IMPERIAL PLASTER PARTITION

All interior partitions, unless otherwise noted on the drawings, shall consist of 2x4 wood studs or 1-5/8" to 6" 25 ga. metal studs, 1/2" and 1/8" finish plaster on each side. Install insulation in wall or as specified on plans.

#### 1.06 DELIVERY AND STORAGE OF MATERIALS

All materials shall be delivered in their original unopened packages, containers, and bundles bearing the name of the manufacturer and the brand name. Materials shall be stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

#### 1.07 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2013 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature demonstrating compliance with these regulations prior to beginning installation.

## **PART 2 PRODUCTS**

### 2.01 MATERIALS

- a. Plaster Base shall be a high-strength, high-density core covered with special absorption face paper designed for veneer plastering. Plaster base shall conform to ASTM Designation C37 and Federal Specification SS-L-30c, Type 1.
- b. Imperial Plaster Base, Type X shall be 5/8" thick, 48" wide, as shown on drawings.
- c. Sheetrock W/R Wallboard shall be 5/8" thick, 48" wide with a special water resistant core.
- d. Fasteners for Plaster Base shall be 1-3/8" or 1-5/8" Dri-type nails for wood construction, or 1" type S hi-low screws for 25 ga. metal attachment.
- e. Reinforcing Tape shall be 2-1/2" glass fiber lino-weave Imperial Tape, Type S.



- f. Corner Beads shall be No. 900, 26 ga. galvanized steel.
- g. Metal Trim, Channel Type shall be USG 700A, 26 ga. galvanized steel.
- h. Metal Trim, Angle Type shall be USG 700B, 26 ga. galvanized steel.
- i. Control Joints shall be USG No. 093 made from roll-formed zinc alloy. Locate control joint at maximum 30 ft. o.c. on continuous partitions.
- j. Plaster Aggregate shall conform to ASTM Designation C35, and shall be graded silica sand passing a 30 or 20 mesh screen.
- k. Plaster Water shall be potable and not contain impurities that affect the setting of gypsum.
- l. USG Metal Trim: No. 200A, 200B, 401, 402, 071B
- m. USG Corner Bead: Dur-A-Bead No. 900
- n. USG Control Joint: No. 093

### **PART 3 EXECUTION**

#### **3.01 PREPARATION FOR INSTALLATION**

Installation shall not be started until windows are glazed and doors are installed unless openings are temporarily closed. In cold weather, the building temperature shall be maintained at a minimum comfortable working temperature. A temperature range of 55 to 60 deg. is recommended. Caution should be taken to avoid higher temperatures, which promote rapid drying conditions and are detrimental to the performance of veneer plaster systems. Air circulation shall also be maintained at a minimum level for 24 hours prior to, during, and after plastering until plaster is dry.

#### **3.02 INSTALLATION**

- a. Imperial Joint Reinforcement Tape shall be applied over the full length of all plaster base joints but shall not overlap at intersections.
- b. Type S Tape shall be firmly pressed along the entire length to insure a wrinkle-free attachment. Tape shall be secured with two 3/8" staples at top, one on each side of joints, 8" o.c. along length of taper, and alternating from side to side, with two staples at bottom. At wall-ceiling intersections and interior corners, tape shall be stapled 8" o.c. along ceiling edge or on one edge only.

#### **3.03 CEILING GRILLAGE AND PLASTER BASE ERECTION**

Imperial plaster base shall be applied face down with the long dimension at right angles to furring members and with all abutting ends occurring over framing members. Imperial plaster base of maximum practical length shall be used to minimize end joints, which shall not be staggered in adjacent rows. Plaster base

shall be fastened to channels with Dri-Type nails, spaced 6" o.c. in field of base and along abutting ends. Nails shall be driven at least 3/8" from ends and edges of bases.

### 3.04 ACCESSORIES

- a. Corner Beads: All vertical and horizontal exterior corners shall be reinforced with corner bead fastened with staples not over 12" o.c. on both flanges along the entire length of the bead.
- b. USG Metal Trim shall be applied over the Imperial plaster base and fastened on the perforated side with staples spaced not over 12" o.c.

### 3.05 MIXING

Plaster materials shall be mixed in conformance with the manufacturer's current printed instructions. Set plaster materials shall not be retempered. Mix 20 lbs. clean white silica sand per 80 lbs. of plaster, where sand finish is called for.

### 3.06 PLASTERING

Imperial basecoat plaster shall be applied over Imperial plaster base to a minimum finished thickness of 3/32" and a maximum of 1/8". All tape shall be embedded and beads shall be filled with a tight, thin coat of plaster material. When embedding plaster has set completely, a tight, thin coat shall be scratched in over the entire area immediately doubling back to the full thickness.

### 3.07 PATCHING

Plaster showing oversanding, cracks, blisters, pits, checks, or discoloration will not be acceptable. Such plaster shall be removed and replaced with new plaster. Patching of defective work will be permitted only when approved by the Architect and such patching shall match existing work in texture and color.

### 3.08 CLEANING

At the completion of the finish plastering work, all plaster daubs shall be cleaned from beads, control joints, and metal trim. All plaster rubbish shall be removed from the building, leaving floors broom clean. Excess material, scaffolding, tools, and other equipment shall be removed from the building and job site.

END OF SECTION  
12/16/2013

**GYPSUM DRYWALL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.

1.02 WORK INCLUDED

- a. Furnish and install all gypsum drywall, including gypboard under acoustic tile.
- b. Furnish and install all accessory items, corner beads, casing beads, and trim.
- c. Taping of all joints, filling over nail or screw heads and surface texturing of all gypsum drywall.

1.03 RELATED WORK

- a. Painting of gypsum wallboard.
- b. Gypsum lath for plastering.

1.04 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2013 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to demonstrate compliance with these regulations prior to beginning installation.

**PART 2 PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

- a. U.S. Gypsum

2.02 MATERIALS

Lathing, plastering and drywall shall conform to UBC Materials, Testing and Installation Vol. 3 listed in Chapters 25 and 35 and Chapter 25A, Part 2 of Title 24, C.B.C.

- a. Drywall Panel Components:
  - 1. Non Fire-Rated: 1/2" or 5/8" thick (as indicated on drawings) regular gypsum wallboard, four (4) feet wide x lengths of six (6) to sixteen (16) feet. Long edges shall be tapered.
  - 2. One (1) Hour Fire-Rated: 5/8" thick, four (4) feet wide x lengths of six (6) to fourteen (14) feet. Long edges shall be tapered.
- b. Fasteners:

1. Nails: GWB - 54 annular ring nails, 1/4" head, .098 diameter x 1-1/4" long for 1/2" thick gypsum wallboard or x 1-3/8" long for 5/8" thick gypsum wallboard.
2. Screws shall conform with ASTM C-1002.
  - (a) Type W x 1-1/4" for anchorage into wood studs.
  - (b) Type "S" x 1" long for anchorage into RF channels.
- c. Metal Accessories:
  1. Corner beads shall be galvanized steel (1" x 1/4" for nailing to 1/2" and 5/8" board), (1-1/8" x 1-1/8" for crimping to any wallboard corner), or Multi-Flex metal tape bead.
  2. Casing beads and trim shall be galvanized steel.
- d. Joint Treatment Materials:
  1. Joint tape shall be U.S. Gypsum Perfatape or approved equal.
  2. Joint compound shall be U.S. Gypsum Powdered or Ready-Mixed or approved equal.
  3. Fast hardening joint compound shall be Durabond "90" or approved equal.
  4. U.S. Gypsum topping compound or approved equal.
- e. Resilient Furring Channels shall be galvanized steel, U.S. Gypsum RC 1 channel or approved equal.
- f. Drywall Texture Products: Wallboard finish shall be U.S. Gypsum Wall Texture, Imperial QT simulated acoustic, Color Texture, as selected by the Architect. Contractor shall furnish sample boards of textural effects for the Architect's selection.

### **PART 3 EXECUTION**

#### **3.01 GENERAL REQUIREMENTS**

- a. Preparation for Work: Examine and inspect materials to which gypsum board is to be applied. Remedy all defects prior to installation of drywall. Any defects in the finished installation due to misaligned framing or other cause will be the responsibility of the work performed under that section of the specifications and such defects shall be remedied under that section of the specifications. Maintain a uniform room temperature between 55 deg. F. and 70 deg. F. in cold weather during application and until completely dry or occupied. Provide adequate ventilation.
- b. Cutting Wallboard: Gypsum wallboards shall be cut by scoring and breaking, or by sawing, working from the face side. Where board meets projecting surfaces, it shall be scribed neatly.
- c. Installing Wallboard: Gypsum wallboard shall be applied first to ceiling at high angles + framing members, then to walls. Boards of maximum practical length shall be used so that an absolute minimum number of end joints occur. Board shall be brought into contact with each other, but shall not be forced into place. Wallboard joints at openings shall be located so that no end joint will align with edges of opening. End joints shall be staggered, and joints on opposite sides of a partition shall not occur on the same stud.
- d. Single Layer Wallboard Application:
  1. Nails: Gypsum wallboard shall be held in firm contact with the framing member while fasteners are being driven. Fastening shall proceed from center portion of the wallboard toward the edges and ends. Fasteners shall be set with the heads slightly below the surface of the wallboard in a dimple formed by the hammer or power screwdriver. Care shall be taken to avoid breaking the face paper of the wallboard. Improperly driven nails or screws shall be removed. Nails shall be located 3/8" min. to 1/2" max. from edges and ends of wallboard. Nails shall be a maximum of 7"

- o.c. on ceilings and a maximum of 8" o.c. on walls, except for "Double Nailing". Refer to USASI A97.1 Specification for "Double Nailing" procedure.
2. Screws: Drywall screws for attaching gypsum wallboard to wood framing shall be 1-1/4" type "W", spaced not to exceed 12" o.c. on ceilings, 16" o.c. on sidewalls. Where studs are spaced 24" o.c., sidewall screw spacing shall not exceed 12" o.c. NOTE: For screw application to steel studs, refer to specifications for partition system selected.
- e. Joint and Corner Finishing:
1. Joint Compound, Quick-Treat, and Topping Compound shall be mixed in accordance with printed instructions contained on the package.
  2. A uniformly thin layer of joint compound shall be applied over the joint approximately 4" wide. The tape shall be centered over the joint and embedded into the compound, leaving sufficient joint compound under the tape to provide proper bond. Ceiling and wall angles and inside corner angles shall be reinforced with the tape folded to conform to the angle and embedded into the compound.
  3. After compound is thoroughly dry, (approximately 24 hrs. for regular compound, 2-1/2 hours for Quick-Treat or Sta-Smooth), the tape shall be covered with a coat of joint compound, or topping compound spread over the tape approximately 3" on each side of the tape, and feathered out at the edge. After thoroughly dry, another coat of joint compound or topping compound shall be applied with a slight uniform crown over the joint. This coat shall be smooth and the edges feathered approximately 3" beyond the preceding coat.
  4. All inside corners shall be coated with at least one coat of joint compound or topping compound with the edges feathered out.
  5. All nail or screw head dimples shall receive three coats. This may be applied as each coat is applied to the joints.
  6. Flanges of wallboard corner bead shall be concealed by at least two coats of compound. The first coat shall be joint compound, and the second coat may be joint compound or topping compound feathered out approximately 9" on both sides of the exposed metal nose.
  7. For joint and corner treatment with Sta-Smooth Compound, fill joint and bed tape simultaneously. After Sta-Smooth Compound has hardened, apply any Gold Bond joint compound.
  8. Allow each application of compound to joints and nail heads to dry, then sand if necessary. Caution shall be used to avoid roughing of the wallboard paper. All wallboard and treated areas shall be smooth and ready for decoration.
- f. Surface Texturing Gypsum Board: The gypsum surface shall be U.S. Gypsum Spray Texture or approved equal.
1. Spray-Quick shall be applied to ceilings only in a coarse, medium, medium-fine texture as selected.
  2. Wall Spray shall be applied to walls, ceilings in an orange peel, a spatter or a crater texture pattern as selected.
  3. Texas Texture shall be spray-applied in a spatter texture pattern or roller applied in a coarse, medium, or fine texture pattern as selected.
  4. Sample boards shall be made of the texture selected and furnished to the Architect for final approval.
  5. Drying time of 24 hours minimum shall be allowed. Temperature shall be maintained uniformly between 55 deg. F. and 70 deg. F. in cold weather during the application of the joint compound, the primer (used for surface preparation), and the texturing until each is thoroughly dry.

6. Gypsum wallboard shall be attached to the framing in accordance with the above specifications. Apply tape and joint compound in the conventional manner to all joints on the surface prior to texturing.
  7. When Spray-Quick is used, the entire ceiling surface must first be primed with Gold Bond Alkyd Flat Paint.
  8. When texture is to serve as final decoration, the entire wallboard surface must be primed with Gold bond Alkyd Flat Paint or Gold bond All Purpose Primer, if Quick-Treat is used a joint finishing compound.
  9. Mix in accordance with instructions printed on the bag.
- g. Resilient furring System:
1. Location: Refer to the drawings and Room Finish Schedule for walls and/or ceilings to receive resilient furring system.
  2. Installation (RC 1 Channels on One Side of Partition): Wood framing shall be erected in accordance with conventional procedure, studs 16" o.c. or 24" o.c. as noted on the drawings. A 1/2" x 3" shim strip of gypsum wallboard shall be nailed to the base plate and top plate continuously on the resilient side of the partition. Channels shall be located horizontally, 24" o.c. maximum, and be secured through alternating flanges at each stud with 1-1/4" GWB-54 nails or Type W drywall screws. Abutting channel ends shall be located over studs, shall be gapped 3/8" and shall be fastened through both flanges. Gypsum wallboard shall be secured to RC 1 channels and Type S drywall screws 12" o.c. Non-resilient side of partition shall be finished with gypsum wallboard in accordance with specifications for single or double layer wallboard application.
  3. Installation (RC 1 Channels on Ceilings): Wood framing shall be erected in accordance with conventional procedure, joists 16" o.c. or 24" o.c. as noted on drawings. RC 1 channels shall be installed perpendicular to joists, spaced 24" o.c. and a maximum of 6" from the ceiling wall line. Abutting channel ends shall be gapped 3/8" and shall be fastened through both flanges at each joist with Type W drywall screws.
  4. Caulking material must be non-hardening, non-staining and easily applied with a caulking gun. Caulking beads should be 1/4" diameter minimum but bead must be increased in size as necessary to assure positive seal. Caulking is recommended at the following locations:
    - (a) One serpentine bead under floor track or sole plate in all cases. (A single, straight bead under center of track is acceptable if positive seal is accomplished).
    - (b) A similar bead under ceiling or wall track if junction is not otherwise sealed. (When wall or ceiling junction is taped, caulking is not required.)
    - (c) where partition is finished with a casing bead at junction of ceiling or wall, use 500VB casing bead or a bead of caulking located so the inner edge of casing bead compresses the caulking.
    - (d) A similar bead at floor line after finish layer of wallboard is applied and before installation of base.

### 3.02 SPECIAL REQUIREMENTS

- a. Fire-Rated Systems: Walls, ceilings and/or protective furring or wrapping of structural members so designated on the drawings and Room Finish Schedule as being fire-rated for a specified time length shall be installed in strict accordance with the requirements specified by the Governing Agency. Where light fixtures, conduit, cabinets, or boxes penetrate fire rated ceilings, walls or floors, provide a fire rated enclosure or fire stop. Rating of enclosure or fire stop shall match or

exceed rating of area penetrated. Verify location of fire rated areas with architectural drawings and with General Contractor.

- b. Expansion Joints:
  - 1. In long expanses of partitions, such as corridors, expansion joints should be used at least every 30 feet. Expansion joints are recommended at door jambs, extending from door head to ceiling. Where jambs extend from floor to ceiling and are spaced not farther apart than 30', no expansion joints are required.
  - 2. In large expanses of ceilings, expansion joints are necessary to limit dimensions in either direction to 50 feet. Expansion joints are required to limit areas to not greater than 2,500 square feet.
  - 3. Acceptable expansion joints in drywall systems do not adversely affect fire or sound ratings. The use of expansion joints in fire rated assemblies is described in U.L. Report R-4024-7-8.
- c. Clean Up: Upon completion of the work hereinbefore specified, remove all unused materials and implements of service, rubbish and debris resulting from this work and leave the entire building and premises, insofar as the work of this Section is concerned, neat, clean and as approved by the Architect.
- d. Guarantee: All work executed under this Section of the Specifications will be free from defects of materials and workmanship for a period of one (1) year from date of final acceptance of this work.
- e. Exterior Gypsum Ceiling Board on Ceilings and Soffits shall be USG Exterior Gypsum Ceiling Board System in strict conformance to United States Gypsum Bulletin 9P, Gypsum Drywall.

END OF SECTION  
12/16/2013

**TILE WORK**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- a. All ceramic tile wall floor and base and setting beds as indicated in Drawings.
- b. Where no lathing and plastering section is included in these Specifications, felt, lathing and a scratch coat for the setting beds shall be provided under this section of the Specifications.

## 1.03 RELATED WORK

Where a lathing and plastering section is included in these Specifications, felt lathing and scratch coat for the tile setting beds is specified under the Lathing and Plastering Section of these Specifications.

## 1.04 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2022 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to demonstrate compliance with these regulations prior to beginning installation.

**PART 2 PRODUCTS**

## 2.01 MATERIALS

- a. Metal Lath: U.S. Gypsum "Junior Diamond" or approved equal 3.4 lb. bearing metal lath.
- b. Cement: Portland cement conforming to ASTM C-150, Type 1.
- c. Grout cement shall comply with ANSI, A118.6.
- d. Wall Lathing Nails: 6d common wire cut nails for application of metal lath on walls.
- e. Lime Putty: High calcium, ASTM, C206, or C207, Type "S."
- f. Sand: ASTM C-144.
- g. Cleavage Membrane: 15-lb. roofing felt or 4-mil polyethylene film.



- h. Tile: All tile, unless otherwise specified, shall be the standard grade in price groups I thru III and comply with ANSI A137.1.
  - 1. Base Tile: Glazed 6" x 6" sanitary cove base. Color to be selected by Architect.
  - 2. Floor Tile: Unglazed ceramic mosaic, natural clay, cushion edge. Except as may be otherwise specified or approved in advance by the Architect, provide floor tiles with coefficient of friction of 0.60 or higher in accordance with pertinent provisions of ASTM C1028. Color to be selected by Architect.
  - 3. Wall Tile: 4-1/4" x 4-1/4" glazed tile, coved corners in all toilet and shower rooms maybe used unless tile pattern indicated on drawings would be interrupted and result in a discontinuity of the pattern indicated on the drawings, and/or 90% unglazed (natural clay) ceramic mosaic and 10% glazed (porcelain) ceramic tile, or sizes as noted on the drawings. All with square edges. 6" x 4-1/4" coved or bullnosed base may be used unless otherwise indicated on drawings. At inside and outside corners of vertical surfaces where accent tile patterns are indicated, the contractor shall mitre corners such as to allow a continuous flow of the pattern. Color to be selected by Architect.
  - 4. Quarry Tile: 6" x 6" unless noted otherwise, Quarry Tile as manufactured by American Olean, coved, bullnosed base and corners where indicated on plans. Color to be selected by Architect. Quarry Tile shall have a coefficient of friction of at least 0.6 per ASTM C1028.
- i. Water shall be clean, free from alkali or organic matter.

## 2.02 SUBSTITUTIONS

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

## 2.03 PRODUCTS

- a. American Olean
- b. Dal-Tile
- c. Florida Tile
- d. Or approved equal

## **PART 3 EXECUTION**

### 3.01 GENERAL REQUIREMENTS

- a. Materials: All materials and workmanship shall be installed in strict accordance with the "Handbook of Ceramic Tile Installation", latest edition, as published by the Tile Council of America, Inc. Except as may be otherwise specified or approved in advance by the Architect, provide floor tiles with coefficient of friction of 0.60 or higher in accordance with pertinent provisions of ASTM C1028.

- b. Color: Tile and grout color and design shall be selected by the Architect. Current sample colors shall be furnished to the Architect for color selection.
- c. Materials Not Permitted: The use of dry lime putty, fire clay or high magnesium lime putty in cement mix will not be permitted. White cement for setting bed and buttering shall not be used, except when mixed with grout.
- d. Completeness: Tile work under this specification shall not be considered complete unless proper angles and stops are used for base, cap, and other trim. Mitering of tile will not be accepted except when absolutely necessary to overcome certain conditions.
- e. Protection: The contractor shall cover all work as necessary and protect the work from damage until completion and acceptance of the building.
- f. Cleaning Site: Shall be per Specification Section 10, Article 46.
- g. Expansion Joints: Provide expansion joints maximum of 16'-0" both ways.

### 3.02 SPECIAL REQUIREMENTS

- a. Application of Wall Tile:
  - 1. Wall tile shall be installed per Ceramic Tile Institute Handbook Method No. W231.
  - 2. Setting Bed or Float Coat:
    - (a) Setting bed shall be composed of one (1) part by volume of Portland cement to five (5) parts by volume of clean sharp damp sand to one-half part Miracle Lime. Comply with ANSI A 108A-4.1a.2.1
    - (b) Setting bed shall be applied over scratch coat, which shall be sufficiently wetted to assure proper bonding of the setting bed.
    - (c) Surface shall be true and not less than 3/4".
  - 3. Application of Tile: ANSI Specifications A108-1B and A118.1, Ceramic Tile in Cement Mortar, insofar as any portion is applicable, are hereby made a direct part of this specification. Installation using thin-bed mortar and water resistant organic adhesives in accordance with manufacturer's directions and as Spec. A108-5 for dry set mortars of C.T.I. 0-010-61 for adhesives is acceptable.
  - 4. Dry Wall Grout: A mixture of Portland cement and additives providing water retentivity. Dry-wall grout has the same characteristics as Dry-Set mortar and is suitable for grouting all walls subject to ordinary use. This grout obviates soaking of wall tile, although dampening is sometimes required under very dry conditions. Comply with ANSI, A108.10.
- b. Application of Floor tile Quarry Tile
  - 1. Floor tile shall be installed per the Ceramic Tile Institute Handbook Method No. F-141 on wood floors and Method No. F111 for concrete slab floors.

2. Preparation: Thoroughly clean the concrete base over which tile is to be placed. Remove all high and uneven spots and all loose material and wash down with water.
  3. Setting Bed: Composed of one (1) part by volume Portland cement and five (5) parts sand with optional up to no more than 1/10<sup>th</sup> part hydrated lime. Bed shall not be less than one and one-half inch (1-1/2") thick. Comply with ANSI 108A-4.1a.2.2.
  4. Setting Floor Tile: Tile shall be set to a true and even surface with uniform joints of appropriate size depending upon the type of tile on a cured mortar bed with dry-set cement mortar. Comply with ANSI- A108.1B and ANSI A108.1C.
  5. Grouting Floors: Joints shall be grouted with grey cement mixed with clean water to a consistency of cream. Force grout into all joints and bring to a level surface with tile. Comply with ANSI, A108.10.
- c. Cutting and Patching:
1. The Contractor shall do all patching of his work as required for the installation of the work of other contractors.
  2. Immediately before turning the building over to the Owner, the Contractor for the tile work shall make a careful inspection of all tile and report to the Architect any damage done to same by other trades.
- d. Cleaning: Immediately upon completion and as directed, all tile shall be thoroughly cleaned with clean water. Cleaning shall be done only by those thoroughly familiar with the proper cleaning of tile. In no instance use acid or abrasive material on glazed tile surfaces. Just prior to acceptance of the completed building project, this cleaning process shall be repeated so that the tile work shall be in an acceptable, clean condition at the time of acceptance of the building.
- e. The contractor shall leave with the owner upon completion of all work; an amount of not less than 2% of each material specified for the use in future repairs.

END OF SECTION  
08/05/2022

**ACOUSTIC TILE**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, scaffolding, equipment, and appliances necessary to complete the work indicated on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- a. All acoustic tile for walls and ceilings.
- b. Metal trim for acoustic tile.
- c. All mastic and wood stripping for the direct application of acoustic tile.
- d. Suspended acoustical ceiling systems, support channels, steel suspension system, complete.
- e. Sound barriers over stud partitions where indicated on drawings.
- f. All #12 ga. slack safety hanger wires (including anchorage to the structural above) for support of light fixtures and air terminals.

## 1.03 RELATED WORK

- a. Plywood backing for acoustic tile is specified under the Carpentry section.
- b. No fiber trim shall be used.
- c. Wood stripping under all gypboard.
- d. All electrical work, including fixtures, wiring, conduits, and junction boxes, is specified under the electrical section.
- e. Suspended wood ceiling framing.
- f. Gypsum wallboard backing for acoustic tile is by Gypsum Drywall Contractor.
- g. Fastening of slack safety hanger wires to light fixtures and air terminals shall be by Electrical and HVAC Contractors, respectively.

## 1.04 SUBMITTALS

- a. Contractor shall provide a minimum of five (5) copies of manufacturer literature on all adhesives indicating compliance with 2022 California Green Building Standards Code, Section 5.504.4.1 and Table 5.504.4.1 Adhesive VOC limit and SCAQMD Rule 1168 VOC Limits for review and approval by the architect prior to beginning installation.
- b. Contractor shall submit a minimum of three (3) product sample for each product which indicates size, shape and color availabilities to the architect for review and selection by Architect.

**PART 2 PRODUCTS**

General: The quality, design and installation of all wall and ceiling coverings and support systems shall comply with the requirements and standards adopted by reference from set forth in Chapter 25A, Part 2, Title 24 C.B.C., CBC Materials, Testing and Installation Standards Vol. 3 No. 25-1, and Division of the State Architect's Interpretation of Regulations (IR) 25-2, current edition.

## 2.01 ACCEPTABLE MANUFACTURERS

- a. Acoustical Ceiling Panels
  - 1. U.S. Gypsum
  - 2. Celotex Corp.
  - 3. Conweb Corp.
  - 4. Gold Bond Building Products
  - 5. Kaiser
  - 6. Armstrong
  - 7. Manville
  - 8. National Gyp. Co.
- b. Exposed and concealed metal direct-hung suspension systems:
  - 1. Chicago Metallic Corporation
  - 2. Donn Corporation
- d. Standard Lay in Acoustical Panels
  - 1. Armstrong "Ultima Health Zone" style for texture and pattern used for reference only.

## 2.02 MATERIALS

All ceiling tiles shall have Class 1 F.S. rating (0-25) and smoke density not exceeding 450.

- a. Acoustic Tile:
  - (1) Mineral Tile: 12"x12"x5/8" thick Type 118, Class 1 Flame Spread (Classification Table No. 8A, Title 24, and UBC), incombustible, carrying Underwriters Lab., Inc. label, Class 1 Flame Spread rating according to Tunnel Test method, factory finish with three (3) coats of washable white paint.
  - (2) Mineral Fiber Lay-In Units: 23-3/4" x 47-3/4" x 5/8" thick for 2 ft. x 4 ft. grid ceilings, Class A (incombustible), carrying Underwriters Lab., Inc. label, Class 1 Flame Spread rating according to Tunnel Test method. Factories finish with three (3) coats of washable white paint.
- b. Suspension System: (non-rated or fire rated as indicated on the drawings) shall be heavy duty T-Bar system for 2 ft. x 4 ft. grid as approved and listed by Division of the State Architect and meeting tests showing compliance with Title 24, Section 1617A.1.21 and ASCE 7, Section 13.5.6.2 Cross tees eliminated at Quadrulon System light fixtures for 4'x4' opening.
  - (1) Components: shall comply with ASTM C635 and ASTM E580 Section 5.1.
    - a) Structural Classification: Heavy Duty per ASTM E 580 Section 5.1.1 as defined by ASTM C635. Cross runners shall have a minimum load bearing capacity of 16lbs per lineal foot per ASTM E580 Section 5.3.3.
    - b) Main runners, cross runners, splices, expansion devices and intersection connectors shall be designed to carry a mean ultimate test load of not less than 180lbs in compression and ension per ASTM E580 Section 5.1.2.and in accordance with the CBC, Section 1617A for Category D, E and F as described in ESR-1308.
    - c) Hanger and brace wire shall conform to ASTM A641 and the material properties required by IR 25-1" Maximum Allowable Load for Ceiling Wires. Hanger and brace wires shall be #12 ga or larger.
    - d) Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
    - e) Acceptable System: **Prelude XL Exposed Tee 15/16"** System as manufactured by Armstrong World Industries.

- (2) Attachment Devices: In accordance with the CBC, Section 1617A for Category D, E, and F.
- (3) Wire for Hangers and Ties: In accordance with the CBC, Section 1617A.
- (4) Wall Moldings: 7/8"x7/8" Angle Molding for use with the BERC2 Clip. In accordance with the International Building Code, Section 1621 for Category D, E, and F or method as described in ESR-1308.
- (5) Accessories:
  - a) BERC2 - 2 inch Beam End Retaining Clip, 0.034 inch thick, hot-dipped galvanized cold-rolled steel per ASTM A568 - used to join main beam or cross tee to wall molding.
  - b) SJCG - Seismic Joint Clip, 5 inches x 1-1/2 inch, hot-dipped galvanized cold-rolled steel per ASTM A568. The two piece unit is designed to accommodate a seismic separation joint. The clip is compatible with 15/16 inch and 9/16 inch grid systems including Prelude, Suprafine, and Silhouette The SJCG is not suitable for use with Vector panel installations.
  - c) SJMR15 - Seismic Joint Clip - Main Beam, 1 inch x 4 inches, commercial quality cold rolled hot dipped galvanized steel per ASTM A568, chemically cleansed.

## PART 3 EXECUTION

### 3.01 GENERAL REQUIREMENTS

- a. Examination of Surfaces: The contractor shall be held to have examined the surfaces over which acoustic tiled/or gypsum board are to be applied and if for any reason a perfect job is impossible or anything is detrimental to obtaining a perfect job (straight and true) and with assurance of obtaining the utmost value of the material, it shall be reported to the Architect before proceeding with the work.
- b. Scribing and Cutting: Scribe acoustic tile to walls with a close, snug fit. Neatly cut in for electrical fixtures and openings so that finish and fixture trim will cover the cut and leave a neat appearance.
- c. The contractor shall furnish to the Electrical Contractor locations for all fixture outlets in acoustic tile areas, locating same in the center of or at the corner intersection of tile prior to installation of electrical rough-in. Locations to be approved by Architect.
- d. Cleaning: Upon completion of the acoustic tile application, clean all tile of fingerprints, dirt, etc., and point up with factory finish and leave all surfaces in a clean and acceptable condition. Site cleaning as per Section 10, Article 30.
- e. Install suspension system and panels in accordance with ASTM C636 and ASTM E580 Section 5.2 and 2022 CBC 1617A 1.21 ASCE 7, Section 13.5.6.2, and with the authorities having jurisdiction.
- f. ESR-1308, Section 4.4.3.1, Alternate Seismic Design Category D, E and F Installation:  
Under this installation, the runners must be rated heavy-duty and have a minimum simple span uniform load of 16.35 pounds per lineal foot (238 N/m); maximum ceiling weight permitted is 1.80 pounds per square foot (8.78 kg/m<sup>2</sup>).
  - 1) The BERC-2 clip is used to secure the main runners and cross runners on two adjacent walls to the structure and the two opposite walls to the perimeter trim, as detailed below. A nominal 7/8-inch (22 mm) wall molding is used in lieu of the 2-inch (51 mm) perimeter supporting closure angle required by Section 1617.1.21 ASCE 7, Section 13.5.6.2.1 for Seismic Design Categories D, E and F. Except for the use of the BERC-2 clip and the 7/8-inch (22 mm) wall molding and elimination of spreader bars, installation of the ceiling system must be as prescribed by the applicable code.

- 2) The BERC-2 clip is attached to the wall molding by sliding the locking lances over the hem of the vertical leg of the wall molding. Clips installed on the walls where the runners are fixed are attached to the runner by a sheet metal screw through the horizontal slot in the clip into the web of the runner.
  - 3) Clips installed on the walls where the runners are not fixed to the runner allow the terminal runner end to move 3/4 inch (19.1 mm) in both directions. BERC-2 clips installed in this manner are an acceptable means of preventing runners from spreading in lieu of spacer bars required in CISCA 3-4, which is referenced in Section 1617A1.21 ASCE 7, Section 13.5.6.2.2.
- i. The SJCG Seismic Separation Joint Clip is to be installed per the manufacturer's instructions, CS-3815.
  - h. The SJMR15 Seismic Joint Clip Main Beam is to be installed per the manufacturer's instructions, CS-3955.
  - i. The presence of a hanger wire within 3 inches of an expansion relief joint as called for in ASTM C636 shall be required in addition to the requirements of the CBC 2022 1617A.1.21 ASCE 7, Section 13.5.6.2 and with the authorities having jurisdiction.
    - 1.) Only applies when using Prelude XL Fire Guard 15/16"; Prelude Plus XL Fire Guard 15/16"; and Suprafine XL Fire Guard 9/16" Exposed Tee Systems.
  - j. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
  - k. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.
  - l. Install suspension system and panels in accordance with the manufacturer's instructions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.
  - m. Suspend main beam from overhead construction with hanger wires spaced 4-0 on center along the length of the main runner. Install hanger wires plumb and straight.
  - n. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.
  - o. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
  - p. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings.

### 3.02 DESIGN AND CONSTRUCTION OF CEILING SUSPENSION SYSTEMS

- a. General: Ceiling suspension systems used primarily to support acoustical tile panels, plastic panels without light fixtures shall be installed and constructed in accordance with the provisions of 2022 CBC as required and according to the following interpretations:
- b. Materials: The materials, installation and workmanship for metal suspension systems for acoustical tile and lay-in panel ceilings shall comply with the requirements for *direct hung* ceilings of ASTM C-635, ASTM C-636 and E580, Section 5 and the provisions and exceptions of these notes.
- c. Design: In accordance with 2022 CBC Sec. 1617A1.21, all ceilings shall be designed and detailed for a minimum lateral force of 1.4 pounds per square foot of ceiling area, or 30 percent of the weight of the ceiling construction and any ceiling-supported partitions, whichever is greater.
- d. Types of Systems: All ceilings shall have a minimum classification of "heavy duty" as defined by ASTM C-635.

- e. Details of Construction:
- (1) General: The following requirements apply to ceiling systems whose total weight, including ceiling mounted air terminals, services and light fixtures, does not exceed four (4) psf. Heavier systems, and those supporting lateral loads from partitions, will require special design details. Ceilings shall not support material or other building components. Duct work, plumbing and like work shall have its own support system and shall not use the ceiling system or suspension wires. The slope of bracing wires shall not exceed 45 degrees from the plane of the ceiling and wires shall be taut. Splices in wires are not permitted without special DSA approval.
  - (2) Vertical Support System: #12 gage wire shall be 0.106 inches in diameter conforming to ASTM A641. #12 gage wire shall be soft annealed, galvanized steel wire with a class 1 coating and may be used for up to and including 4ft. by 4ft. grid spacing and shall be attached to main runners. When drilled-in concrete anchors or power actuated fasteners are used in reinforced concrete for hanger wires, 1 out of 10 wire/anchor assemblies must be field tested for 200 lbs. in tension. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 wire/anchor assemblies must be field tested for 440 lbs. in tension in the direction of the wire. Shot-in anchors in concrete are not permitted for bracing wires. **Note:** Drilled-in or power actuated fasteners require special DSA approval prior to use in prestressed concrete. Fasten #12 hanger wires with not less than three (3) tight turns. Fasten #10 or #12 bracing wires with four (4) tight turns. Make all tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the anchor aligns as closely as possible with the direction of the wire. **Note:** Wire turns made by machine where both strands have been deformed or bent in wrapping can waive the 1-1/2 inch requirement, but the number of turns should be maintained, and be as tight as possible. Provide #12 gage hanger wires at the ends of all main and cross runners within eight (8) inches of the support or within one-fourth (1/4) of the length of the end tee, whichever is least, for the perimeter of the ceiling area. Perimeter wires are not required when the length of the end tee is eight (8) inches or less. Separate all ceiling hanger and bracing wires at least six (6) inches from all unbraced ducts, pipes, conduit, etc. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits, or discontinuous areas. Hanger wires that are more than 1 (horizontal) in 6 (vertical) out of plumb are to have counter-sloping wires.
  - (3) Horizontal Support System: The lateral support system for ceilings shall be shown on the reflected ceiling drawings. The adequacy of the system shall be demonstrated by calculations and/or tests, including the adequacy of the main runner splices and cross runner intersection connections and shall comply with 2022 CBC Section 808. Calculations shall be based on the required lateral loads as called for; tests shall show a capacity of twice the calculated load to allow for a factor of safety. A set of 4 splay wires shall be provided for each 144 sq. ft. for schools unless other specially designed and detailed bracing is provided. First set of splay wires shall be 6'-0" or less from any wall for schools. Splay wires must have 4 tight turns for #12 ga. or 3 tight turns for #10 ga. Wires shall be taut without causing ceiling to lift. Provisions shall be made for possible differential movement between ceilings and side walls. Terminal ends of each main and each cross runner shall be wire supported with #12 hanger wire attached within 8" of wall or soffit; wall trim angles shall not provide



primary support for runners. Lateral support of ceilings shall not be provided by the angle trim and runner may be riveted to wall at a maximum of 2 adjacent walls; the ceiling must be at least 3/4" free of other walls. Cross runners over 12" long and all main runners not connected to walls must be interconnected near the free end with a metal strut securely attached to prevent spreading. In computing the vertical component in a splayed wire ceiling bracing system, a seismic factor of .35. may be used. Any rational system that complies with the requirements of these notes will be acceptable.

- (4) Light Fixture and Air Terminal Support:
- (a) All light fixtures and air terminals shall be attached to the ceiling grid to resist a horizontal force equal to the weight of the fixtures. Screws or approved fasteners are required.
  - (b) Flush or recessed light fixtures, weighing less than 56 lbs. and mechanical terminals and services, weighing less than 20 lbs., may be supported directly on the runners of a heavy duty grid system but, in addition, they must have a minimum of two (2) #12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above. All 4ft. x 4ft. light fixtures must have slack safety wires at each corner.
  - (c) All flush or recessed light fixtures weighing 56 lbs. or more and mechanical terminals and services, weighing 20 lbs. or more, must be independently supported by not less than four (4) taut #12 wires, each attached to the fixture and to the structure above.
  - (d) Support surface mounted light fixtures shall be supported by at least two positive clamping devices made of #14 ga. minimum steel which surround the ceiling runner and supported to the structure above with a #12 ga. wire. Rotational spring clips are not acceptable. A suspension wire shall be attached to the main runners within 6" of the location that the fixture loads the runners (at least 2 wires per fixture).
  - (e) Support pendant mounted light fixtures directly to the structure above with hanger wires through each pendant capable of supporting 4 times the load. The runner shall not be used in the support linkage, but shall be bypassed with a suitable device.
  - (f) All suspension hanger wires and anchors to structure above shall be furnished and installed by acoustic tile contractor. Connection of hanger wires to light fixtures and air terminals shall be by electrical and HVAC contractors, respectively.
  - (g) Provide additional supports when light fixtures are 8 feet or longer. Maximum spacing between supports shall not exceed 8 feet.
- (5) Partitions: If non-bearing partitions that extend to and terminate at a suspended ceiling are supported laterally by opposing splayed wires spaced a maximum of 8 ft. on center along the top edge of the partition or by other equivalent means, they may be considered as not addition to the lateral load required to be resisted by the ceiling system.

Suspended ceiling systems required to provide lateral support for the permanent or relocatable partitions, the connection of the partition to the ceiling system, the ceiling system members and their connections, and the lateral force bracing shall be designed to support the reaction force of the partition from the prescribed loads applied perpendicular to the face of the partition. Partition connectors, the suspended ceiling system and the lateral-force bracing shall all be engineered to suit the individual partition

application and shall be as shown on the drawings or as per these specifications. Per 2022 CBC Section 16, 1617A1.21 ASCE 7 Section 13.5.6.2.2 paragraph 6.

- f. One Hour Rated Assembly: All buildings and/or rooms where indicated on the drawings, shall have a tested and approved one-hour assembly, installed in strict compliance with the requirements for said assembly.
  - (1) Provide U.L. Design No. or Fire Marshal Listing No. The design and installation must conform in every particular with the U.L. or SMF design.
  - (2) A set of 4 "splay" wires shall be provided for each 144 sf. for schools or 96 sf. for hospitals. The first set of splay wires shall be 4'-0" from any wall. Only one set of splay wires may be installed between any two expansion cutouts.
  - (3) There shall be no pop rivets, screws, or other attachments unless specifically detailed on the approved drawings and approved by U.L. and SFM recognized laboratories.
  
- g. Shop Drawings: The Contractor shall submit five (5) copies of shop drawings (with calcs) to the Architect prior to installation; no deferred approval permitted.

**3.03 EXTRA MATERIALS**

- a. Acoustical Ceiling Tiles: Furnish quantity of full size units equal to 2.0 percent of amount installed.
- b. Exposed Suspension System Components: Furnish quantity of each exposed component equal to 2.0 percent of amount installed.

END OF SECTION  
05/21/24

**RESILIENT FLOORING AND RUBBER TOPSET BASE**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

The work of this Section shall include all labor, material, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder. delivery to the building is considered part of this contract.

**1.02 WORK INCLUDED**

- a. All resilient tile flooring
- b. All rubber topset base on walls and cabinets
- c. All vinyl composition coved bases (including cove backing and metal cap trim)
- d. All flat rubber bases where called for at carpeting
- e. All sheet vinyl roll stock and coved base
- f. All waterproof adhesive in connection with setting of tile and bases
- g. Cleaning and waxing of all tile and bases

**1.03 RELATED WORK**

- a. Back-up bases or screeds upon which finish bases are to be laid.
- b. Metal thresholds are furnished by Finish Hardware and installed by Carpentry.

**1.04 SUBSTITUTIONS**

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

**1.05 SUBMITTALS**

- a. Contractor shall provide a minimum of five (5) copies of manufacturer literature on all adhesives indicating compliance with 2022 California Green Building Standards Code, Section 5.504.4.1 and Table 5.504.4.1 Adhesive VOC limit and SCAQMD Rule 1168 VOC Limits for review and approval by the architect prior to beginning installation.
- b. Contractor shall submit a minimum of three (3) product sample for each product which indicates size, shape and color availabilities to the architect for review and selection by Architect.
- c. Contractor shall submit documentation that the Resilient Flooring Systems complies with the 2022 California Green Building Codes Standards, Section 5.504.4.6 per Section 5.504.4.6.1.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- a. Resilient Tile Flooring and Sheet Vinyl Flooring:
  - (1) Armstrong
  - (2) Altro
  - (3) G.A.F.
  - (4) Schuller
  - (5) Kentile
  - (6) Optima
- b. Base:
  - (1) Armstrong
  - (2) Burke
  - (3) Mercer
  - (4) Roppe

## 2.02 MATERIALS

- a. Vinyl Composition Tile: Armstrong Standard Excelon 12" x 12" x 1/8" thick, pattern and color as selected. Fed. Spec. SS-T-312B.
- b. Sheet (Roll Stock) Vinyl: Armstrong Connection Corlon, with Hydrocord back, or approved equal. Color and pattern as selected. Provide Altro Designer 25 commercial sheet vinyl in Kitchens and Food service areas where indicated on plans.
- c. Rubber Topset Base: 4", and/or 6", 1/8" thick. Color as selected. Molded outside corners. Fed. Spec. SS-W-40A, Int. Amend. 1, Notice 1.
- d. Adhesive shall be waterproof and of the type recommended by the manufacturer of the material with which it is used. Adhesives shall comply with 2022 California Green Building Standards Code, Section 5.504.4.1 and Table 5.504.4.1 Adhesive VOC limit and SCAQMD Rule 1168 VOC Limits
- e. Metal Trim: Trimedge, Chromedge or approved equal, extruded white metal molding of shapes and designs indicated on the drawings and/or as herein specified.
- f. Cove Base Cap Trim: Trimedge A-604HG or approved equal for vinyl tile.
- g. Cleaner: Armstrong's Liquid Cleaner, Hillyard's "Super Shine-All" or approved equal.
- h. Wax: All first grade "Super Hil-Brite," as manufactured by Hillyard Chemical Co., Armstrong's "Linogloss" or approved equal.
- i. Vinyl Resilient Reducer Strips: Johnsonite or Mercer of size, shape and color selected by the Architect.
- j. Hydraulic Cement Self-Leveling Compounds shall be Ardex K15 or Napei Ultra Plan or other manufacturers recommended compound.
- k. All resilient flooring shall have a coefficient of friction of at least 0.6 per ASTM D0247.

**PART 3 EXECUTION**

## 3.01 GENERAL REQUIREMENTS

- a. **Workmanship:** Only skilled workmen, experienced in their respective trades and work shall be employed. All work shall be performed in a first class workmanlike manner and shall be subject to the approval of the Architect or his representative.
- b. **Examination of Surfaces:** The contractor shall be held to have examined the floor surfaces over which resilient flooring is to be applied and if for any reason a perfect job is impossible or anything is detrimental to obtaining a perfect job with assurance of obtaining the utmost value of the floor, it shall be reported to the Architect before proceeding with the work. NOTE: If required, the contractor shall remove all sealer material from floor to receive floor tile.
- c. **Colors of all material shall be as selected by the Architect. Current color samples shall be furnished to the Architect for color selection.**
- d. **Manufacturer's Recommendations:** All materials shall be applied in accordance
- e. **Moisture of Surfaces:** All surfaces over which resilient flooring is to be applied shall be thoroughly dry before flooring is applied. Moisture tests shall be performed prior to the start of installation according to the RMA Calcium Chloride test method utilizing 1-test per 1,000 s.f. of floor area. No tests shall be taken until the buildings is climatically controlled to installation temperature flooring manufacturer recommendation. Test results shall not exceed 3-lbs./1000 s.f. /24 hours. Test results shall be mapped, charted and submitted to the Architect prior to installation.
- f. **Temperature of Rooms:** No materials shall be applied in any room where the temperature is less than 70 degrees F. and this temperature shall be maintained during the laying of all specified material. The materials shall be stored in a dry place in the building at a temperature of not less than 70 degrees F. for a period of 24 hours before laying.
- g. **Cleaning:** Upon completion of the work, clean all resilient flooring with specified cleaner or its approved equal; remove all traces of adhesive and wipe clean.
- h. **Protection:** The contractor shall cover all his work as necessary to protect from damage until completion and acceptance of the building.
- i. **Tile, Base and Sheet Vinyl Stock For Owner:** At completion of the work, the Contractor shall leave with the Owner for future repairs, 2% of total used in each color and pattern of material used.
- j. **Bonding and PH testing shall be performed. Testing shall be at the expense of the contractor. Waiver of tests does not constitute waiver of any warranties or guarantees required by the terms of this contract.**

## 3.02 INSTALLATION

- a. **Contractor shall verify all substrates to be acceptable for installation of resilient flooring. The start of laying flooring shall be considered as the contractor acceptance of substrate. Provide and install cement self-leveling compounds where required to ensure an acceptable substrate.**

- b. Laying of Resilient Tile Floors:
  - (1) Sweep floors and bases clean of all dirt, loose and/or foreign materials.
  - (2) Lay out pattern marking to obtain uniform base widths, connections at thresholds, etc.
  - (3) Apply tile to floors and bases with waterproof adhesive as recommended by the manufacturer, making neat joints, cuts, etc.
  
- c. Laying of Rubber Topset Base or Flat Rubber Base:
  - (1) Clean surface of all foreign matter.
  - (2) Apply rubber base in accordance with manufacturer's recommendation, using a waterproof adhesive. All joints shall be cut on the lap and shall be cut to a straight and true line.
  
- d. Laying of Cove Bases:
  - (1) Clean surfaces of all foreign and loose material.
  - (2) Lay out pattern as related to floor tile and sheet vinyl.
  - (3) Apply wood cove bases to receive material and nail to wood grounds.
  - (4) Apply metal cove base cap trim setting to a straight and uniform height and fix in place with nails at 16" o.c. and/or as necessary to obtain a tight fit.
  - (5) Use long lengths of metal trim, miter at corners and scribe to adjoining metal and plaster in a neat workmanlike manner.
  - (6) Apply material to floors, and cove up into metal cove base trim using waterproof adhesive. Make neat joints, cuts, etc., and fit material neatly into metal cap trim. Form coves by heating material and roll into place over wood coves. Miter material at corners, angles and returns.
  
- e. Laying of Sheet Vinyl:
  - (1) Sweep floors and bases clean of all dirt, loose and/or foreign material.
  - (2) Apply sheet vinyl to floors and bases with waterproof adhesive as recommended by manufacturer. Install with Seam Master.
  
- f. Seaming: All seams of sheet vinyl flooring shall be heat welded and sealed per manufacturer recommendation. All seam colors shall match adjacent flooring.
  
- g. Waxing: Clean all resilient flooring with cleaner as specified under Paragraph 3.01, subparagraph g. Wax and buff with two (2) coats of wax and polish to leave a clean and polished surface.
  
- h. Guarantee: All work executed under this Section of the Specifications shall be free from defects of materials and workmanship for a period of one (1) year from date of final acceptance of this work.

END OF SECTION  
08/05/2022

**RESINOUS FLOORING**

DIVISIONS 0 AND 1 AREA APART OF THIS SECTION

**PART I GENERAL**

## 1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, material, scaffolding, equipment and appliances necessary to complete the work indicated on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- A. Resinous flooring includes penetrating two-component epoxy primer, three-component mortar consisting of epoxy resin, curing agent and finely graded quartz silica aggregate, three-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer.
- B. Related Work
  - 1. Cast-in-place Concrete, Section 03 10 00.
  - 2. Section Fluid Applied Waterproofing, Section 07 14 00.
  - 3. Caulkings and Sealants, Section 07 91 00.

## 1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, installation instructions, and general recommendations for each resinous flooring material required. Include certification-indicating compliance of materials with requirements.
- B. Samples: Submit, for verification purposes, 4-inch square samples of each type of resinous flooring required, applied to a rigid backing, in color and finish indicated.
  - 1. For initial selection of colors and finishes, submit manufacturer's color charts showing full range of colors and finishes available.

## 1.04 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain primary resinous flooring materials including primers, resins, hardening agents, finish or sealing coats from a single manufacturer with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Contractor shall have completed at least five projects of similar size and complexity; Stonhard or approved equal. Provide secondary materials only of type and from source recommended by manufacturer of primary materials.

- B. Pre-Installation Conference
  - 1. General contractor shall arrange a meeting not less than thirty days prior to starting work.
  - 2. Attendance
    - a) General Contractor
    - b) Architect/Owner's Representative
    - c) Manufacturer/Installer's Representative
- C. ISO 9002: All materials, including primers, resins, curing agents, finish coats, aggregates and sealants are manufactured and tested under an ISO 9002 registered quality system.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Material shall be delivered to job site and checked by flooring contractor for completeness and shipping damage prior to job start.
- B. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.
- C. Material shall be stored in a dry, enclosed area protected from exposure to moisture. Temperature of storage area shall be maintained between 60 and 85°F/16 and 30°C.

1.06 PROJECT CONDITIONS

- A. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.
- B. Utilities, including electric, water, heat (air temperature between 60 and 85°F/16 and 30°C) and finished lighting to be supplied by General Contractor.
- C. Job area to be free of other trades during, and for a period of 24 hours, after floor installation.
- D. Protection of finished floor from damage by subsequent trades shall be the responsibility of the General Contractor.

1.07 WARRANTY

- A. Manufacturer shall furnish a single, written warranty covering both material and workmanship for a period of one (1) full year from date of installation.

1.08 SUBSTITUTIONS

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.



**1.09 REGULATORY REQUIREMENTS**

- a. Adhesives, sealants and caulking shall comply with 2022 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to demonstrate compliance with these regulations prior to beginning installation.

**PART II PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

- a. Stonshield
- b. Or Approved Equal

**2.02 PRODUCTS**

- A. Stonshield HRI as manufactured by Stonhard, Inc., Maple Shade, NJ, (800) 257-7953 is a nominal 3/16"/5mm thick system comprised of a penetrating two-component epoxy primer, three-component mortar consisting of epoxy resin, curing agent and finely graded silica aggregate, three-component, epoxy undercoat, brightly colored, quartz silica aggregate broadcast and a high performance, two-component, clear epoxy sealer.

- 1. Physical Properties: Provide flooring system in which physical properties of topping including aggregate, when tested in accordance with standards or procedures referenced below, are as follows:

Compressive Strength.....	10,000 psi
(ASTM C-579)	
Tensile Strength .....	2,000 psi
(ASTM C-307)	
Flexural Strength.....	4,300 psi
(ASTM C-580)	
Hardness .....	85-90
(ASTM D-2240/Shore D Durometer)	
Bond Strength .....	>400 psi
(ASTM D-4541)	(100% concrete failure)
Impact Resistance .....	>160 in. lbs.
(ASTM D-4226)	
Abrasion Resistance .....	0.06 gm max. weight loss
(ASTM D-4060, Taber Abrader CS-17 wheel)	
Coefficient of Friction.....	0.7-0.8
(ASTM D-2047)	
Flexural Modulus of Elasticity .....	2.0 x 10 <sup>6</sup> psi
(ASTM C-580)	
Flammability .....	Self Extinguishing
(ASTM D-635)	Extent of burning 0.25 inches max.
Thermal Coefficient of Linear Expansion .....	1.8 x 10 <sup>-5</sup> in/in°C
(ASTM C-531)	

Water Absorption.....	0.1%
(ASTM C-413)	
Heat Resistance Limitation.....	140°F/60°C
	(for continuous exposure)
	..... 200°F/93°C
	(for intermittent spills)
Cure Rate allow .....	8 hours for foot traffic
(at 77°F/25°C)	18 hours for light traffic
	24 hours for normal operations

- B. COLORS
  - a. Colors: As selected by Architect from manufacturer's standard colors.

2.03 JOINT SEALANT MATERIALS

- A. Type produced by manufacturer of resinous flooring system for type of service and joint condition indicated. Sealants shall conform to 2022 California Green Building Standards Code, Table 5.504.4.2 Sealant VOC Limits

**PART III EXECUTION**

3.01 PREPARATION

- A. Substrate: Concrete preparation shall be by mechanical means and include use of a scabber, scarifier or shot blast machine for removal of bond inhibiting materials such as curing compounds or laitance.

3.02 APPLICATION

- A. General: Apply each component of resinous flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawn joints or other types of joints (if any), indicated or required.
- B. Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between resinous flooring materials and substrate.
- C. Troweled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Hand trowel apply mixed material over freshly primed substrate using steel finishing trowels or power trowel material.
- D. Undercoat: Remove any surface irregularities by lightly abrading and vacuuming the floor surface. Mix and apply undercoat with strict adherence to manufacturer's installation procedures and coverage rates.

## SECTION 09 67 23

- E. Broadcast: Immediately broadcast quartz silica aggregate into the undercoat using manufacturer's specially designed spraycaster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- F. Sealer: Remove excess unbonded granules by lightly brushing and vacuuming the floor surface. Mix and apply sealer with strict adherence to manufacturer's installation procedures.
  - 1. Sealants shall conform to 2022 California Green Building Standards Code, Table 5.504.4.2 Sealant VOC Limits.

### 3.03 FIELD QUALITY CONTROL

- A. The right is reserved to invoke the following material testing procedure at any time, and any number of times during period of flooring application.
- B. The Owner will engage service of an independent testing laboratory to sample materials being used on the job site. Samples of material will be taken, identified and sealed, and certified in presence of Contractor.
- C. Testing laboratory will perform tests for any of characteristics specified, using applicable testing procedures referenced herein, or if none referenced, in manufacturer's product data.
- D. If test results show materials being used do not comply with specified requirements, Contractor may be directed by Owner to stop work; remove non-complying materials; pay for testing; reapply flooring materials to properly prepared surfaces which had previously been coated with unacceptable materials.

### 3.04 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 24 hours.
- B. Protect resinous flooring materials from damage and wear during construction operation. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application. General Contractor is responsible for protection and cleaning of surfaces after final coats.
- C. Cleaning: Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

END OF SECTION  
08/05/2022

**PAINTING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, scaffolding, equipment and appliances necessary to complete the work indicated on the drawings and/or specified hereunder.

## 1.02 WORK INCLUDED

- a. Preparation, sanding, scraping, putty work and cleaning of all woodwork and/or metal work to be painted.
- b. Painting, staining, or natural finishing of all exterior woodwork, trim and millwork.
- c. Painting of all heating and ventilating equipment where exposed, including roof mounted air conditioners.
- d. Painting of all exterior and interior exposed metal work (except aluminum).
- e. Paint or natural finishing of all interior woodwork, millwork, casework, counters, shelving, trim, plywood, etc.
- f. Painting of all interior and exterior plaster (not integrally colored).
- g. Painting of all gypsum board (where noted on Room Finish Schedule).
- h. Backpriming of all wood casework, eave fascias, etc.
- i. Field and touch up painting (except prime coat) of structural steel and miscellaneous iron.
- j. Touch-up painting of factory finished metal products, i.e., toilet stalls, shower stalls, lockers, shelving, etc. (Paint furnished by metal product supplier).
- k. Washing, priming and back priming of all sheet metal work.
- l. Painting of all galvanized metal expansion joints 1/2" and wider.
- m. Sealing and painting of all concrete block (where noted to be painted on Room Finish Schedule).
- n. Painting of all exposed steel decking.
- o. Remodel Work:
  - All New Work - Three (3) coats as specified.
  - Existing Work - Fill holes and cracks and apply two (2) coats (final two (2) coats as specified).
- p. Refer to Section 07 14 00, Waterproofing and Dampproofing, for materials to be applied by Painting Contractor.

- q. Finish painting of all factory primed metal equipment supplied under other sections of these specifications, including in wall table pockets.

### 1.03 RELATED WORK

- a. Installation of drywall accessories, taping, filling and surface finishing (texturing) of all gypsum board is specified under Section 09 26 00.
- b. Painting of all aluminum in contract with cement grout or asphalt.

### 1.04 REGULATORY REQUIREMENTS

- a. Adhesives, sealants and caulking shall comply with 2022 California Green Building Standards Code, Section 5.504.4.1 and Tables 5.504.4.1 Adhesive VOC limit, 5.504.4.2 Sealant VOC Limit, 5.504.4.3 VOC Content Limits for Architectural Coatings and SCAQMD Rule 1168 VOC Limits. Contractor shall submit literature to demonstrate compliance with these regulations prior to beginning installation.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- a. Inspection and Samples: Painters' materials are to be delivered at the building in their original labeled, unbroken packages and not opened until inspected and marked by the Architect or his representative. This Contractor shall furnish 12" x 12" sample plywood and masonite boards and shall experiment with colors for all surfaces on the job to the full satisfaction of the Architect or his representative. These sample boards shall not be destroyed until all painting is done and final approval is given.
- b. Names, Brands, Makes and Numbers hereafter specified are used solely for the purpose of establishing a strict first quality grade of paint. Any change from these grades may be had only upon written consent of the Architect. All paint products used on this project shall be the products of one manufacturer unless specifically set forth otherwise herein, in which case the primer and undercoats shall be the products of the same manufacturer as the final coat.
- c. Paint:
  1. Akzonobel Mfg of (Devoe High Performance Coatings, Glidden Professional Paints)
  2. Benjamin Moore and Co. (Moore)
  3. Dunn-Edwards
  4. Sherwin-Williams
  5. Or approved equal
- d. Semi-Transparent Stain:
  1. Akzonobel Mfg of (Devoe High Performance Coatings, Glidden Professional Paints, and Flood wood care products)
  2. Benjamin Moore & Co.
  3. Dunn-Edwards

4. Sherwin-Williams
  5. Or approved equal
- e. Sealer:
1. Rainguard International Mfg of (Micro seal, Blox-Loc ) emulsion/siloxane solution sealer.
  2. Thompson's: Sealing of masonry walls

Anti-graffiti coatings: Two component aliphatic urethane polyester based mixture.

1. Benjamin Moore & Co.
2. Dunn-Edwards Corporation.
3. Rainguard International Mfg of Vandal Guard anti graffiti Coating.

## 2.02 SUBSTITUTIONS

See Div. 0, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

## PART 3 EXECUTION

### 3.01 GENERAL REQUIREMENTS

- a. Workmanship: Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first class workmanlike manner and shall be subject to the approval of the Architect or his representative.
- (1) All finishes shall meet the basic standards of practice, which are satisfactory to the Architect. Each coat shall be of the proper consistency and the mixing, thinning, preparation of surfaces and application in strict accordance with paint manufacturers specifications and/or instructions. Each coat of paint finish shall be well brushed out or flowed on, to obtain a uniform and even finish free of brush marks, runs, sags, crawls, dust, pimples, encrusted brush bristles, holidays and any variance in finish (color, shade, sheen or matt) or other blemishes to the finished surfaces.
  - (2) It is the responsibility of the Contractor for inspection of all surfaces, prior to application of any paint. If the manufacturer's representative or the Contractor consider any surface unsuitable for proper application and/or proper performance of the paint, the manufacturer's representative and the Contractor shall immediately notify the Architect in writing. Materials shall not be applied until such unsuitable surfaces or conditions have been made satisfactory. The manufacturer's representative or the Contractor shall furnish to the Architect a letter certifying that all surfaces were inspected and approved as above specified and that all materials furnished were as specified. The contractor shall furnish to the Architect a letter certifying that all materials used were as specified.
- b. Approvals: An approval for all brands of materials not mentioned in the following list shall be obtained in writing from the Architect before incorporation into the work. Before any paint has been delivered to the site, the Contractor shall submit four (4) lists of materials, which the Contractor proposes to use to the Architect for his review and approval. No deviation from the approved list will be allowed

without written permission. Approved List-Glidden Professional Paints, Fuller O'Brien, Benjamin Moore, Dunn-Edwards, Pittsburgh Paints or approved equal. Requests for substitutions shall be accompanied by test reports from a commercial testing laboratory showing equality in weathering, hardness, washability, gloss and color retention, flow, hiding, flexibility, non-yellowing and general original appearance. These tests shall be conducted according to procedures set forth in Federal Specification TTL-P-141 of American Society of Testing Materials Specification.

- c. Storage: All materials shall be stored and mixed only in such rooms as will be designated for that purpose, by the Architect or his representative and such space shall be kept clean. Floor shall be covered with "Sisal Kraft" paper with joints lapped at least six inches (6"). All necessary precautions shall be taken to prevent fire and all oily rags shall be hung out flat and singly in open air.
- d. Manufacturer's Recommendations: The specifications and instructions of the paint manufacturer shall be carefully followed, especially regarding mixing, thinning, application and preparation of surface.
- e. Preparation of Surfaces: The Painter, before proceeding with his work must see that the carpenter has set all nails in finish, removed all bruises, stains, etc., where same show through finish. Scrape and sandpaper entire woodwork and remove finish hardware and see that the entire woodwork is in good condition before painting. **THE PAINTING CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTING THE WORK OF OTHERS PRIOR TO THE APPLICATION OF ANY PAINT OR FINISHING MATERIAL. IF ANY SURFACE TO BE FINISHED CANNOT BE PUT IN PROPER CONDITION FOR FINISHING BY CUSTOMARY CLEANING, SANDING AND PUTTYING OPERATIONS, THE PAINTING CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR, ARCHITECT OR OWNER IN WRITING, OR ASSUME RESPONSIBILITY FOR RECTIFYING ANY UNSATISFACTORY FINISH RESULTING.** All interior woodwork shall be thoroughly hand sandpapered and dusted thoroughly with air and dry brush. All nail holes, cracks and defects shall be carefully puttied and in stained work shall match the color of the stain. In natural finish, it shall match the color of the wood.
- f. Knots and Pitch Pockets: Interior woodwork to receive shellac over all knots and sap pockets. Pitch pockets cut out by the carpenters and then spackled and shellacked.
- g. Condition of Surfaces: Paint, enamel, stain or varnish shall not be applied to wet, damp, dusty, greasy, fingermarked, rough, unfinished or defective surfaces. Application: Latex or vinyl paint shall only be applied when temperatures of surfaces to be painted and surrounding air temperatures are between 50 degrees F and 90 degrees F. Do not paint when temperature varies widely, which might result in condensation on freshly coated surfaces. Apply solvent thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F and 95 degrees F. All Plaster Walls shall have a maximum of 15% moisture content as measured on a standard moisture met. It is the painter's responsibility to verify the moisture content prior to applying paint.
- h. Sanding: All woodwork shall be sandpapered smoother after each and every coat of material, except last coat, and all surfaces shall be free from dust, dirt or other imperfections.

- i. Priming of Millwork: All millwork must be primed and back-primed on **all** sides immediately on arrival at the job.
- j. Removal and Storage of Hardware: Remove all finish hardware before starting work, carefully labeling same as to its proper location and store carefully during progress of painting work.
- k. Protection: Floors and plumbing fixtures to be kept clean and protected. The dumping of paints, stains, or washes in plumbing fixtures will not be allowed. Great care shall be taken not to injure or spatter paint on adjacent work, which shall be covered and fully protected, but should any paint be spattered for found where not called for, the defective surface shall be cleaned off and the original surface restored.
- l. Rough Plumbing: All exposed plumbing and plumbing fixtures where not enameled shall be painted as specified for metal work.
- m. Inspection by Architect: After each and every coat of paint, sizing, enameling or other application, including sanding and rubbing, the work shall be inspected, passed on, approved and marked by the Architect, his representative or the job inspector before application of the following coats. Notice must be given after all coats and work done without approval of each coat will be rejected and an additional coat applied.
- n. Sample Boards: Furnish sample boards and experiment with colors for the surface on the job to the full satisfaction of the Architect. These sample boards shall not be destroyed until painting is done and until the final approval of the work.
- o. Colors: The color of every coat of paint, enamel, stain, etc., shall be as selected by the Architect. Every coat of paint shall be a slightly different shade. Current color chip samples shall be furnished to the Architect for color selections.
- p. Turpentine shall be used for thinner and drier only. Thinner shall only be used if approved by the Architect and only if recommended by the manufacturer.
- q. Rejected Materials shall be removed from the site immediately upon notification from the Architect.
- r. Cleaning: From time to time, remove all dirt, debris, waste, rubbish, etc., from the building site. All woodwork, hardware, floors or other adjacent work shall be cleaned. The painter shall protect and keep clean all portions of the work that are not to be painted, stained or varnished and upon completion shall have a neat, clean and workmanlike job. Cleaning includes the removal of all paint spots on glass and brush drags where cut in on sash.
- s. Spraying will be permitted on certain types of work **when approved and directed by the Architect** subject to the following stipulations: "Spraying regulations covering work to be done on this project shall be permitted in areas and on surfaces as covered by the "Standard Agreement" recommended by the California State Contractors Association and agreed to by the International Brotherhood of Painters, Paper Hangers and Decorators of America. Copies of this Agreement are available to all contractors in all major cities of California. Any deviations or exceptions shall be referred to the Joint Committee and their ruling shall be final."



- t. Back Priming: All plaster and wood surfaces that will not be exposed to view shall be painted the same as the first coat of finish specified, except gypsum board.
- u. Multiple colors: Classrooms will have two colors selected for each room. Colors will be designated for entire wall. There will be no accent strips.
- v. Exterior Painting: Painter shall allow for three (3) color selections, plus the school colors for exterior painting and trim colors.

### 3.02 SPECIAL REQUIREMENTS

- a. All products listed are those of Glidden Professional Paints and are specified solely for establishing a quality standard.

- b. EXTERIOR WORK:

- (1) On Metal Work: (Metal trim Hollow Metal Doors and Frames)

1st coat:	Devoe Devflex 4020 Primer
2nd coat:	Devoe Devflex 4216 Semi Gloss Finish
3rd coat:	Devoe Devflex 4216 semi Gloss
	or
1st coat:	Ultra Spec Acrylic Metal Primer (HP04)
2nd coat:	DTM Acrylic Semi-Gloss Enamel (WH29)
3rd coat:	DTM Acrylic Semi-Gloss Enamel (WH29)

- (2) On Metal Work: (Bonderized or Base Metal and Shop Primed) (Total of 3 coats)

1st coat:	Devoe Devflex 4020 Primer
2nd coat:	Glidden Professional Fortis 350 2406-xxx Enamel (Tinted toward final color)
3rd coat:	Glidden Professional Fortis 350 2406-xxx semi gloss enamel*
	or
1st coat:	Ultra Spec Acrylic Metal Primer (HP04)
2nd coat:	Ultra Spec EXT Gloss Finish (N449)
3rd coat:	Ultra Spec EXT Gloss Finish (N449)

- (3) On Metal Work: (Galvanized) (Total of 4 coats)

1st coat:	Chemical Etch Devoe Devprep 88
2nd coat:	Devoe Devflex 4020 Metal Primer 100% Acrylic Multi-Purpose Primer
3rd coat:	Glidden Professional Fortis 350 2406-xxx Exterior 100% Acrylic Semi-Gloss Paint (Tinted toward final color)
4th coat:	Same as 3 <sup>rd</sup> coat
	or
1st coat:	Fresh Start High-Hiding All Purpose Primer (046)
2nd coat:	Ultra Spec EXT Gloss Finish (N449)
3rd coat:	Ultra Spec EXT Gloss Finish (N449)

## (4) On Wood Work: (Total of 3 coats)

- 1st coat: Glidden Professional 6001-1200 Hydrosealer  
Exterior 100% Acrylic Wood Primer
- 2nd coat: Glidden Professional Fortis 650 2406-xxx SEMI-  
GLOSS Enamel (Tinted toward final color)
- 3rd coat: Same as 2<sup>nd</sup> coat\*
- or
- 1st coat: Ultra Spec EXT Latex Primer (N558)
- 2nd coat: Ultra Spec EXT Gloss Finish (N449)
- 3rd coat: Ultra Spec EXT Gloss Finish (N449)

## (5) Back Priming: (Total of 1 coat)

- 1st coat: Glidden Professional 6001-1200 Hydro seal  
Exterior 100% Acrylic Wood Primer
- or
- 1st coat: Ultra Spec EXT Latex Primer (N558)

## (6) Field Painting - Misc. Steel &amp; Iron: (Total of 3 coats)

- (7) 1st coat: Devoe Devguard 4141-7100 Rust Preventative Metal  
Primer (when "Shop Primed" omit first coat and only touch up primer)
- 2nd coat: Glidden Professional Diamond 350 1406-xxx  
Exterior 100% Acrylic Semi-Gloss Enamel
- 3rd coat: Same as 2<sup>nd</sup> coat
- or
- 1st coat: Ultra Spec Acrylic Metal Primer (HP04)
- 2nd coat: DTM Acrylic Semi-Gloss Enamel (WH29)
- 3rd coat: DTM Acrylic Semi-Gloss Enamel (WH29)

## (8) Stained Finish on Unselected Birch Veneer Doors and Woodwork:

## Varnish Finish: (Total of 3 coats)

- 1st coat: 1700 - Stain
- 2nd coat: 1808 semi gloss Finish
- 3rd coat: Same as 2<sup>nd</sup> coat
- or
- 1st coat: ARBORCOAT Alkyd Semi-Transparent Stain (C328)
- 2nd coat: ARBORCOAT Alkyd Semi-Transparent Stain (C328)
- 3rd coat:

## (9) Concrete Block: (Clear Sealer) Applied by airless spray gun.

- 1st coat: RAIN GUARD Microseal SEALER 60 sq. ft. Per  
Gallon on standard CMU block Ten Year Labor and  
Material warranty
- or
- 1st coat: Texcrete Silicone Water Repellent (194)
- 2nd coat: Texcrete Silicone Water Repellent (194)

3rd coat:

(10) Mechanical Equipment (Duct Work and Miscellaneous Equipment)

1st coat: Devoe Devflex 4020 100% Acrylic Multi-Purpose Primer  
 2nd coat: Glidden Professional Fortis 2406-xxx Exterior 100% Acrylic Semi- Gloss Paint  
 3rd coat: Same as 2<sup>nd</sup> coat  
 or  
 1st coat: Fresh Start High-Hiding All Purpose Primer (N023)  
 2nd coat: Ultra Spec EXT Gloss Fininsh (N449)  
 3rd coat: Ultra Spec EXT Gloss Fininsh (N449)

(11) Play court and Traffic Marking: (Total of 1 coat)

1st coat: Pervo Traffic Marking Paint - 2" wide lines, 3" wide for all accessibility markings (or of width as noted on drawings) Use color equal to Federal Specification 595 B No. 15090 for all accessibility markings. Color as indicated on drawings. **DO NOT APPLY UNLESS ASPHALT IS PROPERLY CURED AND COMPLETELY CLEAN.**

or

1st coat: Insl-X Latex Traffic Paint (TP-22XX)  
 2nd coat: Insl-X Latex Traffic Paint (TP-22XX)

(12) Exterior Cement Plaster (over color coat or Existing paint)

1<sup>st</sup> coat Glidden Professional Fortis 650 2200-xxx Flat Primer  
 2<sup>nd</sup> coat Glidden Professional Fortis 350 2200-xxx Exterior 100% Acrylic Flat Finish  
 or  
 1st coat: Ultra Spec EXT Latex Primer (N558)  
 2nd coat: Ultra Spec EXT Gloss Fininsh (N449)  
 3rd coat: Ultra Spec EXT Gloss Fininsh (N449)

(12) Anti-graffiti Coating – Apply to monument signs, masonry walls at areas of Administration and in Gym up to 10'-0". Masonry fencing on street exposure side and all other locations indicated on plans.

1<sup>st</sup> Coat: Rainguard Microseal sealer  
 2<sup>nd</sup> Coat: Rainguard Vandal Guard Five permanent anti graffiti.  
 3<sup>rd</sup> Coat: Rainguard Vandal Guard finish coat graffiti barrier.  
 or  
 1st coat: 100% Solids Epoxy Primer (V155)  
 2nd coat: Corotech Waterborne Urethane (540)  
 3rd coat: Corotech Waterborne Urethane (540)

c. INTERIOR WORK:

## (1) Enamel For Metal Trim and Metal Doors and Jambs: (Total of 3 coats)

1st coat: Glidden Professional Gripper 3210 Multi-Primer  
 2nd coat: Devoe Devflex 4216 Semi Gloss Finish  
 3rd coat: Devoe Devflex 4216 Semi Gloss Finish  
 or  
 1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: DTM Acrylic Semi-Gloss Enamel (WH29)  
 3rd coat: DTM Acrylic Semi-Gloss Enamel (WH29)

## (2) Concrete and Masonry

## a. Vinyl-Acrylic, Satin Enamel Finish

1st coat: Glidden Professional 3210 Gripper 100% Acrylic Primer  
 2nd coat: Glidden Professional Diamond 350 1403-xxx 100% Acrylic Enamel  
 3rd coat: Same as 2<sup>nd</sup> coat  
 or  
 1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: Ultra Spec 500 Interior Eggshell (N538)  
 3rd coat: Ultra Spec 500 Interior Eggshell (N538)

## b. CMU Block Acrylic Enamel, Semi-Gloss Finish

1st coat: Glidden Professional 3010-1200 Acrylic Block Filler  
 2nd coat: Glidden Professional Diamond 1407-xxx 100% Acrylic Semi Gloss Enamel  
 3rd coat: Glidden Professional Diamond 1407-xxx 100% Acrylic Semi Gloss Enamel  
 or  
 1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: Ultra Spec 500 Interior Semi-Gloss (N539)  
 3rd coat: Ultra Spec 500 Interior Semi-Gloss (N539)

## (3) Enamel For Wood Trim, Plywood and Casework: (Total of 3 coats)

1st coat: Glidden Professional Gripper 3210 Multi-Primer  
 2nd coat: Devoe Devflex 4216 Semi Gloss Finish  
 3rd coat: Same as 2<sup>nd</sup> coat.  
 or  
 1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)  
 3rd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)

## (4) Enamels for Plaster Walls and Ceilings: (Total of 3 coats)

1st coat: Glidden Professional Bond Prep 3030-1200 Latex Primer Sealer

2nd coat: Glidden Professional Diamond 350 1407-xxx  
Acrylic Semi-gloss Interior Wall & Trim Enamel  
3rd coat: Same as 2<sup>nd</sup> coat  
or  
1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
2nd coat: Ultra Spec 500 Interior Semi-Gloss (N539)  
3rd coat: Ultra Spec 500 Interior Semi-Gloss (N539)

## (5) Enamel for Gypsum Board Walls and Ceilings: (Total of 3 coats)

1st coat: Glidden Professional Prep Prime 1000-1200  
Interior Acrylic Wall Primer Sealer  
2nd coat: Glidden Professional Diamond 350 1407-xxx  
100% Acrylic Latex Semi-Gloss or Satin 1403-xxx  
3rd coat: Glidden Professional Diamond 350 1407-xxx  
100% Acrylic Latex Semi-Gloss or Satin 1403-  
xxx  
or  
1st coat: Ultra Spec Interior Latex Primer (N534)  
2nd coat: Ultra Spec 500 Interior Semi-Gloss (N539)  
3rd coat: Ultra Spec 500 Interior Semi-Gloss (N539)

## (6) Gypsum Wallboard, Satin Finish High Performance Acrylic

1st coat: Glidden Professional 1000-1200 Interior Acrylic Wall  
Primer/Sealer  
2nd coat: Devco Devflex HP 4212-xxx Interior 100% Acrylic  
Satin Enamel  
3rd coat: Same as 2<sup>nd</sup> coat  
*Note – Provide High Performance Waterborne Acrylic Devflex HP  
4216-xxx Semi-Gloss Enamel in Restrooms, Kitchens, etc.*

or  
1st coat: Ultra Spec Interior Primer (N534)  
2nd coat: Ultra Spec Scuff-X Interior Eggshell (486)  
3rd coat: Ultra Spec Scuff-X Interior Eggshell (486)

## Gypsum Board Walls and Ceilings Flat Finish

1st coat: Ultra Spec Interior Latex Primer (N534)  
2nd coat: Ultra Spec 500 Interior Flat (N536)  
3rd coat: Ultra Spec 500 Interior Flat (N536)

## (7) Natural or Glazed Transparent Finish on Plywood Walls, Casework and Interior Doors: (Soft and Hard Woods) (Total of 3 coats)

1st coat: Gemini 200-0012 550 VOC high build Clear  
Lacquer Sanding Sealer  
2nd Coat: Gemini 500-0034 550 VOC High Solid Semi-Gloss  
Clear Lacquer  
3rd coat: Same as 2<sup>nd</sup> coat

or

1st coat: DuraLaq HB Pro Lacquer Sealer (1C.383)  
 2nd coat: DuraLaq HB Pro Lacquer Semi-Gloss (1LL.636)  
 3rd coat: DuraLaq HB Pro Lacquer Semi-Gloss (1LL.636)

(8) Exposed Metal: (Total of 3 coats)

1st coat: Devoe Devflex 4020-7100 Primer  
 2nd coat: Glidden Professional Diamond 1407-xxx Acrylic  
 Semi-gloss Interior Wall & Trim Enamel  
 3rd coat: Same as 2<sup>nd</sup> coat

or

1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)  
 3rd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)

(9) Insulated Pipe Covering and Duct Work: (Total of 3 coats)

1st coat: Devflex 4020 Interior Primer  
 2nd coat: Glidden Professional Diamond 1407-xxx Acrylic  
 Semi-gloss Trim Enamel  
 3rd coat: Same as 2<sup>nd</sup> coat

or

1st coat: Fresh Start High-Hiding All Purpose Primer (046)  
 2nd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)  
 3rd coat: Ultra Spec Scuff-X Interior Semi-Gloss (487)

(10) Tanks, Water Piping, Misc. Equipment: (Total of 2 coats)

1st coat: Devoe Devflex 4020 Primer  
 2nd coat: Devoe Devflex HP 4216 Semi Gloss

or

1st coat: Ultra Spec Acrylic Metal Primer (HP04)  
 2nd coat: DTM Acrylic Semi-Gloss Enamel (WH29)  
 3rd coat: DTM Acrylic Semi-Gloss Enamel (WH29)

(11) Vinyl For Walls and Ceilings: (Total of 2 coats)

1st coat: 1201 Dulux Ultra Velvet Sheen Interior Flat Latex  
 Wall & Trim Finish  
 2nd coat: Same as 1<sup>st</sup> Coat

or

1st coat: Ultra Spec Interior Latex Primer (N534)  
 2nd coat: Ultra Spec 500 Interior Low Sheen (N537)  
 3rd coat: Ultra Spec 500 Interior Low Sheen (N537)

(12) Concrete Block: (Clear Sealer) RAIN GUARD BLOX LOX SEALER.

1st coat: SAME AS ABOVE

- (13) Special Finish (Epoxy) for Plaster Walls and Ceilings in Shower and Locker Rooms: (Total of 3 coats)

*NOTE: Always check compatibility of Plaster and Epoxy top coats.*

1st coat:	Devoe True Glaze 4030 Epoxy Primer-Sealer
2nd coat:	Devoe True glaze 4428 Epoxy Gloss
3rd coat:	Same as 2 <sup>nd</sup> coat
or	
1st coat:	Corotech Waterborne Bonding Primer (V175)
2nd coat:	Corotech Pre-Catalyzed Waterborne Epoxy (V341)
3rd coat:	Corotech Pre-Catalyzed Waterborne Epoxy (V341)

- (14) Wood Floors:

1st coat:	1808 Gym Floor Finish Clear
2nd coat:	Same as 1st coat

- (15) Special Ceiling Paint: (Total of 1 coat) Spray one (1) coat of Glidden Professional 1250 Speedwall

- d. Painting of Mechanical and Electrical Equipment: All mechanical and electrical equipment, piping and machinery (not factory finished) of any kind where exposed to view shall be painted as specified and shall be included as a part of this work. Inside of ducts, where exposed to view through register and grilles, shall be painted two (2) coats of black paint of type specified for metal work. All structural framing supporting equipment shall be painted same as for equipment where exposed to view. All ducts, plenums, ventilators, fan housings, ventilating equipment, etc., shall be painted as specified for metal work. All piping equipment and machinery (not factory finished) in heater rooms and/or mechanical rooms, shall be painted the same color but a different shade, as the walls or ceilings adjacent. Piping and equipment covered up in attic space, furred ceilings and furred pipe spaces will not require paint finishes.

- e. Miscellaneous Painting:

- (1) Interior surfaces of all casework and cabinet work, including tops, bottoms, backs and interior surfaces of all drawers and trays shall be shellacked and varnished, one (1) coat of white shellac and two (2) (2) coats of clear "satinflat" varnish. (Sand after first and second coats.)
- (2) Tops, bottoms, sides, edges and ends of all doors shall receive the same number of coats as specified for woodwork. All portions that cannot be painted shall be oiled.
- (3) All millwork shall be primed and back primed immediately upon arrival at the job. All case backs shall be primed before installation in the final location.
- (4) Tops of casework shall be painted same number of coats as casework.
- (5) Underside and piping under all plumbing fixtures and enameled iron exposed to view shall be painted same as for adjacent wall surfaces.

- (6) All metal brackets, except chrome or nickel plated items, shall be painted as specified for metal work.
  - (7) All light fixtures, switch plates, receptacle plates and other similar prime coated items shall be painted as specified for interior metal work.
  - (8) Electrical cabinet frames and doors, fire extinguisher cabinets and frames, interior and exterior, shall be painted as specified for interior and exterior metal trim.
- f. Cleaning and Touch Up:
- (1) Carefully remove all spattering and traces of paint materials from the work of others; from glass, plumbing fixtures and trim, hardware, tile surfaces, floor covering, etc., and make good all damages thereto that may be caused by such materials or cleaning. Likewise, make a detailed inspection of all painting work and touch up or refinish satisfactorily all abraded, stained or otherwise disfigured portions thereof, as required to produce a first-class job.
  - (2) Upon completion of the work herein before specified, remove all unused materials and implements of service, rubbish and debris resulting from the paint work and leave the entire building and premises, insofar as the work of this section is concerned, neat, clean and as approved by the Architect.
- g. Guarantee: All work executed under this Section of the Specifications will be free from defects of materials and workmanship for a period of one (1) year from date of final acceptance of this work.
- h. Vinyl Wall Covering shall be cloth-backed vinyl in strict accordance with manufacturers directions.
- i. Extra Stock - Upon completion of the work of this Section, deliver to the Owner additional stock equaling 1 percent, but not less than a full unopened container of each color, type and gloss of paint used.

END OF SECTION  
08/05/2022



**ZINC ETCHED IDENTIFICATION SIGNS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL****1.01 SCOPE OF WORK**

The work of this Section shall include all labor, materials, appliances, equipment, and transportation in connection with furnishing and installing of all chemically etched zinc signs, complete, as shown on the drawings and specified herein.

**1.02 RELATED WORK**

- a. Installation of signs

**PART 2 PRODUCTS****2.01 APPROVED MANUFACTURERS**

- a. Vital Signs – (661) 325-1987
- b. Dixie Graphics – (661) 832-7000
- c. Advance Corporation – (800) 328-9451
- d. Gemini Signage – (800) 538-8377
- e. A.R.K. Ramos – (800) 725-7266
- f. Or approved equal

**2.02 PRODUCT REQUIREMENTS**

- a. All signs shall be single-faced and shall be unframed, for flush mounting, in standard manufacturers' colors as selected by the Architect. Type style shall be Helvetica Medium.
- b. Raised And Braille Characters And Pictorial Symbol Signage: Letters and numerals shall be raised 1/32 in., uppercase, Sans Serif or simple Serif type and shall be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 in. high but no higher than 2 in. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6-in. minimum in height.
- c. Visual character finish and contrast between character, symbols and their background shall either be light characters on dark background or dark characters on light background and have a non-glare finish per 2022 CBC Sec 11B-703.5.1.
- d. Characters on signs shall be per 2022 CBC Sec 11B-703.5.

Character Proportions Visual characters on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I". 2022 CBC Sec 11B-703.5.4

Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character. 2022 CBC Sec 11B-703.5.7

Character height on signs shall be per 2022 CBC Sec 11B-7035.5 and sized according to 2022 CBC Table 11B-7035.5. The minimum height is measured using uppercase letter "I". Lowercase characters are permitted. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign.

HEIGHT TO FINISH FLOOR OR GROUND BASELINE OF CHARACTER	HORIZONTAL VIEWING DISTANCE	MINIMUM CHARACTER HEIGHT
40" to ≤70"	< 72"	5/8"
	72" and greater	5/8" plus 1/8"/ft of viewing distance above 72"
>70" to ≤ 120"	< 180"	2"
	180" and greater	2" plus 1/8"/ft of viewing distance above 180"
>120"	<21'	3"
	21' and greater	3" plus 1/8"/ft of viewing distance above 21'

- e. California Grade 2 Braille shall be used wherever Braille is required in other portions of these standards. Dots shall be 0.100 inch (2.5mm) on centers in each cell with 0.300 inch (7.6mm) space between cells, measured from the first column of dots in the first cell to the first column of dots in the second cell. Dots shall be raised a minimum of 0.025 inch (0.6mm) above the background. 2022 CBC 11B-703.3 and 11B-703.4.

Recommend Rounded or domed California Braille dots, each distinct and separate. Dots with straight sides and flat tops are not readable for many Braille users.

2.03 SIGNS

- a. Metal Room Identification and Directional Signs: Interior and Exterior
  - (1) Chemically etched zinc room identification signs with raised copy and braille, painted background, black acrylic back plate and natural satin aluminum frame.
  - (2) Copy and Braille shall be raised a minimum of 1/32". Copy of the 5/8" high Helvetica medium uppercase unfinished satin zinc accompanied with grade 2 braille. Letters shall be an integral part of the plaque.
  - (3) Size: As required to accommodate copy.
- b. No backer plates to enable plaque to fit as flush to building as possible.
- c. Sign Mounting: Mechanically fasten the frame to wall with a minimum of four flush counter-sunk screws. Then attach the metal plaque in the frame with a minimum of three to four round head "tork" tamper-resistant fasteners.

**PART 3 EXECUTION**

3.01 INSTALLATION – CBC 2022 11B-703.4

- a. Identification devices herein specified shall be installed under the Carpentry Section, in accordance with the drawings and as directed by the Architect. Tactile characters on signs shall be located 48 inches minimum above finished floor or ground surface, measured from the baseline of the lowest line of Braille and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.

Mounting location where a tactile sign is provided at a door shall be located alongside the door on the latch side and shall be positioned per 2022 CBC Sec 11B-703.4.2.

- b. Mount all single faced signs on wall surfaces by applying a contact adhesive, as manufactured by Weldwood, or an approved equal, to both the sign back and mounting surface, in accordance with adhesive manufacturer's recommendations.

3.02 SCHEDULE: Accessible restroom signage to be B.H. OLSEN - SBH or equal. For additional door signage information refer to sheet A5.0

- a. Nurses Station: Verbiage to be verified with District prior to fabrication

Sign Type "A"

- 1001 DINING
- 1002 KITCHEN/SERVING
- 1003 CORRIDOR
- 1004 GIRLS
- 1005 BOYS
- 1006 ELECTRICAL
- 1007 CAN-WASH/JANITOR
- 1008 MECHANICAL
- 1009 TOILET
- 1010 BREAK/LOCKERS
- 1011 OFFICE
- 1012 CORRIDOR
- 1013 RECEIVING
- 1014 DRY STORAGE
- 1015 DRY STORAGE
- 1016 FACULTY LOUNGE
- 1017 WALK-IN COOLER
- 1018 WALK-IN FREEZER

Sign Type "B"

Exit

Sign Type "C"

Exit Route

Sign Type "D"

Maximum Occupancy

Sign Type "E"

Mens sign for door face

Sign Type "F"

Mens sign w/ braille for door strike side

Sign Type "G"

Womens sign for door face

Sign Type "H"

Womens sign w/ braille for door strike side

Sign Type "J"

Unisex sign for door face

Sign Type "K"

Unisex sign w/ braille for door strike side

**END OF SECTION**

08/10/2023

**SOLID PLASTIC TOILET AND SHOWER STALLS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment and appliances required to complete all the toilet and shower partition work shown on the drawings and specified hereunder. Delivery to the building is considered part of this contract.

1.02 WORK INCLUDED

- a. Provide and install all solid plastic toilet stalls and screens.
- b. Provide and install all anchors and fittings for installation of all solid plastic toilet stalls, screens and shower compartments.

1.03 RELATED WORK

- a. Wood backing for anchorage of toilet stalls, baffles and compartments is specified in Section 06 10 00.

1.04 REFERENCES

- a. ASTM International (ASTM):
  - 1. A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - 2. B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 3. E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- b. National Fire Protection Association (NFPA) 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

1.05 SUBSTITUTIONS

See Div.00, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

1.06 GENERAL REQUIREMENTS

- a. Cooperation: Cooperate with the other trades for a completely anchored and finished job, furnishing and installing anchors, braces, hardware, flanges, etc.
- b. Anchorage: If, for any reason, the proper anchorage is impossible, this Contractor shall report same to the Architect and receive further instructions before proceeding with the work.
- c. Damage: The Contractor shall protect from damage the other trades work and shall repair same where any damage occurs.

- d. Responsibility: The Contractor shall assume the responsibility for proper anchorage of the equipment, and all partitions posts and fittings shall be securely anchored.

**1.07 SHOP DRAWINGS**

Shall be submitted as indicated in Section 01 33 00.

**1.08 APPROVED PARTITION MANUFACTURER'S**

- a. Scranton Products, Inc.
- b. Bobrick
- c. Approved equal

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- a. Materials specified are for Scranton Products, Hiney Hider Series, to set standard of quality.
- b. All Compartments For Toilets: Shall be High Density polyethylene (HDPE) solid 1" thick panels.
- c. Materials: All panels, doors, pilasters, screens and benches shall be fabricated from polymer resins under high pressure forming a single component section that is waterproof, corrosion proof, impact resistant and non-absorbent, which has a self-lubricating surface similar and equal to Santana's 'Plasti-Glaze 280' finish which resists marking with pens, pencils, lipsticks and other writing or marking implements. Manufacturers to submit necessary ASTM E-84 test data to comply with applicable fire codes, flame spread Class II.
- d. All Partitions: Shall be 1" thick, with all edges machined to a radius of .250" and all sharp corners removed. All dividing panels and doors shall be 55" high, and mounted 14" above finished floor, shower partitions shall be 76" high. Provide aluminum edging strips at all door and panel bottoms.
- e. All Pilasters: Shall be floor-to-ceiling height or floor mounted overhead braced, as shown on plans, and fastened to 3" high non-corrosive polymer resin shoes by means of theft-proof stainless steel sex bolts, fasten shoe to floor with #14x3-1/2" S.S. screws in plastic rawls.
- f. Hinges: Shall be integral, fabricated from door and pilaster with no exposed metal parts. Door pivots on opposing cams made of nylon 6/6 with reinforced stainless steel pin. ADA accessible stall doors shall have extra-large heavy-duty self-closing hinges.
- g. Doors: Shall be 55" high mounted 14" above floor and shall be furnished with (1) hook/bumper, mount at +48" in ADA accessible stall in addition, ADA accessible stalls shall have (1) "U" Shaped door pull each side and (1) wall stop.

- h. Door Strike and Keeper: Shall be heavy duty 6" plates, fabricated from heavy aluminum extrusion (6463-T5 alloy) with clear anodized finish with wrap-around flange and thru-bolted to pilaster with one-way sex bolts.
- i. Door Latch Housing: Shall be fabricated from heavy aluminum extrusions (6463-T5 alloy) with clear anodized finish, thru-bolted to door with one-way sex bolts. Slide bolt and button shall be heavy aluminum with 'tough-coat black' finish. Hardware shall comply with requirement for the persons with Disabilities Act.
- j. Wall Brackets: Shall be continuous (55" min.) fabricated from high density polymer resin weighing not less than #. 82/lf. Brackets shall be used for all panel to pilaster, pilaster to wall and wall to panel connections. Brackets shall be thru-bolted to panel/pilasters with one-way sex bolts at 12" o.c. Connect bracket to Stud wall with (3) #14 x 3-1/2" stainless steel screws at 12" o.c. staggered. At Masonry Wall attach with 1/4" diameter Hilti Kwik Bolt 3 Stainless Steel 2" minimum Embed. 12" o.c. staggered, per ICC EST 1385.
- k. Door Pulls, Door Stops and Bumper/Hooks: Shall be of Stainless Steel (no Zamac). Door pulls shall be "U" shaped or wire pull both sides of the door. Door hardware shall be mounted t 30" to 44" above finished floor.
- l. Color: Shall be as selected by the Architect from the manufacturer's standard colors (minimum of 9).
- m. ADA accessible Compartment Doors: Shall provide 32" clear access at end entry and 34" clear access at side entry. Doors shall be self-closing. Provide "U" shaped door pull below latch each side.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- a. Erection of partitions, etc. shall be in accordance with the manufacturer's standard recommendations and the following:
- b. All parts shall be erected in a substantial manner, straight, level and plumb.
- c. No evidence of drilling, cutting, or patching shall be visible in the finished work.
- d. Clearance at vertical edges of doors shall be uniform top to bottom and shall not exceed 3/16".
- e. Finished surfaces shall be cleaned after installation and left free from imperfections.
- f. Approved shop drawings to be submitted through subcontractor and manufacturer showing plans, elevations and details prior to fabrication and installation.

END OF SECTION  
08/05/2022

**TOILET AND BATH ACCESSORIES**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment and appliances required to complete all the work shown on the drawings and/or specified hereunder.

1.02 WORK INCLUDED

Provide and install all toilet and bath accessories, including, but not limited to grab bars, toilet paper dispensers, mirror, hand dryers, toilet seat cover dispensers, etc.

1.03 RELATED WORK

Backing for accessories is specified under Section 06 10 00 Rough Carpentry.

1.04 MANUFACTURERS' SPECIFICATIONS

Contractor shall submit catalogs, manuals and/or advertising literature for each toilet room accessory item installed. These catalogs or manuals shall clearly describe the item, replacement parts, and methods of service or repair and shall list acceptable, paper or other materials to be used or dispensed by item. All submittals shall adhere to specifications Section 01 33 00 Submittals.

**PART 2 PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

- a. Bobrick Washroom Equipment, Inc.
- b. American Specialties, Inc.
- c. Excel Dryer (for 2.02 b.2.)
- d. Or Approved equal.

2.02 MATERIALS

- a. Materials and finish shall be the best of their several kinds and shall be the manufacturer's standard for the various units except where specified otherwise. Proprietary items herein referred to are for type and style reference only.
- b. The following shall be as manufactured by Bobrick with exception to item 2.:
  - 1. Concealed mounted straight Grab bars, B-5806.99 x 36 and 42 as shown drawings.
  - 2. Hand dryers, "Xlerator", XL-SB 208-230V recessed mounted with ADA-Compliant Recess Kit #40502.

3. Recessed Multi-Roll Toilet Tissue Dispenser, B-4388
4. Surface Mounted Toilet Seat Cover Dispenser, B-4221
5. Mirror, B-290 2436

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

Contractor shall verify locations and dimensions shown with field conditions and shall be responsible for accuracy and conformity of work with existing conditions, and shall bear all expenses of changes or extras resulting from inaccuracies in his work. Contractor shall avoid damaging the work or finish of other trades and shall repair any damage, or replace damaged items, as directed, at no additional cost to Owner.

**3.02 INSTALLATION**

- a. Accessories shall be installed after all other adjacent finishes are completed. Only workmen skilled in this category shall install the various items; care shall be exercised to avoid damage to other trades' work. Contractor shall be responsible for damage during performance of this work.
- b. Toilet accessories required to be accessible shall be mounted at heights according to 2022 CBC 11B-308.

END OF SECTION  
08/10/23



**FIRE EXTINGUISHERS, CABINETS, AND ACCESSORIES**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The scope of work under this Section of the Specifications is intended to include labor, materials, tools, equipment, etc., for the complete installation of the fire extinguishers, and accessories as shown on the Drawings and/or specified herein.

1.02 WORK INCLUDED

- a. Fire extinguishers
- b. Accessories

1.03 RELATED WORK

- a. Gypsum Board Systems: Roughed-in wall. Section 09 26 00
- b. Painting: Field paint finish-Section 09 91 00
- c. Rough Carpentry- Section 06 10 00

1.04 REFERENCES

NFPA 10 Portable Fire Extinguishers.

1.05 QUALITY ASSURANCE

Conform to NFPA 10 requirements for extinguishers.

1.06 SUBMITTALS

- a. Submit product data under per Section 01 33 00.
- b. Include physical dimensions, operational features, color, and finish, wall mounting brackets with mounted measurements, anchorage details, rough-in measurements, location, and details.
- c. Submit manufacturer's installation instructions per Section 01 33 00.

1.07 OPERATION AND MAINTENANCE DATA

- a. Submit manufacturer's operation and maintenance data per Division 0 Section 33 – General Conditions Article 53.
- b. Include test, refill or recharge schedules, procedures, and re-certification requirements.

1.08 ENVIRONMENTAL REQUIREMENTS

Do not install extinguishers when ambient temperatures may cause freezing.

**PART 2 PRODUCTS**

2.01 ACCEPTABLE MANUFACTURERS

- a. J. L. Industries
- b. Larsen's Manufacturing Company
- c. Or approved equal. Substitutions per Division 0, Part 3 Instructions to Bidders.

2.02 MATERIALS

- a. Fire extinguishers shall typically be Cosmic 5E Multi-Purpose ABC Dry Chemical 5lbs (3A-40BC UL Rating), and shall be mounted 48" above finish floor to center of handle.
- b. Mounting brackets: MB818C for Cosmic 5E.

**PART 3 EXECUTION**

3.01 INSPECTION

- a. Verify location is correct.
- b. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

- a. Install fire extinguishers plumb and level on wall openings such that operating device is 48" above finish floor to center of handle.
- b. Secure with brackets (2) 1/4"-14x3" Philips wafer head self-drilling screws per bracket.

END OF SECTION

7/06/2022

**INTERIOR LOCKERS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- a. The work of this Section shall include all labor, materials, tools, equipment, facilities, transportation and services necessary for and/or reasonable incidental to the furnishing and installation of all the work shown on the drawings and/or specified herein.

1.02 REFERENCES

- a. All materials shall comply to the 2022 CBC , Chapter 11B.

1.03 GENERAL REQUIREMENTS

- a. Workmanship: Only skilled workmen experienced in their respective trades and work shall be employed. All work shall be performed in a first-class workmanlike manner and shall be subject to the approval of the Owner.
- b. Manufacturer's Recommendations: All materials shall be installed in strict accordance with manufacturer's directions.
- c. Shop Drawings: Submit, prior to fabrication and in accordance with Section 20, for approval of Architect, showing cross sections, finishes and attachment to adjacent construction. Shop drawings shall verify dimensions affecting locker installation, shall show lockers in detail, method of installation, fillers, trim, base and accessories. Locker numbering sequence information shall be included.
- d. Samples: Submit samples of all finish materials for approval. The Architect shall retain sample throughout the construction period to assure that the quality and manufacturing methods of the specification are met.
- e. Delivery: Do not deliver metal lockers until building is enclosed and ready for their installation. Protect from damage during delivery, handling, storage and installation.
- f. Lifetime warranty for all-welded, fully framed lockers and full lifetime warranty for other lockers against defects in materials and workmanship.

**PART 2 PRODUCTS**

2.01 APPROVED MANUFACTURERS

- a. List Industries, Inc.
- b. DeBourgh Mfg. Co.
- c. Republic
- d. Approved Equal

2.02 MATERIALS

Lockers shall be as manufactured by List Industries, Inc., Graduate Corridor Locker 12x15x30 fully framed all welded, heavy duty locker to set the standard. Arrangement as indicated on the drawings.

- a. Provide each type of metal locker as a complete unit produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- b. All lockers shall be pre-assembled, of all mig welded construction, in multiple column units to meet job conditions. Assemble of lock bodies be means of bolts, screws or rivets will not be permitted.
- c. All sheet steel used in fabrication shall be prime grade, free from scale and imperfections. All locking mechanisms and hooks must be zinc plated. All installation hardware to be zinc plated.
- d. Tops and bottoms shall be formed from 16 gauge cold rolled sheet steel.
- e. Backs shall be 18 gauge cold rolled sheet steel. Ventilated backs of 13 gauge flattened expanded metal shall be provided for all back to back units for gym lockers only.
- f. Each locker opening shall have an aluminum number plate with 3/8" high numerals, riveted to door at time of installation.
- g. Finish: All units shall be thoroughly cleaned and 100% iron phosphate coated after fabrication to provide protection against corrosion. The units shall then be baked powder coat paint with a minimum 2 – 3 mil average dry thickness. Provide TGIC for UV protection for all exterior lockers. Finish shall be manufacturer's standard, with a selection of at least 10 colors with 2 tones between frame and locker.
- h. Door shall be one piece 14 gauge steel with both vertical edges formed into channel shape; top and bottom shall be flanged at 90° angle with louvers for ventilation.
- i. Locking device shall engage frame at one (1) point locking device with 11 gauge latch hooks for attaching padlock and recessed handle.
- j. Hinges shall be heavy duty 13 ga 7 knuckle 3-1/2" hinges.

END OF SECTION  
05/21/2022

**FOOD SERVICE EQUIPMENT**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section includes all labor, material, equipment and appliances required for fabrication and delivery of the kitchen equipment work shown on the drawings and specified hereunder.

1.02 WORK INCLUDED

- a. Provide and install food service equipment and accessories per paragraph 2.04a.

1.03 RELATED WORK

- a. All plumbing, steam or gas connections, valves, traps, faucets, and other miscellaneous fittings as necessary to make final connections to this equipment shall be furnished and installed as specified in Section 22 00 00.
- b. Flue or vent connections beyond the walls or ceilings of the kitchen for exhaust or vapor hoods shall be furnished and installed as specified in Section 23 00 00.
- c. All electrical connections, switches and miscellaneous accessories shall be furnished and installed as specified in Section 26 00 00.

1.04 GENERAL REQUIREMENTS

- a. Shop Drawings: Submit for Architect's approval per Sections 10 and 01301.
- b. Guarantee: The CONTRACTOR shall furnish to the Owner a written guarantee stipulating that all equipment furnished and manufactured by him will be replaced or taken to the shop, repaired and re-installed. Should any such equipment or manufactured item be found defective within one year after the Notice of Completion, written notices to the General CONTRACTOR shall constitute sufficient notification that such equipment is defective and the CONTRACTOR shall replace or repair the defective equipment within ten (10) days after receiving notice to do so.
- c. Motors: 1/2 HP and smaller shall be wired for 120 volts, single phase; motors of over 1/2 HP shall be wired for voltage indicated.
- d. Heating Elements: 1,000 watts and smaller shall be wired for 120 volts, single phase. Heating elements within one fixture, totaling more than 1,000 watts shall be wired for 208/240 volts, single phase.
- e. Switches, Controls and/or Starters: Shall be supplied for each motor-driven appliance or electrically heated unit. Controls mounted on vertical surfaces of fixtures shall be set into recessed boxes, or otherwise indented to prevent damage.

- f. Counter Type Fixtures: Such as the soiled dishtable containing electrically operated or heated equipment, shall be pre-wired to a junction box located within the fixture, ready for connection. Provide all electrical components, such as conduit, wire fittings, junction boxes, face plates for outlets, as are necessary and pre-wire these fixtures ready for connection to the utility rough-ins at the fixture junction box.
- g. Cabinet Type Fabricated Fixtures: Other than sink and drainboard assemblies, containing items requiring water or drain lines, shall be completely pre-plumbed to the actual point of utility connection.

#### 1.05 SPECIAL REQUIREMENTS

The CONTRACTOR shall perform the following adjustments and checks before final approval by the Architect:

1. Match all burner orifices to the gas pressure
2. Check gas pressure at the equipment
3. Adjust all burners as per manufacturers recommendations
4. Adjust all thermostats as per manufacturers recommendations
5. Final adjustment of all equipment, including leveling all tables, equipment and fixtures, to be witnessed by job inspector
6. At completion of project, give instructions and equipment description brochures to Owner, and instruct kitchen personnel in operation of all equipment and locations of all shut-off or adjustment valves. An emergency service telephone number shall be included in all service manuals.
7. All stationary fixtures/equipment over 60" tall shall be fastened/secured as required by the seismic restraint standards of T24 CBC. CONTRACTOR shall be responsible for design and configuration of seismic restraints.

#### 1.06 QUALITY ASSURANCE

- a. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of food service equipment of types, capacities, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- b. Kitchen Equipment Contractors and Manufactures: Shall have a direct factory brand representative in the immediate area where this project is to be built, and must have satisfactory service in this area for at least five (5) years.
- c. Installer's Qualifications: Firm with at least (3) years of successful installation experience on projects with food service equipment similar to that required for project.
- d. Fabricator's Qualifications: The CONTRACTOR shall provide units custom fabricated by shop which is skilled and with a minimum of (5) years of experience in similar work. Fabricate all custom equipment items at same shop. Where units cannot be fully shop-fabricated, complete fabrication work at project site.

- e. Coordination: The CONTRACTOR shall carefully examine all drawings and specifications, and fully inform himself about all conditions and limitations under which he will be obliged to perform his work. After award of contract, no subsequent allowance will be made to the CONTRACTOR due to his failure to comply with the above requirements, or due to any misunderstandings or misconception of quantities or character or work, locations, accessibility, availability, or any other condition affecting the installation and completion of all work. Submittal of a written bid shall constitute acceptance of all terms of this specification.

#### 1.07 CODES AND STANDARDS

- a. NSF Standards: Comply with applicable National Sanitation Foundation (NSF) standards and recommended criteria. Provide each principal item of food service equipment with a NSF "Seal of Approval".
- b. UL Labels: Where available, provide UL labels on prime electrical components of food service equipment. Provide UL "recognized marking" on other items with electrical components, signifying listing by UL, where available.
- c. ANSI Standards: Comply with applicable ANSI standards for electric powered and gas-burning appliances, for piping to compressed gas cylinders, and for plumbing fittings including vacuum breakers and air gaps to prevent siphonage in water piping.
- d. NFPA Codes: Install food service equipment in accordance with the following National Fire Protection Codes (NFPA) Codes:
  - (1) NFPA 54 - National Fuel Gas Code
  - (2) NFPA 70 - National Electrical Code
  - (3) NFPA 96 - Removal of Smoke and Grease-Laden Vapors for Commercial Cooking Equipment (Exhaust Hood)
- e. Health Code: Install food service equipment in accordance with local health department applicable regulations.
  - (1) American Gas Association (AGA) approvals. Comply with applicable standards, approvals and recommended criteria.
  - (2) American Society of Mechanical Engineers (ASME) approvals. Comply with applicable standards, approvals and recommended criteria.
  - (3) Equipment Manufactures specifications and recommendations. Comply with applicable standards, approvals and recommended criteria.

#### 1.08 SPECIAL PROJECT WARRANTY

- a. Warranty on Refrigeration Compressors: Provide written warranty, signed by manufacturer, agreeing to replace/repair, within warranty period, compressors with inadequate and defective materials and workmanship, including leakage, breakage, improper assembly, or failure to perform as required; provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty period. Replacement is limited to component replacement only, and does not include labor for removal and reinstallation.
- b. Warranty Period: Shall be (5) years from date of Notice of Completion.

**PART 2 PRODUCTS**

## 2.01 WORKMANSHIP AND MANUFACTURER

- a. Catalog Numbers and Trade Names: Shall be used in the Equipment Schedule for the purpose of establishing equipment types and quality standards. Manufacturer's products that are the equal of those specified will be acceptable only when they have been approved in writing by the Architect.
- b. All equipment: Shall be of the latest design and manufacture throughout. All fixtures shall be of "formed" construction, rigidly reinforced with formed heavy gauge channels, electric arc welded throughout. (Both shop and field welds). No spot welding will be permitted. All welds shall be hidden or ground smooth and polished to original finish of material. Tops to be formed and welded into one integral piece giving a smooth and easily cleaned surface and having no discoloration caused by welding. Shop or field soldering is not acceptable. Welding shall be done with rod of the same composition as the parts to be joined. Excess metal shall be ground off. Welds shall be free from pits, warps, cracks, or other defects. On exposed surfaces, welds shall be finished to match adjacent material and simulate one piece construction.
- c. Sink Compartments and Drainboards: Shall be formed and welded into one integral piece. Welds on stainless steel to be ground smooth and polished to original finish of material. Drainboard shall slope to sinks.
- d. All equipment: Shall have a one year guarantee.

## 2.02 MATERIALS

- a. Stainless Steel: Shall conform to ANSI No. 18-8, Type 304. Provide nonmagnetic sheets, free of buckles, waves and surface imperfections. Provide No. 4 polished finish for any surfaces which will be exposed. Edges shall be ground smooth.
  - (1) Provide self-adhesive protective paper covering on polished surfaces of stainless steel sheet work, and retain/maintain until time of final testing, cleaning, start-up, and substantial completion.
- b. Galvanized Sheet Steel: Shall conform to ASTM A-526-85, except ASTM A-527-85 for extensive forming; ASTM A-525-87, G90 zinc coating, chemical treatment.
- c. Steel Sheet: Shall conform to ASTM A-569-85 hot-rolled carbon steel.
- d. Stainless Steel Tube: Shall conform to ASTM A-554, Type 304 with No. 4 polished finish.
- e. Sealants: Shall conform to ASTM C-920; Type S Grade NS, Class 25, Use NT. Provide sealant that when fully cured and washed meets requirements of Food and Drug Administration Regulation 21 CFR 177.2600 for use in areas where it comes in contact with food.
  - (1) Color: Shall be as selected by Architect from manufacturer's standard colors.
  - (2) Backer Rod: Shall be closed-cell polyethylene rod stock, larger than joint width.



- f. Gaskets: Shall be solid or hollow (not cellular) neoprene or PVC; light grey, minimum 40 Shore A hardness, self-adhesive or prepared for either adhesive application or mechanical anchorage.

## 2.03 FABRICATION REQUIREMENTS

- a. Pipe Stands and Frames for Open Base Tables: Shall be constructed of stainless steel tubing. Joints between legs and cross braces shall be welded and ground smooth. Flattened ends on tub stretchers will not be permitted. Provide with adjustable sanitary stainless steel bullet feet, and circular gussets.
- b. Table Tops: Shall be of 16 gauge stainless steel unless otherwise noted, with all shop seams and corners welded, ground smooth and polished. Working tops of closed base fixtures shall be reinforced on the underside with a framework of 1-1/2" x 1-1/2" x 1/8" galvanized angles or 16 gauge hat sections and on open pipe frames with a 4" channel at each pair of legs. Channel runners, running lengthwise, shall be provided on all tops up to 30" wide. Tops shall be reinforced so that there will not be any noticeable deflection, and reinforcements shall be welded to the underside of the top. Unless otherwise shown, metal tops shall be turned down 2" and back at 45 degree angle with 1/8" turn under, except where adjacent to walls or other pieces of equipment. The wall side shall be turned up 10" and back 2" at a 45 degree angle unless otherwise specified. Ends of this splash are to be closed, and space between wall and backsplash at junction with top, shall be closed with spherical. All tops shall have 1/8" sound deadening material applied to the underside.
- c. Enclosed Bases or Cabinet Bodies: Shall be closed on the ends and sides as required. Bases shall be reinforced at the top with a frame of 1-1/2" x 1-1/2" x 1/8" galvanized angles, with all corners of frame mitered and welded. Bottom shall be provided to reinforce shelves and support tops. In the case of fixtures fitting against or between walls, the bodies shall be extended back to the wall line to permit adjustment to wall irregularities. A flush fitting vertical trim strip of the same material as the body, shall be provided at each end of the body and shall extend 1" to the wall line. These fixtures shall be constructed to set on channel bases or legs as hereinafter specified, and shall be covered with same material as floor and coved in a verminproof manner if mounted on a base.
- d. Shelves, Mullions and Aprons: Shall be fabricated flush with cabinet body, welded, ground, and polished.
- e. Drawers: Shall be die-stamped out of one piece of 18 gauge stainless steel approximately 15" x 20" x 5" deep, set loosely in a channel frame for lift out cleaning. Top edges of drawer shall be rounded on 1" radius and interior vertical corners on a 2" radius. The support frame shall be of welded stainless channel. Drawer face shall be welded to this frame so that there will be no exposed screws or rivets on the face. Face shall be 16 ga. stainless steel. Stainless steel drawer slides shall be mounted on the channel frame and shall be fitted with ball bearing nylon rollers. Drawers under open base tables shall be enclosed in a 18 gauge stainless steel housing to make them verminproof. Drawer slides shall extend far enough into the open position to permit vertical removal of drawer liners without releasing stops. Provide approved pull.
- f. Shelving:
  - (1) Interior shelves shall be solid, non-removable stainless steel shelves, with ends and backs provided with a 1-1/2" high turnup against the body of the fixtures and welded to same.

- (2) Undershelves on open base tables unless otherwise detailed, shall be constructed of 16 gauge stainless steel flanged 90 degrees down 1-1/2" and back 90 degrees 1/2". The corners shall be welded to the legs. Undershelf shall be 10" from the floor. Back shall be turned up 3".
  - (3) Elevated shelves shall have edges turned down 1-1/2" in square edge, and back 7/8" except where shelves are adjacent to walls or other fixtures, where they shall be turned up 2". Corners shall be spherical. Shelves shall be held out from wall at back and ends 1".
- g. Sinks and Drainboards: Shall be constructed of 16-gauge stainless steel. The working edges of the sink shall be provided with 1 1/2" radius sanitary rolled edges in one piece with rounded corners. The sinks shall be provided with 10" backsplash and end splash, with top edge flanged back 2" at 30 degree angle and attached to the building wall, it shall be all grained in the same direction. Sink bowls shall be made individually having four sides and bottom, which shall be welded together, and shall be capped on the front, the bottom, and completely up the back, making this verminproof by welding flush stainless steel trim around the joint.

**2.04 SCHEDULE**

a. Index		
No. on Dwgs	Description	Number Required
A1.	Air Curtain, Unheated.....	2
A2.	Mop Sink Cabinet.....	1
A2.1.	Service Faucet.....	1
A3.	Refrigerator, Reach-In, Existing, By Owner.....	1
A4.	Hot Holding Cabinet, Existing, By Owner.....	3
A4.1.	Retractable Drop Cord, By EC.....	1
A5.	Stainless Steel Serving Counter.....	1
A6.	POS System, By Owner.....	3
A7.	Heated Zone Merchandiser.....	4
A8.	Grab-N-Go Case, Refrigerated, Mobile.....	4
A9.	Spare Number.....	1
A10.	Spare Number.....	1
A11.	Milk Refrigerator.....	2
A12.	Stainless Steel Serving Counter.....	1
A13.	Stainless Steel Serving Counter.....	1
A14.	Hand Sink, With Soap and Towel Dispenser.....	4
A15.	Trash Receptacle, 23 Gallon, By Owner.....	4
A16.	Air Curtain.....	1
A17.	Refrigerator, Roll-In, Existing, By Owner.....	1
A18.	Pan Rack Cart, Existing, By Owner.....	5
A19.	Spare Number.....	4
A20.	Corner Guard, L Shape.....	19
A21.	Refrigerator, Reach-In, Existing, By Owner.....	1
A22.	Freezer, Roll-In, Existing, By Owner.....	1
A23.	Work Table, Mobile, With Drawers.....	3
A24.	Work Table.....	1
A25.	Wall Shelf, Single With Concealed Brackets.....	1
A26.	Corner Guard, U Shape.....	4
A27.	Exhaust Hood With MUA.....	1
A27.1.	Fire Suppression System, Wall Mounted.....	1
A27.2.	Hood Control Panel.....	1
A28.	Convection Oven, Double.....	4
A29.	Spare Number.....	1

A30.	Spare Number .....	1
A31.	Wall Flashing .....	1
A32.	Range, 6-Burner With Standard Oven .....	1
A33.	Work Table .....	1
A34.	Wall Shelf, Single With Concealed Brackets .....	1
A35.	Work Table With Sinks .....	1
A36.	Wall Shelf, Single With Concealed Brackets .....	1
A37.	Wall Flashing .....	1
A38.	Trash Receptacle With Dolly.....	3
A39.	Hose Reel .....	1
A39.1.	Hose Reel Control Cabinet .....	1
A40.	Chemical Dispensing System, By Purveyor .....	2
A41.	Soiled Dish Table.....	1
A42.	Dish Machine, Door Type, Ventless .....	1
A42.1.	Drain Water Tempering Kit.....	1
A43.	Clean Dish Table .....	1
A44.	Mobile Drying Rack, Four Tier, Mobile.....	3
A45.	Utensil Rack .....	1
A46.	Pot Sink.....	1
A46.1.	Pre-Rinse Faucet .....	1
A47.	Wall Shelf, Single With Concealed Brackets .....	2
A48.	Ice Machine, Existing, By Owner.....	1
A48.1.	Ice Bin, Existing, By Owner .....	1
A48.2.	Water Filtration System .....	1
A49.	Spare Number .....	1
A50.	Spare Number .....	1
A51.	Work Table .....	1
A52.	Wall Shelf, Single With Concealed Brackets .....	1
A53.	Can Opener .....	1
A54.	Walk-In Cooler .....	1
A54.1.	Cooler Evaporator Coil.....	1
A54.2.	Cooler Evaporator Coil.....	1
A54.3.	Remote Compressor Rack, Outdoor, Air Cooled .....	1
A55.	Cooler Storage Shelving, Four Tier.....	13
A56.	Dry Storage Shelving, Four Tier .....	15
A57.	Spare Number .....	1
A58.	Spare Number .....	1
A59.	Dry Storage Shelving, Four Tier, Mobile.....	2
A60.	Spare Number .....	1
A61.	Faculty Lounge Center, By Arch/ID, With Sink .....	1
A61.1.	Deck Mount Faucet, By PC.....	1
A62.	Wall Cabinet With Doors, By Arch/ID.....	1
A63.	Vending Machine, By Owner .....	1
A64.	Walk-In Freezer .....	1
A64.1.	Freezer Evaporator Coil .....	1
A64.2.	Freezer Evaporator Coil .....	1
A64.3.	Remote Compressor Rack, Outdoor, Air Cooled .....	1
A65.	Freezer Storage Shelving, Four Tier .....	16
A66.	Spare Number .....	1
A67.	Air Curtain .....	2
A68.	Wall Guard.....	9
A69.	Spare Number .....	1
A70.	Spare Number .....	1
A71.	Locker, Double .....	4
A72.	Chemical Storage Shelving, Four Tier, Mobile.....	1

A73.	Mop Sink .....	1
A73.1.	Service Faucet.....	1
A74.	Mop Holder .....	1
A75.	Wall Flashing .....	1

b. Equipment Specifications:

- A1. Air Curtain, Unheated: Shall be a Mars Air Systems Model # 99-014, LoPro Series 2 Air Curtain, or approved equal. For 72" wide door, unheated, galvanized steel cabinet, obsidian black powder coat finish, (1) 1/6 HP motor, 115v/60/1-ph, cETLus. Mechanical switches. One set #99-014 Door Limit Switch, indoor, plunger/roller type, remote mounted, 1 HP max, 250v, 20.0 amps, NEMA 2. Remote Mounted Switch, variable speed, 120v, 6.0 amps.
- A2. Mop Sink Cabinet: Shall be an Advance Tabco Model # 9-OPC-84DL-300, or approved equal. Cabinet with Mop Sink, 50-3/8"W x 22-3/4"D x 84"H O.A., double hinged doors, left side mop sink 20"W x 16"D front to back x 12" deep (drain included), storage for mop bucket to roll in on right, (2) mop holders, (4) fixed intermediate shelves (3 on right, 1 on left above sink), slotted side panels for ventilation, 16/304 series stainless steel sink bowl, 18/304 series sink bowl apron, 18/300 series stainless steel cabinet, NSF. Model # K-94-BACK-300 Back panel for mop sink cabinet, type 300 stainless steel. Model # TA-48 12" x 12" cut out for plumbing in back panel or undershelf.
- A2.1. Service Faucet: Shall be a T&S Brass Model # B-0655-01, or approved equal. Service Sink Faucet, vacuum breaker nozzle with 3/4" garden hose thread, 1/2" NPT female flanged adjustable inlet with screwdriver stops, 6" wrist action handles, pail hook, bottom support, wall brace. 6" wrist action handle, standard. Model # B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "Ell" 1/2" NPT female x male.
- A3. Refrigerator, Reach-In, Existing, By Owner.
- A4. Hot Holding Cabinet, Existing, By Owner.
- A4.1. Retractable Drop Cord, By EC.
- A5. Stainless Steel Serving Counter: Shall be a Fabricated, Model #Custom, or approved equal. Serving counter, see plans for width, length, height, and configuration. Similar to standard details; FSD5-12, FSD1-7, FSD1-10, and FSD1-23. These standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Removable, stainless steel kick plates on public sides.
- A6. POS System, By Owner.
- A7. Heated Zone Merchandiser: Shall be a Hatco Model # HZMH-24D, or approved equal. Spot On Horizontal Heated Zone Merchandising Warmer, countertop, dual shelf, (2) zones per shelf, (6) divider rods, thermostat, infrared heat, LED lighting, hardcoat aluminum base, tempered side glass hinged to post, designer panels, 1500 watts, 12.5 amps, cUL, UL, UL EPH Classified. 120v/60/1-ph, 1500 watts, 12.5 amps, NEMA 5-20P, standard. Black, designer color. Model # HZM24FLIP Plexi-Glass flip-up door on front upper shelf for 24 models. Model # HZM24FLIP Plexi-Glass flip-up door on front lower shelf for 24 models.
- A8. Grab-N-Go Case, Refrigerated: Shall be a Federal Industries Model # RSSM360SC, or approved equal. Specialty Display High Profile Self-Serve Refrigerated Merchandiser, 36"W x 35-1/4"D x 60-1/4"H, self contained refrigeration, energy saving night curtain, 3500K LED top light, (2) tiers of

adjustable black metal shelves, stainless steel display deck, black interior, tempered glass ends, choice of laminate, designed for continuous lineups, cULus, UL EPH Classified, Made In USA, DOE 2017 compliant. Self-contained refrigeration standard. 208-240v/60/1-ph, standard. Laminate standard color – Black. Sound deadening kit, foam insulated base. Rollco security roll-up cover, Black. Stainless steel interior (includes shelving). LED Lights below shelves. 2-1/2" Casters (includes cord & plug).

- A9. Spare Number.
- A10. Spare Number.
- A11. Milk Refrigerator, Existing, By Owner.
- A12. Stainless Steel Serving Counter: Shall be a Fabricated, Model #Custom, or approved equal. Serving counter, see plans for width, length, height, and configuration. Similar to standard details; FSD5-12, FSD1-7, FSD1-10, and FSD1-23. These standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Removable, stainless steel kick plates on public sides.
- A13. Stainless Steel Serving Counter: Shall be a Fabricated, Model #Custom, or approved equal. Serving counter, see plans for width, length, height, and configuration. Similar to standard details; FSD5-12, FSD1-7, FSD1-10, and FSD1-23. These standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Removable, stainless steel kick plates on public sides.
- A14. Hand Sink, With Soap and Towel Dispenser: Shall be an Eagle Group Model # HSAP-14-ADA-FW, or approved equal. Hand Sink, wall mount, 14" wide x 16" front-to-back x 5" deep bowl, 16/304 stainless steel construction, splash mount gooseneck faucet with wrist handles & mixer valve, marine edge on front & sides, 1/2" NPS water inlet, chrome-plated P-trap, wrist handles, soap dispenser, basket drain, skirt assembly & paper towel dispenser, PHYSICALLY CHALLENGED, NSF. Model # -LRS, Left & right side splashes.
- A15. Trash Receptacle, 23 Gallon, By Owner.
- A16. Air Curtain: Shall be a Mars Air Systems Model # NH236-1UA-TS, or approved equal. High Velocity Series 2 Air Curtain, for 36" wide door, unheated, galvanized steel cabinet, titanium silver powder coat finish, (1) 1 HP motor, 115v/60/1-ph, ETL. Mechanical switches. Model #99-014, Door Limit Switch, indoor, plunger/roller type, remote mounted, 1 HP max, 250v, 20.0 amps, NEMA 2. Model #MCPB-1UA, Motor Control Panel, for unheated units, remote mounted, (1) 1 HP motor maximum, 115v/60/1-ph.
- A17. Refrigerator, Roll-In, Existing, By Owner.
- A18. Pan Rack Cart, Existing, By Owner.
- A19. Spare Number.
- A20. Corner Guard, L Shape: Shall be a Fabricated, Model # Custom, or approved equal. Similar to standard detail FSD1-40. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions.
- A21. Reach-In Refrigerator, Existing, By Owner.
- A22. Freezer, Roll-In, Existing, By Owner.
- A23. Work Table, Mobile, With Drawers: Shall be a Fabricated, Model # Custom, or approved equal. Work table, see plans for width, length, height, and configuration. Standard details are to be utilized as basic

- minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-7 and FSD1-10. Island work table with undershelf, similar to detail FSD2-6. 5" Heavy-duty casters, two (2) with brakes. Straight turn-down edge profile similar to detail FSD1-1A. Provide 20" x 20" x 5" deep drawer assembly, similar to detail FSD1-15, number and location as shown on plans.
- A24. Work Table: Shall be a Fabricated, Model # Custom, or approved equal. Work table, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-7 and FSD1-10. Work table with backsplash and undershelf, similar to detail FSD2-5. 6"-high backsplash similar to detail FSD1-5A. Provide stainless steel adjustable bullet feet. Straight turn-down edge profile similar to detail FSD1-1A.
- A25. Wall Shelf, Single With Concealed Brackets: Shall be a Fabricated, Model # Custom, or approved equal. Single tier wall shelf with concealed bracket similar to standard detail FSD12-7. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications & any fabrication details included in the contract drawings for precise & complete fabrication instructions.
- A26. Corner Guard, U Shape: Shall be a Fabricated, Model # Custom, or approved equal. Similar to standard detail FSD1-40. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions.
- A27. Exhaust Hood With MUA: Shall be an Accurex, Model # XXEW-118.5-S, or approved equal. Filter type exhaust hood, length and width as shown on plans. Construction to consist of 18 Gauge type 304 stainless steel, including any exposed back. External welded construction in accordance with the latest edition of NFPA 96. All welds to be ground and polished. U.L. Classified, removable, stainless steel non adjustable grease filters. Stainless steel, removable grease can(s). Sloped grease trough, full length below filters to grease can(s). Hangers, supports and miscellaneous accessories as required for installation. Air space at wall(s) to accommodate requirements of the latest edition of NFPA 96 clearance to combustibles. All welded duct collar(s). Pre piping for hood fire suppression system. Final connections to hood duct collar(s) by the Mechanical Division. Hood construction and components to be UL and NSF listed. Mounting height of bottom edge of hood to be 6'-8" above finished floor. Verify and coordinate all dimensions, and duct requirements and locations with site conditions and Mechanical Division. See ventilation drawing sheet for general size and location of duct(s). If not installed against the finished ceiling, provide matching stainless steel closure panels above hood to finished ceiling, to conceal duct(s) and hood fire suppression system piping; verify height. If finished ceiling is more than 24" above the top of the hood(s), or ceiling is open type ceiling, verify requirement for closure panels with Architect/Interior Designer. Recessed LED light fixtures and tubes, U.L. listed for use in commercial cooking hoods, NSF approved. Provide an adequate number and type of light fixtures to provide a minimum light level of 50 foot candles at 36" AFF, below the hood. The Kitchen Equipment Contractor shall provide light bulbs as required by hood manufacturer to meet this requirement. If light bulbs are not readily

available through retail outlets the Kitchen Equipment Contractor shall provide two (2) complete sets.

- A27.1 Fire Suppression System, Wall Mounted: Shall be an Accurex, Model # Ansul R-102, or approved equal. Ansul R 102 Ansulex Liquid Fire Suppressant. Surface appliance nozzles, hood and duct protection nozzles in Exhaust Hood Item A27. Manual pull station and micro switches with two sets of normally open and two sets of normally closed contact points. All exposed pipe and fittings to be chrome plated or stainless steel. All components and labor necessary for completely installed system in accordance with manufacturer's listings and instructions, U.L. Standard 300, UL Standard 1254, NFPA 17A, NFPA-96, and all applicable local codes, standards, and regulations. Components inside exhaust hood to be installed at hood manufacturer's shop during fabrication. Provide with automatic mechanical gas shut off valves (not electric solenoid valves) for equipment below exhaust hood. Coordinate size(s) and installation with Plumbing Division. Six month and twelve month inspections, servicing, and replacement of components as per N.F.P.A. 96. Electrical Division to provide shunt trip breakers at main power panel, or disconnects, as designated by the Electrical Engineer; interconnected with micro switch at fire system control panel, for all electricity in and under exhaust hood. Shunt trips/disconnects to accomplish shut off of electricity in event of fire system activation. Ansul to provide complete shop drawings, locate and/or verify and coordinate system tank(s), panel(s), and pull station(s) location(s) and requirements, and verify and coordinate with Mechanical Engineer's documents and Division 15's exhaust and supply air requirements for hood(s); for proper protection of hood(s) and equipment in and below the hood(s), controlling of associated components, and interconnection of multiple fire systems as required. Provision and installation of components and system(s) to be by dealer and installer authorized, factory trained, and certified to sell, install, and service Ansul fire suppression system(s) as noted in this specification, at the time of bidding, installation, start-up, and warranty period of this project. As part of this item, provide wall mounted type K Ansul hand held portable fire extinguisher, placard, and mounting bracket as required in the immediate vicinity of each cooking area, per NFPA-96 and NFPA-10. Additional fire extinguishers as required in the kitchen area are to be specified by the Architect and provided by the General Contractor.
- A27.2 Hood Control Panel: Shall be an Accurex, Model # XKC-CV-SB-21-2-1-0, or approved equal. Ventilator control panel, semi-recessed, where located on plan. Stainless steel trim strips. Time clock for automatic wash-down operation. Ventilator light switch. Unit to operate Ventilator(s), Item A27.
- A28. Convection Oven, Double: Shall be a Montague Company, Model # 2-115A, or approved equal. Vectaire Convection Oven, gas, double-deck, bakery depth, thermostatic controls, single speed fan, vertical opening doors with windows, stainless steel top, front & sides, 3" high flue deflector with stainless steel front trim, 6" adjustable legs, 115,000 BTU per deck, NSF, CSA Star. Natural gas. (2) 120v/60/1ph, 3/4 hp, cord with 3-prong plug. Stainless steel exterior bottom, per deck. Flex connector kit, 3/4" x 4' (hose, disconnect & restraining device) per deck.
- A29. Spare Number.
- A30. Spare Number.
- A31. Wall Flashing: Shall be a Fabricated, Model # Custom, or approved equal. Similar to standard detail FSD1-39. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications and any fabrication details included in the contract drawings

- for precise and complete fabrication instructions. Cover wall behind the cooking equipment from the finished floor to the bottom of the exhaust hood, the length of the exhaust hood.
- A32. Range, 6-Burner With Standard Oven: Shall be a Montague Company, Model # 136-5, or approved equal. Legend™ Heavy Duty Range, gas, 36", (6) 12" 30,000 BTU open burners, standard oven base, stainless steel front & 4" flue riser, black sides, 6" high adjustable stainless steel legs, 220,000 BTU, NSF, cETLus, CE.
- A33. Work Table: Shall be a Fabricated, Model # Custom, or approved equal. Work table, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-7 and FSD1-10. Work table with backsplash and undershelf, similar to detail FSD2-5. 6"-high backsplash similar to detail FSD1-5A. Provide flanged feet, anchor to floor. Straight turn-down edge profile similar to detail FSD1-1A. Provide 20" x 20" x 5" deep drawer assembly, similar to detail FSD1-15, number and location as shown on plans.
- A34. Wall Shelf, Single With Concealed Brackets: Shall be a Fabricated, Model # Custom, or approved equal. Single tier wall shelf with concealed bracket similar to standard detail FSD12-7. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications & any fabrication details included in the contract drawings for precise & complete fabrication instructions.
- A35. Work Table With Sinks: Shall be a Fabricated, Model # Custom, or approved equal. Work table with sink(s), see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-7 and FSD1-10. Work table with backsplash and undershelf, similar to detail FSD2-5. 6"-high backsplash similar to detail FSD1-5A. Provide sidesplash where table end meets wall or adjacent equipment. Provide two (2) integral sinks, similar to detail FSD2-7. Size and location as shown on plans and on elevations. Provide rotary waste assemblies with overflows and lever brackets similar to detail FSD1-13. Provide one (1) T&S Model #B-0231 backsplash mounted faucet (12" spout) with wrist-action handles. Provide flanged feet, anchor to floor. Marine rolled flat edge profile similar to detail FSD1-2C.
- A36. Wall Shelf, Single With Concealed Brackets: Shall be a Fabricated, Model # Custom, or approved equal. Single tier wall shelf with concealed bracket similar to standard detail FSD12-7. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications & any fabrication details included in the contract drawings for precise & complete fabrication instructions.
- A37. Wall Flashing: Shall be a Fabricated, Model # Custom, or approved equal. Similar to standard detail FSD1-39. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Provide 20 gauge stainless steel panels from top of backsplash to ceiling.
- A38. Trash Receptacle With Dolly: Shall be a Rubbermaid Commercial Products Model #FG262000GRAY, or approved equal. ProSave® BRUTE® Container, without lid, 20 gallon, 19-1/2"D x 22-7/8"H, round, reinforced



- rim, built in handles, double rimmed base, high-impact plastic construction, gray, NSF, Made in USA. Model #FG264043BLA BRUTE® Quiet Dolly, 18-1/4"D x 6-5/8"H, non-marking casters, black, NSF, Made in USA.
- A39. Hose Reel: Shall be a T&S Brass Model # B-7122-C01, or approved equal. Hose Reel System, enclosed, 3/8" x 30' hose with blue spray valve, with ratcheting system & adjustable hose bumper, stainless steel. Model #B-0512 Concealed Mixing Faucet, 4-arm handles, 3/8" NPT inlets & outlets, 3" centers.
- A39.1 Hose Reel Control Cabinet: Shall be a T&S Brass Model # B-2339-LR, or approved equal. Hose Reel Control Cabinet, with control valve & temperature gauge & dual check valves.
- A40. Chemical Dispensing System, By Purveyor.
- A41. Soiled Dish Table: Shall be a Fabricated, Model # Custom, or approved equal. Dishtable, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-4B, FSD1-5C, FSD1-7, and FSD1-10. Basic dish table configuration to be similar to details FSD4-1, FSD4-2, FSD4-3, and FSD4-4. Provide quick drain grate at dish machine, similar to detail FSD1-34.
- A42. Dish Machine, Door Type, Ventless: Shall be a Hobart Model # AM16VLT-ADV-2, or approved equal. Ventless Dishwashing Machine, tall chamber (27") door type, energy recovery, automatic soil removal (ASR), drain water energy recovery (DWER), high temp sanitizing, 208-240/60/3 (field convertible to single phase), internal condensing system, 38 racks/hour, straight-thru or corner installation, user-friendly smart touchscreen controls, Sense-A-Temp™ booster, electric tank heat, X-shaped wash arms, scrap screen and basket, door actuated start, door lock, stainless steel tank, tank shelf, chamber, trim panels, frame & feet, pumped drain air gap, drain water tempering, cULus, NSF, ENERGY STAR®. Factory Startup. Model # RAPID-FILL1-AM16 Rapid Fill Kit Single Valve – For faster filling, requires separate hot water connection. Model # WTRHAMARREST-AM16, Water Hammer Arrestor – Assembly includes 3/4" brass pressure regulator, pressure gauge, shock arrestor and garden hose adapter. Model # FLNG-FT-AM16 Flanged Feet, Bolt Down – Set of 4.
- A42.1 Drain Water Tempering Kit: Shall be a Hobart Model # AM16VLT-ADV-2, or approved equal. Drain water tempering (dual valve) kit with Pumped Drain Air Gap for VL-BAS and VLT-BAS models.
- A43. Clean Dish Table: Shall be a Fabricated, Model # Custom, or approved equal. Dishtable, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-4B, FSD1-5C, FSD1-7, FSD1-10, FSD4-2, and FSD4-9.
- A44. Mobile Drying Rack, Four Tier, Mobile: Shall be a Metro Model #MAX4-PR48VX4, or approved equal. MetroMax® 4 Mobile Drying Rack Unit, 48"W x 24"D x 68"H, 4-tier, for trays/cutting boards/sheet pans & steam pans, includes: (4) open shelf frames, (4) 63" mobile posts, (2) cutting board/tray drying racks, (2) pan racks, (4) polymer swivel casters (2 with brakes), built in Microban® antimicrobial product protection, NSF. Model # MAX4-PR36VX4 MetroMax® 4 Mobile Drying Rack Unit, 36"W x 24"D x 68"H, 4-tier, for trays/cutting boards/sheet pans & steam pans, includes: (4) open shelf frames, (4) 63" mobile posts, (2) cutting board/tray drying

- racks, (2) pan racks, (4) polymer swivel casters (2 with brakes), built in Microban® antimicrobial product protection, NSF.
- A45. Utensil Rack: Shall be a Fabricated, Model # Custom, or approved equal. Provide wall mounted utensil rack size and configuration as shown on plan, similar to standard detail FSD14-7.
- A46. Pot Sink: Shall be a Fabricated, Model # Custom, or approved equal. Pot sink, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-4B, FSD1-5C, FSD1-7, FSD1-8, FSD1-10, FSD1-13, FSD3-1, FSD3-3, and FSD3-4. Provide sidesplash where pot sink end meets wall or adjacent equipment. Integral sinks to have one (1) T&S Model #B-0292 Big-Flo splash mount 3/4" faucet with 24" double joint swing nozzle and three (3) rotary waste assemblies with overflows. Provide stainless steel waste lever brackets similar to standard detail FSD1-13.
- A46.1 Pre-Rinse Faucet: Shall be a T&S Brass Model # B-0133-12-CR-B, or approved equal. EasyInstall Pre-Rinse Unit, spring action gooseneck, 8" wall mount, spray valve (B-0107), 12" add-on faucet, wall bracket, quarter-turn Cerama cartridges, low lead. Model # B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "EII" 1/2" NPT female x male.
- A47. Wall Shelf, Single With Concealed Brackets: Shall be a Fabricated, Model # Custom, or approved equal. Single tier wall shelf with concealed bracket similar to standard detail FSD12-7. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications & any fabrication details included in the contract drawings for precise & complete fabrication instructions.
- A48. Ice Machine, Existing, By Owner.
- A48.1 Ice Bin, Existing, By Owner.
- A48.2 Water Filtration System, Existing, By Owner.
- A49. Spare Number.
- A50. Spare Number.
- A51. Work Table. Shall be a Fabricated, Model # Custom, or approved equal. Work table, see plans for width, length, height, and configuration. Standard details are to be utilized as basic minimum guidelines only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Similar to standard details FSD1-7 and FSD1-10 Work table with backsplash and undershelf, similar to detail FSD2-5. 6"-high backsplash similar to detail FSD1-5A. Provide stainless steel adjustable bullet feet. Straight turn-down edge profile similar to detail FSD1-1A.
- A52. Wall Shelf, Single With Concealed Brackets: Shall be a Fabricated, Model # Custom, or approved equal. Single tier wall shelf with concealed bracket similar to standard detail FSD12-7. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications & any fabrication details included in the contract drawings for precise & complete fabrication instructions.
- A53. Can Opener: Shall be an Edlund Model # S-11, or approved equal. Can Opener, manual, 16" bar length, dishwasher safe, rust proof, stainless steel, with cast stainless steel base, NSF certified.
- A54. Walk-In Cooler: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A54.1 Cooler Evaporator Coil: See Section 13 21 26 Insulated Cold Storage Rooms for details.

- A54.2 Cooler Evaporator Coil: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A54.3 Remote Compressor Rack: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A55. Cooler Storage Shelving: Shall be a Metro, MetroMax (Q) open grid mat shelving, or approved equal. A total of thirteen shelving freestanding shelving units with four legs, 74" high.
- (a) 3 sections of shelving consisting of:  
4 ea. – 21" deep x 42" long shelves.
  - (b) 10 sections of shelving consisting of:  
4 ea. – 21" deep x 48" long shelves.
- A56. Dry Storage Shelving: Shall be a Metro, MetroMax (Q) open grid mat shelving, or approved equal. A total of fifteen shelving freestanding shelving units with four legs, 74" high.
- (a) 2 sections of shelving consisting of:  
4 ea. – 21" deep x 36" long shelves.
  - (b) 4 sections of shelving consisting of:  
4 ea. – 21" deep x 42" long shelves.
  - (c) 9 sections of shelving consisting of:  
4 ea. – 21" deep x 48" long shelves.
- A57. Spare Number.
- A58. Spare Number.
- A59. Dry Storage Shelving: Shall be a Metro, MetroMax (Q) open grid mat shelving, or approved equal. A total of fifteen shelving freestanding shelving units with four legs, 74" high.
- (a) 2 sections of shelving consisting of:  
4 ea. – 21" deep x 42" long shelves.
- A60. Spare Number.
- A61. Faculty Lounge Center, By Arch/ID, With Sink.
- A61.1 Deck Mount Faucet, By PC.
- A62. Wall Cabinet With Doors, By Arch/ID.
- A63. Vending Machine, By Owner.
- A64. Walk-In Freezer: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A64.1 Freezer Evaporator Coil: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A64.2 Freezer Evaporator Coil: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A64.3 Remote Compressor Rack: See Section 13 21 26 Insulated Cold Storage Rooms for details.
- A65. Freezer Storage Shelving: Shall be a Metro, MetroMax (Q) open grid mat shelving, or approved equal. A total of sixteen shelving freestanding shelving units with four legs, 74" high.
- (b) 1 section of shelving consisting of:  
4 ea. – 21" deep x 30" long shelves.
  - (c) 1 section of shelving consisting of:  
4 ea. – 21" deep x 36" long shelves.
  - (d) 3 sections of shelving consisting of:  
4 ea. – 21" deep x 42" long shelves.
  - (e) 11 sections of shelving consisting of:  
4 ea. – 21" deep x 48" long shelves.
- A66. Spare Number.
- A67. Air Curtain: Shall be a Mars Air Systems Model #NH272-2UA-TS, or approved equal. High Velocity Series 2 Air Curtain, for 72" wide door, unheated, galvanized steel cabinet, titanium silver powder coat finish, (2) 1

- HP motors, 115v/60/1-ph, ETL. Mechanical switches. Model #99-014 Door Limit Switch, indoor, plunger/roller type, remote mounted, 1 HP max, 250v, 20.0 amps, NEMA 2. Model #MCPB-2UA Motor Control Panel, for unheated units, remote mounted, (2) 1 HP motor maximum, 115v/60/1-ph.
- A68. Wall Guard: Shall be a Fabricated, Model # Custom, or approved equal. Stainless Steel Wall Guard per FSD1-59.
- A69. Spare Number.
- A70. Spare Number.
- A71. Locker, Double, By Owner.
- A72. Chemical Storage Shelving: Shall be a Metro, MetroMax (Q) open grid mat shelving, or approved equal. A total of one shelving freestanding shelving unit with four legs with casters, 74" high.
- (a) 1 section of shelving consisting of:  
4 ea. – 21" deep x 48" long shelves.
- A73. Mop Sink: Shall be an Advance Tabco Model #9-OP-28, or approved equal. Mop Sink, floor mounted, 33"W x 25"D x 10"H (overall), 28"W x 20" front-to-back x 6" deep (bowl size), free flow drain with 2" IPS outlet, stainless steel construction, NSF.
- A73.1 Service Faucet: Shall be a T&S Brass Model #B-0655-0, or approved equal. Service Sink Faucet, vacuum breaker nozzle with 3/4" garden hose thread, 1/2" NPT female flanged adjustable inlet with screwdriver stops, 6" wrist action handles, pail hook, bottom support, wall brace. 6" wrist action handle, standard. Model # B-0230-K Installation Kit, (2) 1/2" NPT nipples, lock nuts & washers, (2) short "Ell" 1/2" NPT female x male.
- A74. Mop Holder: Shall be an Advance Tabco Model # K-242, or approved equal. Mop Hanger, 23", accommodates (3).
- A75. Wall Flashing: Shall be a Fabricated, Model # Custom, or approved equal. Similar to standard detail FSD1-39. This standard detail is to be utilized as a basic minimum guideline only. Refer to these written specifications and any fabrication details included in the contract drawings for precise and complete fabrication instructions. Cover wall behind mop sink, from top of mop sink up 48".

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

Prior to installation, coordinate all size and electrical requirements.

#### **3.02 INSTALLATION**

Installation shall be per manufacturer's installation requirements.

END OF SECTION  
07/07/2022

**INSULATED COLD STORAGE ROOMS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE OF WORK

The work of this Section includes all labor, material, equipment, and appliances required to compete the installation of the cold storage room and freezer and its associated mechanical refrigeration system.

## 1.02 WORK INCLUDED

- a. Provide and install refrigerator and freezer walk-in boxes.
- b. Provide and install all appurtenant mechanical equipment for freezer/refrigerator walk-ins.

## 1.03 RELATED WORK

- a. All reinforced concrete floor construction, aggregate sub-base, and concrete wearing surfaces - see Section 03 10 00.
- b. All floor sinks, sanitary drains, French drains, vents, and water piping - see Section 22 00 00.
- c. All field wiring, including, but not limited to, power connections and disconnects; control wiring external to and interconnecting with the condensing units; and mounting and wiring of light fixtures - see Section 26 50 00.
- d. All roof-mounted mechanical platforms - see Section 06 10 00.

## 1.04 GENERAL REQUIREMENTS

- a. Submittals: Shall include dimensional and schematic drawings, electrical diagrams, a list of equipment and materials with detailed descriptions, capacity data, and installation details and shall comply with Sections 10 and 01 33 00. Field dimensions must be noted on plans.
- b. Installation and Service: The Contractor shall provide for complete installation of room in allocated space and start up of refrigeration system. Successful bidder shall have a valid California Contractor's C-38 License and shall have been engaged in installing refrigerator/freezers of this type for at least 5 years.
- c. Manufacturer's Installation Instructions: The Contractor shall furnish to Owner instructions detailing assembly of the walk in, installation of the refrigeration equipment, wiring diagrams, operating and maintenance instructions, and other data pertaining to proper upkeep and operation of the freezers and coolers. Installation, start up, and testing shall be carried out with the approval of the Architect in accordance with the equipment manufacturer's published instructions.
- d. Supervision of Installation: The Contractor shall provide experienced supervision for installation of walk-ins.
- e. Regulations and Codes: All work and materials shall be in full accordance with local and/or state ordinances, and with any other prevailing rules and regulations regarding potentially hazardous equipment or locations.

## 1.05 QUALITY ASSURANCE

- a. Warranty: Ten (10) years. The manufacturer shall warrant that any part of the installed structure except the refrigeration system and its related accessories is free from defects in material or workmanship under normal use and service. The manufacturer shall be obligated to repair or replace any part of this equipment covered by the warranty, which proves to be defective within the period of ten years from the date of final acceptance. The warranty shall not apply to equipment, which has been subjected to any accident, alteration, abuse, misuse or improper installation. The warranty shall include labor for replacement or repair of defective parts except refrigeration. (Extended 4-year guarantees are available at extra cost for refrigeration condensing units, evaporator coils and self-contained refrigeration systems).
- b. Sectional cold storage rooms shall be listed by Factory Mutual, Underwriters' Laboratories and National Sanitation Foundation and shall carry labels indicating all such listing or approvals.

**PART 2 PRODUCTS**

## 2.01 APPROVED MANUFACTURERS

- a. Thermalrite
- b. Kolpak
- c. Approved equal

## 2.02 COLD STORAGE ROOMS

- a. As per plans, if noted otherwise.
- b. Panels:
  - 1. The individual panels shall be certified by Underwriters' Laboratories as having flame spread under 25 or lower and smoke generation of less than 450 when tested in accordance with ASTM E-84-89a. They shall also be approved by Factory Mutual as Class I building type. Panel manufacturing to meet California State Bill #AB3497. Core shall be ICBO listed.
  - 2. Panels shall consist of interior and exterior metal skins with single and double flanges precisely formed with steel dies and roll-form equipment and thoroughly checked with gauges for uniformity and accuracy. The metal skins shall be placed into steel molds and liquid urethane injected between them. For extra rigidity, the exteriors of all vertical panels, except corners, shall have vertical grooves spaced on 5-3/4" centers. Panels over 12 feet high will also have interior vertical grooves.
  - 3. Urethane shall be foamed-in-place (poured, not frothed) and, when completely heat-cured, shall bind tenaciously to the metal skins to form a rigid 4" (or 5") thick insulated panel. The expanding agent shall be freon only, with an inherent pressure of 38 psi when foam is heated to 150 deg. F.
  - 4. The thermal conductivity factor ("K") shall not exceed 0.118 BTU per hour per square foot per degree Fahrenheit per inch. Overall coefficient of heat transfer ("U" factor) shall not exceed .029 (R-34) for 4" thick walls and .023 (R-42) for 5" walls. The insulation must retain dimensional stability in an operating temperature range of minus 90 deg. F. to plus 250-deg. F dry heat.
  - 5. Panels shall contain 100 percent urethane insulation and have no internal wood or metal structural members between the skins.

6. To insure tight joints, panel edges must have foamed-in-place tongues and grooves with a flexible vinyl gasket also foamed-in-place on the interior and exterior of all tongue edges. Gaskets shall be resistant to damage from oil, fats, water, detergents and sunlight and must be NSF approved.
  7. All panels except corner panels shall be made in 23" and 46" widths, and shall be fully interchangeable for fast, easy assembly. Panel's 11-1/2" wide are to be furnished only when required to fit the allocated space. To assure perfect alignment and maximum strength, corner panels shall be 90-degree angles with exterior horizontal dimensions of 12" on each side.
  8. Panels shall be equipped with joining devices - Bally "Speed-Lok" or equal. The distance between locks shall not exceed 46". Each locking device shall consist of a cam action hooked locking arm of a replaceable type placed in one adjoining panel, so that when the locking arm is rotated, the hook engages over the rod and draws the panels tightly together with cam action. The locking arms and steel rods shall be housed in individual steel pockets set into the panel. Pockets on one side of the panel shall be connected to pockets on the other side, in width, by the use of 2" wide steel strap set into the insulation. When panels are joined together, these straps shall form "perimeters of steel", with lock-to-lock-to-lock connections for extra strength. An aligning device shall be provided in at least one "Speed-Lok" pocket for every vertical panel. Press-fit caps shall be provided to close wrench holes. The required locking wrench shall be supplied as part of the walk-in.
- c. Exterior Finish: Bright galvanized 22 ga. steel; 20 ga., Type 301 stainless steel (with No. 3 polish) on exposed front. Provide 16 ga. stainless steel ceiling/wall closure panels at exposed front.
  - d. Interior Finish: Bright galvanized steel.
  - e. Built-In Insulated Floor: Reinforced concrete sub-slab shall be depressed and installed over a 2" sand bed and a 10 mil. PVC membrane installed over a 15" deep bed of 2" diameter clean aggregate. This slab shall be insulated with (2) layers of 2" slab urethane with joints staggered, and a protective vapor permeable slip-sheet shall be applied over the insulation. This 4" of insulation shall be overlaid with a 4" concrete wearing floor with heavy broom finish. Wall panels shall be installed flush to concrete floor by 1-1/2" x 2-1/2" x 1/8" thick base anchor clips. Anchor clips shall be installed every 23" around the entire interior perimeter of the cold storage rooms. Anchor clips shall be covered with stainless steel 1-7/8" wide x 3-5/8" high coved base, No. 18885 or equal, installed per manufacturer's standards, with urethane two-sided tape sealed with silicone caulking top and bottom. Provide one-piece corners.
  - f. Standard Hinged Entrance Door Panels:
    1. 34" wide entrance opening shall be provided in 46" (or 69") wide panels. The door is an infitting flush-mounted type. Construction of both panel and door shall be as stated above. A thermoplastic gasket with a magnetic core shall be mounted on the top edge and along both sides of the door. The bottom edge of the door shall contain a flexible, dual-blade wiper gasket. The magnetic force of the gasket shall keep the door in a closed position and the gasket shall form a tight seal. Gaskets shall be replaceable and resistant to damage from oil, fats, water, detergents and sunlight. All gaskets shall be NSF approved.
    2. Construction of the door panel shall include a heavy, "U"-channel-type reinforced steel frame around the entire perimeter of the door opening to prevent racking or twisting.
    3. Anti-condensate heater wires shall be concealed behind the metal edge of the door jambs/head/sill on all four sides. An additional heater shall be concealed beneath the exterior edges of the doorcap around its entire

- perimeter. Heaters shall be connected to an adjustable "Energy Saver Condensate Control" switch to provide sufficient heat to eliminate condensation and frost under various humidity conditions.
- g. Hardware for Standard Hinged Entrance Doors: (34" wide openings.) All hardware shall be of satin finish aluminum.
    - 1. Door Hinges: Each door shall have two hinges of the spring loaded, self-closing type, with plated steel pins and Delrin cam-type bearings.
    - 2. Door Latch: The latch shall be designed to open the door easily by breaking the magnetic force of the door gasket. The latch shall have a cylinder lock with provisions for padlocking. It shall also include an inside safety release handle to prevent anyone from being locked inside.
    - 3. Door Threshold: Threshold shall be manufacturer's Standard Anti-Sweat Heater Cover and anchor with integral heater wires tied into door condensate control. This unit shall be set into concrete floor after door has been erected. Supply stainless steel threshold cover plates each side of doorstop.
    - 4. Door Opener: Provide 'No-Hands' door opener (foot treadle) at each door.
  - h. Pressure Relief Ports: Shall be provided for all freezers. A relief port shall be provided to equalize the difference in exterior and interior pressure caused by sudden temperature changes due to opening doors, loading product and the defrosting of coils. The relief port shall be located in a side panel, away from the direct air stream flowing from the evaporator coils. It must be located away from obstructions so that air can freely move into or out of the freezer. Electrical service required is 120 volt, 60 hertz, 1 phase, A.C.
  - i. Thermostat: A built-in thermometer shall be furnished at each wall-panel door location with a range of -60° F. to +80° F.
  - j. Partitions: Insulated, metal-clad panels shall be provided to form separate compartments within the walk-in. A non-conductor strip must be built into all panels at the joints where partitions butt to prevent transfer of heat from one compartment to another. Partition panels shall be Speed-Locked to these panels.
  - k. Alarm System: Audio and visual alarms are to be installed for each compartment and to work in the following manner: When the interior compartment temperature approaches the undesirable range, a red indicator light goes on and a horn alarm sounds instantaneously. A National 100 Audio-Visual Alarm or equal is to be furnished for each compartment and is to work in the following manner: When the interior compartment temperature approaches the undesirable range, digital readout display flashes and audio alarm sounds. Probe cable assembly measures 20 feet. The alarm shall be flush mounted on walk-in doorframe.
  - l. In accordance with California Title 8 safety regulations, each compartment shall be supplied with a constantly burning light located inside near the door. Either following option fulfills this requirement:
    - 1. 3-Way interior light switch with constant red pilot light.
    - 2. Constant burning vapor-proof light. Light switch circuit shall be modified so that the interior vapor-proof light remains constantly illuminated at approximately 25% power when standard exterior switch is in the off position.
  - m. Extra Vapor-Proof Lights: Incandescent vapor-proof lamps shall be mounted to the ceiling panels, (as shown on plans) and will be connected to a pilot light and switch which shall be mounted in door panels on the exterior. Junction boxes shall be provided for 120 volts, 60 hertz, single-phase electric service.



## 2.03 MECHANICAL REFRIGERATION

- a. General: All refrigeration systems shall be supplied by a single manufacturer and shall be catalogued as systems, complete with system capacities. All components, including controls and accessories, shall be furnished by the system manufacturer. The components shall include a fully piped, air cooled condensing unit (as described below), evaporator (as described below), thermostatic expansion valve, filter-drier, room thermostat and liquid line solenoid valve (on specific models). Refrigeration systems, capacities and horsepower ratings shall be as described in the refrigeration schedule on the contractor provided shop drawings and plans. Evaporator unit location shall be ceiling mounted inside cold storage room typ. u.n.o.
- b. Condensing Units (Ground mounted): Shall include motor-compressor, condenser, receiver, and electrical control panel components assembled, piped, and wired by the manufacturer. (3/4 h.p. min. for cooler and 1-1/2 h.p. min. for freezer.)
1. The motor-compressors shall be of the accessible hermetic type, with inherent three-leg overload protection.
  2. The coils and fan motors shall be similar in construction to those specified under the evaporator section below.
  3. Accessories include moisture-liquid indicator, and suction and discharge vibration eliminators.
  4. Electrical controls, installed by the system manufacturer, shall include a high-low pressure control switch, oil failure safety switch (for units of 5 H.P. and larger), magnetic contractor, and where applicable, a defrost timer and pumpdown switch.
  5. The motor-compressor shall be protected automatically against liquid slugging and overloading during defrost, post-defrost, and normal cycle periods.
  6. A head pressure control and crankcase heater shall be installed on the condensing unit to maintain desired condensing pressure and protect the compressor from liquid migration when ambient temperatures are below 55 deg. F.
  7. Weatherproof casings and hoods shall be factory fabricated.
  8. Condensing units shall be roof-mounted above kitchen on mechanical unit platforms (4x-perimeter frame with plywood deck with 24 GA G.I. continuous flashing) per standard structural platform details, verify location, and coordinate with structural framing prior to installation. Unit shall be mounted on Title 24 approved isolation curb.
- c. Evaporators:
1. The coil shall have copper tubes expanded into aluminum fins.
  2. Thermal overload protection shall be built into the fan motor.
  3. The housing shall be of aluminum.
  4. On systems operating below 35 dg. F., electric defrost evaporators shall be used. Coils and drain pans shall be electrically heated. Selection and wiring of all defrost controls shall be the sole responsibility of the system manufacturer.
- d. Installation
1. Interconnecting accessories shall be installed in accordance with the manufacturer's recommendations and shall be located for ease of servicing. Piping shall be placed in accordance with good engineering practice. Particular attention shall be given to oil return, air velocities, refrigerant pressure drops, and neatness.
  2. Copper tubing for use in refrigerant piping shall conform to ASTM B280-88 standard specifications. All tubing shall be type "L" hard-drawn copper.

3. Evaporators shall be suspended according to the manufacturer's recommendations and Title 24 requirements.
4. Each system shall be triple-evacuated prior to charging. Fifteen hundred and 500 microns of vacuum shall be drawn, successively and broken with dry refrigerant. After the third evacuation the system shall be charged.
5. Suction line insulation shall be sized and installed according to the insulation manufacturer's recommendation to prevent suction line condensation.
6. Penetrations shall be sealed with non-hardening caulking compound. The exposed ends of the penetration must be trimmed.
7. Placement of all exposed pipes shall be approved by the Architect before installation.
8. Condensate drain lines within the walk-in shall be provided, installed and wrapped with drain heaters and insulated with 1/2" thick wall pipe insulation.
9. Individual traps shall be provided for all condensate drains.

#### 2.04 PRE-ASSEMBLED REMOTE REFRIGERATION SYSTEMS

- a. Pre-assembled remote refrigeration equipment, which shall include all necessary components, factory-installed on both evaporator and condensing unit assemblies. All components shall be prewired, so that job site work is limited to making electrical and tubing connections between the assemblies. All necessary refrigeration tubing/insulation shall be furnished and installed by this Contractor. All necessary electrical interconnection between equipment and the cold storage rooms shall be furnished under Section 16400. Unit or units shall be installed on a mechanical equipment platform (4x perimeter with plywood deck with 24 GA. G.I. continuous flashings) with Title 24 approved isolation curb.
- b. The evaporator assembly shall include, in addition to the evaporator, a heat exchanger, temperature control and an expansion valve.
- c. The condensing unit assembly shall include, in addition to the condensing unit, a sight glass, time clock, a vibration eliminator and, if required, a suction accumulator. (If the condensing unit is to be installed outdoors, a crankcase heater, winter control and a protective hood shall be furnished.
- d. Freezer refrigeration shall Coldzone Model CFO500L4SEBNT, or approved equal. Cooler refrigeration shall be Coldzone Model CFO200E4SEANT, or approved equal.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

Prior to installation, coordinate all size and electrical requirements.

#### 3.02 INSTALLATION

Installation shall be per manufacturer's installation requirements.

END OF SECTION  
07/04/2022

**PLUMBING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 – GENERAL****A. GENERAL PROVISIONS**

1. General Provisions of the contract including General and Supplementary Conditions apply to the work specified in this Section. The provisions of this section shall apply to these specifications.

**B. SCOPE.**

1. Work Included. Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
  - a. A complete system of sanitary soil, waste and vent piping including grease waste, connection to existing utility, waste, and drain connections to all fixtures and equipment.
  - b. A complete system of hot and cold water piping including connection to site water main, and connections to fixtures and equipment.
  - c. A complete system of natural gas fuel piping including connection to site medium pressure gas main, pressure regulator, and connections to all gas utilizing equipment.
  - d. Condensate drains from air conditioning and refrigeration units.
  - e. Area drains.
  - f. Furnishing, mounting and final connections to fixtures and equipment as shown or scheduled on the plumbing and architectural drawings that is part of any system listed above.
  - g. Final connections to equipment provided in other sections of these specifications or indicated as furnished by owner and installed by the contractor.
  - h. Demolition of all plumbing fixtures, equipment and piping systems indicated or required to be removed or modified.
  - i. Acceptance testing as required under California Building Energy Efficiency Standards, Title 24.
  - j. Coordination with acceptance testing technician (ATT) and / or commissioning agent. Acceptance testing and / or commissioning required where noted in construction documents or per code requirements.

**C. CODES AND STANDARDS**

1. All work and materials shall conform with current rules and regulations of applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern.
  - a. Applicable codes and standards shall include but are not necessarily limited to:
    - i. California Code Of Regulations:
      1. Title 8, Industrial Relations
      2. Title 17, Public Health
      3. Title 19, Public Safety
      4. Title 21, Public Works
      5. Title 24, Energy Regulations
    - ii. California Building Code.

- iii. California Mechanical Code
- iv. California Plumbing Code
- v. American Society for Testing and Materials (ASTM)
- vi. American Water Works Association (AWWA)
- vii. Cast Iron Soil Pipe Institute (CISPI)
- viii. National Electrical Code (NEC)
- ix. National Electrical Manufacturers Association (NEMA)
- x. National Fire Protection Association (NFPA)
- xi. National Sanitation Foundation (NSF)
- xii. Occupational Safety and Health Act (OSHA)
- xiii. Plumbing and Drainage Institute (PDI)
- xiv. Americans with Disabilities Act. Accessibility Guidelines for Buildings and Facilities. (ADAAG).

#### **D. PERMITS AND FEES**

1. The Contractor shall take out all permits and arrange for all tests in connection with such work as required. All charges are to be included in the work. All charges or fees for service connections, meters, etc., shall be included in the work.

#### **E. COORDINATION OF WORK**

1. Before starting any work, thoroughly examine all existing and newly completed underlying and adjoining work and conditions upon which the installation of this work is in any way dependent for the workmanship required by the Contract Documents. Report to the Architect and Engineer in writing any and all conditions which might adversely affect this work and limit ability to perform the required workmanship.
2. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc., shall be carefully planned, prior to installation of any work, to avoid all interference's with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.
3. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the mechanical, electrical, structural, architectural drawings and field conditions that could affect the work to be performed and arrange such work accordingly. Provide the required piping and ductwork offsets, fittings, and accessories to meet such conditions.
4. Spaces provided in the design of the building shall be utilized and the work shall be kept within walls or furring lines established on the drawings. Any discrepancy between Architectural or Mechanical drawings with respect to wall or furring locations and dimensions shall be brought to the Architect's attention for resolution before proceeding with installation.
5. Any work which is done as an addition, expansion, or remodel of and existing system shall be compatible with that system

#### **F. MANUFACTURER'S RECOMMENDATIONS**

1. All material, equipment, and devices, etc., shall be installed in a manner meeting approval of the manufacturer of the particular item. The Contractor shall make himself available of all installation manuals, brochures, and procedures that the manufacturer issues for the equipment and material. Contractor shall be held responsible for all installations contrary to the manufacturer's recommendations. Contractor shall make all necessary changes and revisions to achieve such compliance.

**G. GUARANTEE**

1. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner.

**H. QUIETNESS**

1. Piping of all types, ductwork, and equipment shall be arranged and supported so that the vibration is at a minimum and is not transmitted to the building structure.

**I. DAMAGES BY LEAKS**

1. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping or mechanical systems prior to completion of work and during the period of the guarantee.

**J. SUBMITTALS**

1. Shop Drawings. Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc., proposed for use on this project. Material or equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:
  - a. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the contract documents. Descriptive literature shall be current manufacturer's brochures and submittal sheets.
  - b. All shop drawings shall be submitted at one time in a three hole binder with title sheet including Project Title, Architect, Engineer, Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings. Submittals shall bear the stamp of certification by the Contractor as evidence that the Contract Documents (Specifications and Drawings) have been thoroughly checked.
  - c. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.
2. Review. Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
  - a. If deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. Submittals for products and equipment offered as an alternate to that specified will require, if accepted by the Engineer, resubmission of the Title 24 Energy Compliance Calculations if the specified product or equipment was included within the scope of the approved calculations on file with the reviewing authority. The cost of preparing resubmission will be the responsibility of the Contractor.

**K. OPENINGS, CUTTING AND PATCHING**

1. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Restoration of all surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect and Engineer.

**L. DEMOLITION**

1. Existing equipment, ducts, piping, valves, fittings, devices, etc., requiring removal shall be removed and delivered to the Owner at a location on the job site to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense.
2. Existing piping, ducts, and services, etc., requiring capping or plugging shall be capped or plugged below floors, behind walls, above ceilings or above roof unless otherwise noted.

**M. EXCAVATION AND BACKFILLING**

1. Excavation and backfilling for work to be done under this Specification Section shall be done under this Section. All underground lines outside buildings shall be 2'-0" minimum backfill cover unless a greater depth of cover is recommended by the pipe manufacturer for the particular application. Width at top of pipe shall be 16" plus the outside width of pipe. Provide all shoring where required by site conditions.
2. Backfill
  - a. 6" Below, Around, and to 12" Above Pipe. Material shall be sand. Place Carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
  - b. One Foot Above Pipe to Grade. Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
3. Compaction. Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at 8" above top of pipe. Perform test at every 100' of trench. If a test fails, the compaction shall be re-worked in both directions back to test points that passed, before re-testing.
4. Electrical conduit shall not be run in excavations provided for mechanical systems.
5. Excavation and backfilling in a public right-of-way shall be done in strict accordance with the agency having jurisdiction.

**N. HANGERS AND SUPPORTS.**

1. Provide all hangers, bracing, and supports for the proper installation of equipment and materials under this Section of the Specification.
2. Any structural element required to properly hang or support piping, ducts, or equipment, etc., provided under this Specification Section and not shown on the Architectural or Structural Drawings shall be provided under this Specification Section.
3. All plumbing piping shall be supported and seismically braced in compliance with OSHPD / HCAI Pre-Approval No. OPM-0542 the "nVent Caddy Seismic Bracing System". Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.

**O. FLASHING**

1. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association

**P. PAINTING**

1. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

**Q. CONTINUITY OF SERVICES**

1. All existing services and systems shall be maintained except for short intervals when connections are to be made. The contractor shall be responsible for any interruptions of services and shall repair damage done to any existing service caused by the work.
2. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the architect immediately for further instructions.

**R. ELECTRICAL CONNECTIONS**

1. Provide under Specification Division 23 00 00 all required control conduit, wiring, controls and control panels as indicated on the drawings or as may be required for system operation.
2. No control device shall be mounted with rigid connections on vibration isolated mechanical equipment. No field furnished control device shall be mounted on any piece of equipment so that it interferes with physical access of air or water flow, or covers any portions of nameplates or access doors.

**S. Motors.**

1. Shall be selected for quiet operation, voltage, and rpm to match the project electrical characteristics. Motors shall be open, drip-proof, normal torque and weatherproofed where indicated or required. Motors shall be of the NEMA premium efficiency type.

**T. Electrical Coordination**

1. Prior to commencing construction arrange a conference with the electrical and mechanical trades as well as equipment suppliers and verify types, sizes, locations, voltage requirements, controls and diagrams of all equipment furnished by them. In writing, inform the Architect that all phases of coordination of this equipment have been covered and if there are any unusual conditions or problems they shall be enumerated at this time.

**U. FLASHING**

1. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association.

**V. DEFINITIONS**

1. Provide. The term "provide" as used in these specifications or on the Drawing shall mean furnish and install.
2. Piping. The term "piping" as used in these Specifications or on the Drawings shall mean all pipe, fittings, nipples, valves, unions, hangers, and thermal insulation, etc., as may be required for a complete and functional system.
3. Wiring. The term "wiring" shall include the provision of all necessary products which are required for a complete installation and shall include products such as conduit, electrical boxes, connections, transformers, relays and switches.

**W. ACCESS DOORS AND PANELS**

1. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings or as required to match wall construction. 16-gauge steel frame and 14-gauge steel panel with paintable finish, except in ceramic tile, where panel shall be 16-gauge stainless steel with satin finish. Continuous hinge. Screwdriver latch. Deliver panels to the General Contractor for installation. Provide Zurn Z-1460-4 for square doors and Z-1460-5 for rectangular doors, Karp, or equivalent. Unless otherwise noted, the minimum sizes shall be as follows:
  - a. 1 valve up to 1-1/2" 12"x12"
  - b. 1 valve up to 3" 16"x16"
  - c. Fire damper, VAV box, coil 16"x16"

#### **X. SYSTEM IDENTIFICATION**

1. Above Grade Piping. Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, by stenciled marking or decals, and include arrows to indicated direction of flow. Locate markers at end of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches of equipment connections are not required. Decals pasted, glued, or adhered to piping or insulation shall be Seton "Setmark", or equivalent. Decals or stencils shall be applied after the painting of all piping systems is complete and after preliminary acceptance of piping system. Decals and stencils shall comply with ANSI and OSHA specifications with respect to marker size, color, and legend.
2. Below Grade Piping. Bury a continuous, pre-printed, bright colored plastic ribbon marker with each underground pipe. Locate directly over buried pipe, 6" to 8" below grade
3. Equipment. All equipment shall be identified with a plastic laminated engraved nameplate which bears the unit number marked as indicated on the drawings (e.g. AC-4, WH-1) Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the unit. Air conditioning equipment shall be identified as to area served.

#### **Y. PROTECTIVE COATING FOR UNDERGROUND PIPING**

1. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, such as X-Tru-Coat or Scotchkote. All fittings and areas of damaged coating shall be covered with two layers of double wrap 10 mil polyvinyl tape to total thickness of 40 mils. Johns-Manville. Protective coating shall be extended 6" above surrounding grade.

#### **Z. CONCRETE ANCHORS**

1. Steel bolt with expansion anchor requiring a drilled hole - powder driven anchors are not acceptable. Minimum concrete embedment shall be 4½ diameters. Minimum spacing shall be 10 diameters center to center and 5 diameters center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the ICBO test report values. Hilti, Phillips. Wej-it.

#### **AA.PROJECT CLOSE-OUT**

1. Record Drawings
  - a. Provide in accordance with general conditions of the specifications.
2. Operation and Maintenance Manual for Mechanical Systems
  - a. Provide three (3) copies of Operation and Maintenance Manuals to the Engineer for review and acceptance. Provide the Owner's designated representative with one copy of the approved O & M manual. Bind Operation and Maintenance Manuals for



each Mechanical System (Plumbing, Air Conditioning, etc.) in a hard-backed binder. Cover of each binder shall have the following lettering:

OPERATION  
AND  
MAINTENANCE  
MANUAL  
CAFETERIA MODERNIZATION  
HIGHLAND HIGH SCHOOL  
2900 ROYAL SCOTTS WAY  
BAKERSFIELD, CALIFORNIA

Provide a transmittal letter at the beginning of the manual on the Contractor's letterhead. Letter shall be signed by a contractor principal (Owner or Corporate Officer) and shall be countersigned by the Owner's designated representative and shall indicate the date when the mechanical systems were shown and explained in detail to the Owner's designated representative. (The Engineers office shall be notified 48 hours minimum prior to the owner-contractor meeting.)

Provide a master index at the beginning of Manual showing items included. Use plastic tab indexes for the sections of the Manual.

Section 1, General. Provide:

Name of Architect, Mechanical Engineer, Contractor and Mechanical Sub-Contractor.

A complete list of installed equipment with project mark number, indicating name of vendor, address and phone number.

A sub-section with manufacturer's descriptive literature for each item of installed equipment with model, capacities, and all other pertinent information highlighted.

Section 2, Operating instructions. Provide:

General description of each separate system and sub-system.

Step by step procedure to follow in putting each piece of mechanical equipment into operation. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's written instruction.

Schematic as-built control diagrams for each separate system. Diagrams shall bear the date of the acceptance of the project. Include all temperature control panels and their respective functions.

Section 3, Maintenance Instructions. Provide:

Summary list of mechanical equipment used indicating name, model, serial number, and nameplate date of each item together with number and name associated with each system item.

Manufacturer's maintenance instructions for each piece of mechanical equipment installed in project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment and maintenance and lubrication instructions.

Section 4, Warranties. Provide:

A copy of each manufacturer's warranty statement, completely filled out and indicating date forwarded to the respective manufacturer.

## PART 2 MATERIALS

### A. PIPING

1. Domestic Cold Water
  - a. Inside Building, Above Grade or Slab
    - i. Type "L" hard drawn copper tubing with wrought copper solder joint fittings, NIBCO, ANACONDA, or acceptable equivalent. Joints shall be made with 95.5 solder, such as Silavoy Streamline 122, Silvabrite 100 or acceptable "lead free" equivalent. Pipe to be reamed to full bore, de-burred, and joint area cleaned with a Trisodiumphosphate solution prior to joining.
    - ii. Where allowed under local and state building codes: Pro-Press pipe joining system for copper piping.
  - b. Outside Building, Below Grade, Slab, and Paved Areas.
    - i. Schedule 40 galvanized steel with galvanized malleable iron banded 150 lb. fittings. Pipe shall be protected as specified elsewhere in this section.
    - ii. Polyvinylchloride (PVC) pressure rated Schedule 40, ASTM D 2241, with rubber rings, ASTM D 1869. Piping shall be equivalent to Johns-Manville "Ring-Tite" and shall be installed in strict compliance with Manufacturer's Installation Guide. Where sizes shown are smaller than those available with "Ring-Tite" pipe, use schedule 80 PVC glued pipe and fittings. Piping option only where local codes allow its use.
    - iii. Type "K" hard drawn. All else per copper specification above.
2. Domestic Hot Water.
  - a. Inside Building, Above grade or slab
    - i. Same as Cold Water Piping - Inside Building.
  - b. Outside Building, Below Grade, Slab, and Paved Areas.
    - i. Pre-insulated, Type K copper core. 1" foamed polyurethane insulation. Polyvinylchloride jacket. Sealed ends. Rubber ring internal slip joint. Fittings shall be wrought copper, with brazed joints (1100°F, min.) Ricwill, Thermal Pipe Systems.
3. Soil Waste Piping
  - a. Inside Building and Within 5 Feet of Building Wall
    - i. Coated standard weight cast iron pipe and fittings, CISPI Standard 301 and ASTM A-888. Joints shall be ABI "No-Hub" stainless steel band, mechanically assembled (no welds), conforming to ASTM C564.
  - b. Outside Building
    - i. Johns-Manville ring-tite, or equivalent, polyvinylchloride (PVC) gravity pipe, where permitted by local codes, complying with ASTM 03034-SDR 35 with joints using flexible elastomeric seals meeting requirements of ASTM D-3212.
4. Soil Waste Vent Piping
  - i. Schedule 40 PVC-DWV pipe and fittings.

- ii. Risers in wall to be cast-iron no-hub per waste piping specification. Use PVC-DWV after pipe rises above wall.
- 5. Condensate Drains
  - a. Type "L" hard drawn copper tubing with wrought copper solder joint fittings. All changes in direction of condensate drain shall be accomplished with plugged tees. Drains shall be extended as indicated on drawings or to nearest acceptable fixture or vent if not indicated.
- 6. Gas Piping
  - a. Inside Building and Above Grade
    - i. 2" and Smaller. Black steel pipe Schedule 40 with 150 psi threaded black malleable fitting. All joints shall be treated with code approved pipe dope. Flexible appliance connectors shall be convoluted stainless steel with dielectric couplings, AGA for indoor and outdoor use. Connector shall be AGA certified laboratory approved for vibration resistance.
    - ii. 2½" thru 4". Same as above except with welded fittings.
  - b. Outside Building Below Grade
    - i. Black steel pipe Schedule 40 with welded fittings and joints. Protect as specified elsewhere in this section.
    - ii. Polyethylene pipe and fittings, ANSI B31.8. ASTM D 2513, DuPont Alloy "A" or Nipak
- 7. Exposed Pipe at Fixtures
  - a. Chrome plated red brass pipe, iron pipe size, with threaded cast bronze chromium plated couplings and fittings. Any pipe required to extend from finish wall into exposed view within Toilet Rooms shall be chrome plated.
- 8. Piping Protective Wrap
  - a. All galvanized or black steel piping buried below grade shall be factory coated with Scotchkote 101 Epoxy Resin as manufactured by 3M Company, or "X-tru-Coat" as manufactured by Pipe Line Service Corp. Field joints shall be wrapped by Scotchrap #50 or coated with Scotchkote 302 as recommended by manufacturer. In lieu of above, pipe may be machine-wrapped with Scotchrap #51. 50% lapped with joints per above.
  - b. Provide a continuous test of all pipe covering, including field joints, prior to backfilling. This test shall be made using a "Holiday Detector" as manufactured by Tinker and Rascor Co., or approved equal. Test at an electrical voltage of 10,000 volts D.C.. Any wrap holiday found shall be patched and retested. This test shall be done in the presence of the owner's inspector
- 9. Concrete Thrust Blocks
  - a. Shall be constructed at all valves, tees, elbows, bands, crosses, reducers and dead ends in loose-joint pipe. Blocks shall cure a minimum of 7 days before pressure is applied. Concrete shall be 2000 psi min.

## B. Valves

- 1. General
  - a. Manufacturer's model numbers are listed to complete description. Equivalent models of Crane, Grinnell, Nibco, or Stockham are acceptable. Use ball valves for 1-1/2" and smaller domestic hot and cold water, and gate valves for 2" and larger size.
- 2. Gate Valve
  - a. 2" and Smaller. All bronze, Malleable iron hand wheel, Rising stem, Union bonnet, Wedge disc, 200 psi WOG, Stockham B-105.
  - b. 2-1/2" and Larger. Iron body, bronze mounted, Non-rising stem, Wedge disc, 200 psi WOG, Flanged or AWWA hub end as applicable. Stockham G-612. Underground valves shall have square operating nut. Provide one operating "T" handle for underground valves.
- 3. Check Valves
  - a. 2" and Smaller. All bronze swing check, regrinding. 200 psi WOG. Stockham B-319.
  - b. 2-1/2" and Larger. Swing check, iron body, brass mounted seats, Class 125. Stockham G-931.
- 4. Ball Valve.
  - a. Bronze body, cap, stem, disk and ball. Screwed connection. Lever handle TFE seat. O-ring seals. 600 psi WOG. Consolidated Brass "Apollo", Grinnell,
- 5. Plug Valves

- a. Lubricated plug cock. Cast iron or semi-steel body and plug. 200 PSI WOG. Flanged. Wrench handle. U.L. listed for gas distribution. Resun R-1430 Walworth 1700 F. Ball valves with U.L. listing for gas distribution and equivalent or higher pressure rating may be substituted for 2" and smaller plug valves. Apollo, Watts.

### C. Insulation

- 1. General
  - a. All insulation shall comply with the requirements per the California Building energy Efficiency standards, Title 24. Refer to Table 120.3-A, Pipe Insulation Thickness
  - b. All insulation shall be provided in accordance with the "National Insulation Contractors Association" manuals. Insulation shall be applied by a contractor holding a valid California C-2 License.
  - c. All insulation jackets and lapseal adhesives shall be tested as a composite product in accordance with UBC Standard No. 42-1 and shall have a flame spread of not more than 25 and a smoke developed rating of not more than 50.
  - d. All domestic hot water piping, fittings and accessories shall be insulated. All circulating piping shall be insulated. Cold water piping in ventilated attic shall be insulated.
- 2. Interior Piping, Fittings and Valves
  - a. Shall be insulated with 1" thick Fiberglass ASJ/SSL U.L. rated pipe insulation through 1" diameter pipe, 1-1/2" thick for 1-1/4" diameter pipe and above. Fittings shall be hard molded plastic flush. Do not insulate flanges or valves unless water temperature exceeds 140°F or the piping is exposed to weather.
- 3. Piping Exposed to Weather or View
  - a. All piping and fittings exposed to weather shall have, in addition to the above-described insulation, aluminum jacketing. 0.016" thickness for straight pipe. 0.024" thickness for fittings. Integral moisture barrier. Provide pre-fabricated aluminum strapping and seals by same manufacturer, "Childers" or equal. Secure in place with factory supplied straps. Install all joints to prevent water entry. All joints shall be sealed with outdoor mastic. Benjamin Foster 65-07 or equal.
  - b. For Miscellaneous fittings for which aluminum jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the insulation with stretchable glass fabric and at least two coats of outdoor mastic.
  - c. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather such as in equipment rooms shall be given an additional finish of PVC jackets.
- 4. Hot Water Supply/Drain Piping and Handicap Fixtures "Handi Lav-Guard" insulating kits by Truebro, Inc.. or "Trap Wrap" as manufactured by Brocar Industries. Pre-formed insulation and materials to cover hot water, cold water, and drain piping. Must conform to ADA and California codes. Pressure sensitive expanded poly foam tape will not be accepted.

### D. Cleanouts

- 1. Style shall be ZURN as follows (equivalent models of Smith are acceptable):
  - a. For vinyl tile use #ZN-1400-6
  - b. For carpeted areas use #ZN-1400-14
  - c. For terrazzo areas use #ZN-1400-10
  - d. For ceramic tile or finished concrete use #ZN-1420-2
  - e. Grade cleanouts (Non-Traffic areas) use #ZN-1400-25
  - f. Grade cleanouts (Traffic areas) use #ZN-146-15W/Z-1450-8
  - g. For wall cleanouts use #ZN-1460-8
- 2. Cleanout Box.
  - a. Precast reinforced concrete. Cast iron lid marked for service.

### E. Fixtures and Trim

- 1. General
  - a. Provide Rough-in for and install all plumbing fixtures shown on drawings. All trim not concealed shall be brass with polished chrome plate finish unless noted otherwise. Waste shall be chrome plated 17 gauge P-trap shall have clean-out and escutcheon

at tailpiece. All enameled fixtures to be acid resisting. Standard color is white unless otherwise noted.

- b. All drinking water faucet products shall be certified to NSF Standard 61 section 9 Drinking Water Components. The brass casting shall contain no more than two tenths of one percent lead by dry weight.
  - c. Other brass components which contact water within the faucet shall be from brass which contains no more than three percent lead by dry weight. All faucets exempt from NSF Standard 61 Section 9 shall meet the same lead content criteria.
2. Supplies
    - a. Standard compression stop, straight pattern, loose key, chromium plated with stuffing box.
    - b. All exposed fixture supplies to lavatories, sink-sand water closets shall be Brass-Craft "Speedway" flexible supplies with metal compression ring connection at all stops or fittings as designated by part number, and shall have a rigid metal to metal connection to fixture valves. For lavatories & sinks use STR 1715A and for tank-type water closets use STR 1712DL.
  3. Air Chambers
    - a. Zurn Z-1700 "Shoktrol" complete with shut-off valve on branch to air chamber and screwdriver stop stainless steel access panel. Provide where noted on drawings and upstream at every quick-closing manual, solenoid or flush valve. Install per manufacturers instructions locating chamber between the last two fixtures on a 20' or shorter header, or use (2) chambers (calculated for the total fixture unit count) for headers over 20' in length with locations in the middle and between the last two fixtures on the header.

#### **F. Backflow Preventers**

1. General
  - a. Backflow preventers shall be provided on building domestic water service as may be required by the local utility and shall also be provided in all branch lines serving any new or existing boiler, cooling tower, evap. condenser or other device requiring chemical water treatment.
2. Reduced Pressure Type: Two spring loaded "Y" pattern check valves, differential relief valve mechanism, inlet and outlet shut-off valves, and four test cocks. Approved by AWWA. Febco, Beeco, or equivalent.
3. Double Check Type: Two spring loaded "Y" pattern check valves, inlet and outlet shut-off valves, and four test cocks. Approved by AWWA. Febco, Beeco, or equivalent.
4. Pressure Type Vacuum Breaker: Spring loaded check valve assembly, air inlet port and poppet, inlet and outlet shut-off valves, and two test cocks. Febco, Beeco or equivalent.
5. Domestic Water Heater Expansion Tank: Provide expansion tank on cold water supply to any water heater if backflow prevention is required at site water connection. "Amtrol" ST series sized per manufacturer's recommendations.

#### **G. Strainers**

1. Threaded strainers are to be of the gasketed capped cover extra heavy iron body type - Similar to Mueller Fig. #11. Provide gate valve and pipe nipple with 3/4" hose connection on each strainer for blow-off.

#### **H. Floor, Ceiling, and Wall Plates**

1. Beaton and Cadwell No. 10, steel flange with locking device and polished chromium plated finish. Provide plates on any finished surface through which pipe passes.

#### **I. Insulating Fitting**

1. Epco dielectric unions with Epconite insulating gasket selected for applicable duty. Provide wherever pipes of different metals are joined.

**J. Pipe Markers**

1. One inch (1") high minimum, stenciled letters, located every 6'-0". Markers shall indicate piping service such as domestic cold water supply, etc., and shall have directional flow arrow at each location of stenciled letters. Decals pasted, glued, or adhered to piping or insulation are not acceptable unless decal wraps entirely around pipe or insulation such as Seton "Set mark", or equivalent. Decals shall be applied after painting of all piping systems is complete and after preliminary acceptance of piping system. Decals shall comply with ANSI and OSHA specifications with respect to marker size, color, and legend

**K. Thermometers**

1. 9" liquid filled type with adjustable angle base, aluminum case. 2-1/2" insertion length stem. 3/4" NPT connection. 20-240F, 2F divisions. Provide separable thermometer well. Trerice, Weksler. Provide Brass thermometer well suitable for thermometer above. Provide 2" extension at insulated pipes

**L. Pressure Gauge**

1. Phosphor bronze tube. Bronze bushed, 1% accuracy. Cast aluminum case. 3-1/2" white dial. Adjustable pointer. Operating pressure at mid-scale. 1/4" NPT brass socket. Provide brass porous core pressure snubber and gauge cock. Trerice, Walker.

**M. Gauge Cock**

1. Lever handle brass cock. 1/4" NPT connections.

**N. Temperature and Pressure Relief Valve**

1. ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. "Watts" series 40 or 140 sized per BTU input

**O. Gas Pressure Reducing Valve**

1. Capacity and pressure ratings as indicated on drawings. Reliance Series 1800

**P. Flue and Vent Connector Piping**

1. Gas flue piping - Double wall metal flue pipe. UL listed as type "B". Metalbestos/Ameri-Vent.
2. Flue Cap - Gravity ventilator designed to properly ventilate flue regardless of wind direction. Metalbestos/Ameri-Vent

**Q. Union**

1. 2" and smaller - AAR malleable iron, bronze to iron ground seat. 30 psi. Size 2-1/2" and larger - Grooved pipe, synthetic gasket, malleable iron housing. Victaulic Style 77, Type "E" gasket, Grinnell.

**R. Pipe Hangers and Supports**

1. General
  - a. All plumbing piping shall be supported and seismically braced in compliance with OSHPD / HCAI Pre-Approval No. OPM-0542 the "nVent Caddy Seismic Bracing System". Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.
2. Steel pipe and Cast Iron Soil Pipe
  - a. 1/2" through 4" pipe. Provide B-line B3690 J-style hanger, with standard electro-plated finish.
  - b. 5" and larger pipe. B-line B3100 Clevis-Style pipe hanger with standard electro-plated finish.
3. Copper Tubing
  - a. Provide B-line B3690F felt-lined hanger for copper tubing with standard electro-plated finish.
4. Insulated Pipe & Tubing
  - a. Provide B-line B3380 thru B3384 360° calcium silicate shield. The hanger and shield shall be fitted to the outside of the pipe insulation.

- 5. Cast Iron Pressure Piping
  - a. Provide B-line B3102 Clevis-Type hangers sized for water works piping.
- 6. Hanger Rod Sizing
  - a. Hanger rods shall be roll threaded mild steel with electro-galvanized finish and shall meet or exceed the following table:

Piping or Tubing Size	Hanger Rod Size
1/2" through 2"	3/8"
2-1/2" through 5"	1/2"
6" through 10"	5/8"

- 7. Hanger Spacing
  - a. Provide at least one hanger per branch and independently support all line-mounted equipment. Provide a hanger within 12" of elbow at riser or drop. Spacing of hangers along the run of the pipe shall not exceed the following table:

Pipe or Tubing Size	Steel Pipe	Copper Tube	CI Pipe
1/2" through 3/4"	7'-0"	5'-0"	5'-0"
1" through 1-1/4"	7'-0"	6'-0"	5'-0"
1-1/2" through larger	10'-0"	10'-0"	5'-0"

- 8. Structure Attachments
  - a. General
    - i. Shall be engineered to support the intended design load and shall be sized for the hanger rod specified.
    - ii. For poured-in-place construction, install B-line B2500 Spot insert. After removing the concrete forms, install hanger rod in insert hanger rod in insert using channel nuts.
    - iii. For steel and concrete decking, install B-line B3019 insert through steel form prior to the pour. The anchor plate shall be fastened to the steel deck with machine screw.
    - iv. For attaching to steel channels, use B-line beam clamp threaded anchor hook.
- 9. Trapeze Hangers
  - a. Trapeze hangers shall be fabricated from galvanized channel. Stress on the installed channel shall not exceed 25,000 psi. Deflection on the installed channel shall not be greater than 1/240th of the span length. For load calculations, all piping to be assumed to be water-filled unless handling a heavier liquid. Hanger rods for trapeze hangers shall be limited to 9,000 psi stress based on the area at the root of the threads. Minimum hanger rod size shall be 3/8"
- 10. Riser Clamps
  - a. B-Line B3373 plain finish for interiors, galvanized for exterior. Provide on vertical piping at each floor.

**S. Sleeves**

- 1. Non-Rated Assemblies: Sleeves for pipe passing through concrete floors or walls shall be Schedule 40 galvanized steel pipe of size sufficient to permit the pipes to pass through with a minimum clearance of 1/2" between sleeve and pipe. Sleeves shall have square ends cut flush with surface and shall be caulked tight whether pipe is bare or insulated. Sleeves through floors shall extend 1" above finished floor surface.
- 2. Rated Assemblies
  - a. Bare Pipe. Same as for non-rated assemblies except that sleeves shall provide a clearance of 1" between sleeve and pipe. Clearance shall be packed for its entire length with a UL system 161 three hour classification such as a 3M FireDam 160 caulk at ends and mineral wool batt material stuffer in middle of penetration.

- b. Insulated Pipe. Insulation for pipe in sleeve shall consist of a 360 degree water-proofed calcium silicate insert sized to extend a minimum of 1" beyond each end of sleeve. Calcium silicate insert shall be of the same thickness of adjoining insulation. Clearance shall be packed for its entire length with a UL system 161 three hour classification such as a 3M FireDam 160 caulk at ends and mineral wool batt stuffer in middle of penetration.

#### T. Flashings

- 1. Vent flashing shall be 4 lb. seamless lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Provide 24"x24" 4 lb. lead flashing at each roof drain. Flashing for other piping through roof shall be prefabricated galvanized steel roof-jacks with 16" sq. flange. Provide storm collar and seal water tight with mastic

#### U. Yard Boxes and Covers

- 1. One piece precast concrete with cast iron cover labeled "Sewer", "Gas", "Water", etc., as required. Provide traffic weight cover in traffic areas. Provide 6" minimum length "Thinwall" series 2000 6" diameter pipe extension to valves installed deeper than boxes. Install in workman like manner. Multiple boxes located on same centerline parallel to building exterior wall. Provide 6" concrete apron in non-paved areas.

### PART 3 EQUIPMENT

#### A. General Requirements

- 1. Capacity. Capacities and efficiencies shall be in accordance with schedules shown on drawings. Scheduled numbers are to be considered minimum.
- 2. Dimensions. Equipment must conform to space requirements and limitations indicated on drawings and as required for operation and maintenance. Equipment that does not readily conform to space conditions is unacceptable. Prepare and submit layout drawings for all proposed equipment substitutes showing actual job conditions, required clearances for proper operation, maintenance, etc.

### PART 4 INSTALLATION

#### A. Equipment Connections

- 1. Water and drain connections shall be provided for each piece of equipment as required. Provide shut- off valve or fixture stop for each water supply to each piece of equipment whether or not equipment is furnished in this Specification Section.
- 2. Provide a backflow preventer at each connection to equipment as required by code whether or not equipment is provided in this specification section.
- 3. Provide a regulating valve at drinking fountain supplies. Valve, supply piping, and electrical connector shall be installed so as not to be visible.
- 4. Ratings
  - a. Gas. Natural gas burning equipment shall be furnished with 100% safety gas shut-off, intermittent pilot ignition, and be approved by AGA.
  - b. Electrical. Equipment shall be in accordance with NEMA standards and U.L. listed where applicable standards have been established.
- 5. Piping.
  - a. Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be furnished, installed, and wired except where noted by others on drawings



- B. Water Heaters - See plumbing fixture schedule on drawings.**
- C. Circulating Pump - See plumbing fixture schedule on drawings.**
- D. Fixtures**

1. Piping beyond finished wall at each fixture shall be chrome plated.
2. All piping supporting flush valves, hose bibbs, etc., shall be securely fastened to the building structure at each device to prevent movement of piping. All supplies to individual and/or adjacent fixtures shall be at same height and on center line of waste insofar as possible. Fixture height shall be as indicated on architectural drawings
3. Wall hung fixtures shall have space between fixture and wall surface caulked with white silicone caulk.
4. Rough-in and connection for trim and other fixtures supplied by others shall be included in this specification section.
5. Where aerators are scheduled for the various fixtures, provide Chicago "Lam-A-Flo" Laminar flow controls.
6. Floor Drains or Floor Sinks shall be placed parallel to room surfaces, set level, flush with floor and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.

**E. Piping**

1. Constantly coordinate work with that of other trades so as to prevent any interference with this installation.
2. Install cleanouts at ends of sewer lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.
3. Vents shall terminate not less than 6" above the roof nor less than 12" from any vertical surface nor within 10' of any outside air intake. Install horizontal vent lines at 1/4" per foot pitch. Offset vents 2' minimum from gutters, parapets, ridges and roof flashing.
4. Condensate Drain Piping shall be installed with constant pitch of 1/8" per foot minimum. Provide tee with clean-out plug at all changes of direction. Provide a trap at each air handling unit to prevent air leakage. Connections to equipment mounted on vibration isolators shall be made with flexible connections.
5. Freeze Protection
  - a. All piping two inch and smaller located outside building and above ground and where exposed to freezing conditions shall be neatly wrapped with refrigerant insulated tape for freeze protection.
6. Sterilization of Piping
  - a. Disinfect all domestic hot and cold water piping systems in accordance with 2013 CPC 609.9, "Standard for Disinfecting Water Mains". Disinfecting process shall be performed by contractor and witnessed by a representative of the Engineer. During procedure signs shall be posted at each water outlet stating, "Chlorinating - Do not drink". After disinfecting, water samples shall be collected and sent to an independent lab for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained from lab and delivered to the Owner through the Engineer.
7. Tests and Adjustments
  - a. Sanitary Sewer. All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test shall be maintained until all joints have been inspected, but no less than 2 hours. Grade tests will be allowed on "ring-tite" PVC pipe.
  - b. Condensate Drain. Similar to Sanitary Sewer.

- c. Pressure Systems
  - i. There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.
  - ii. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.
  - iii. Gas Piping. Maintain 100 psig air pressure for 4 hours.

**END OF SECTION**

05/22/2024

**HEATING, VENTILATING & AIR CONDITIONING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 – GENERAL**

**GENERAL PROVISIONS**

1. General Provisions of the contract including General and Supplementary Conditions apply to the work specified in this Section. The provisions of this section shall apply to all sections of Division 15 of these specifications.

**SCOPE.**

2. Work Included. Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
  - a. Air distribution systems.
  - b. All equipment as shown or noted on the drawings or as specified.
  - c. Factory start-up for all HVAC systems.
  - d. System energy balance.
  - e. Demolition as indicated on drawings.
  - f. HVAC controls. Refer to Specification Section 23 09 00.
  - g. Acceptance testing as required under California Building Energy Efficiency Standards, Title 24.
  - h. Coordination with acceptance testing technician (ATT) and / or commissioning agent. Acceptance testing and / or commissioning required where noted in construction documents or per code requirements.

**CODES AND STANDARDS**

1. All work and materials shall conform with current rules and regulations of applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern.
  - a. Applicable codes and standards shall include but are not necessarily limited to:

- i. California Code Of Regulations:
  1. Title 8, Industrial Relations
  2. Title 17, Public Health
  3. Title 19, Public Safety
  4. Title 21, Public Works
  5. Title 24, Energy Regulations
  
- ii. California Building Code.
- iii. California Mechanical Code
- iv. California Plumbing Code
- v. Local Codes and Ordinances
- vi. Air Moving and Conditioning Association (AMCA)
- vii. American National Standards Institute (ANSI)
- viii. Air Conditioning and Refrigeration Institute (ARI)
- ix. American Society of Heating, Refrigerating, and Air Conditioning Engineers
- x. American Society of Mechanical Engineers (ASME)
- xi. American Society for Testing and Materials (ASTM)
- xii. American Water Works Association (AWWA)
- xiii. National Electrical Code (NEC)
- xiv. National Electrical Manufacturers Association (NEMA)
- xv. National Fire Protection Association (NFPA)
- xvi. Occupational Safety and Health Act (OSHA)
- xvii. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
- xviii. Americans with Disabilities Act. Accessibility Guidelines for Buildings and Facilities. (ADAAG).

**PERMITS AND FEES**

1. The Contractor shall take out all permits and arrange for all tests in connection with such work as required. All charges are to be included in the work. All charges or fees for service connections, meters, etc., shall be included in the work.

**COORDINATION OF WORK**

1. Before starting any work, thoroughly examine all existing and newly completed underlying and adjoining work and conditions upon which the installation of this work is in any way dependent for the workmanship required by the Contract Documents. Report to the Architect and Engineer in writing any and all conditions which might adversely affect this work and limit ability to perform the required workmanship.
2. Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc., shall be carefully planned, prior to installation of any work, to avoid all interference's with each other, or with structural, electrical or architectural elements. Verify the proper voltage and phase of all equipment with the electrical plans. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment.
3. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the mechanical, electrical, structural, architectural drawings and field conditions that could affect the work to be performed and arrange such work accordingly. Provide the required piping and ductwork offsets, fittings, and accessories to meet such conditions.
4. Spaces provided in the design of the building shall be utilized and the work shall be kept within walls or furring lines established on the drawings. Any discrepancy between Architectural or Mechanical drawings with respect to wall or furring locations and dimensions shall be brought to the Architect's attention for resolution before proceeding with installation.
5. Any work which is done as an addition, expansion, or remodel of and existing system shall be compatible with that system.

**MANUFACTURER'S RECOMMENDATIONS**

1. All material, equipment, and devices, etc., shall be installed in a manner meeting approval of the manufacturer of the particular item. The Contractor shall make himself available of all installation manuals, brochures, and procedures that the manufacturer issues for the equipment and material. Contractor shall be held responsible for all installations contrary to the manufacturer's recommendations. Contractor shall make all necessary changes and revisions to achieve such compliance

**GUARANTEE**

1. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extensions are called for, or

where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner.

**QUIETNESS**

1. Piping of all types, ductwork, and equipment shall be arranged and supported so that the vibration is at a minimum and is not transmitted to the building structure.

**DAMAGES BY LEAKS**

1. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping or mechanical systems prior to completion of work and during the period of the guarantee.

**SUBMITTALS**

1. Shop Drawings. Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc., proposed for use on this project. Material or equipment shall not be ordered or installed until written review is processed by the Engineer. Any item omitted from the submittal shall be provided as specified without substitution. All shop drawings must comply with the following:
  - a. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the contract documents. Descriptive literature shall be current manufacturer's brochures and submittal sheets.
  - b. All shop drawings shall be submitted at one time in a three hole binder with title sheet including Project Title, Architect, Engineer, Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings. Submittals shall bear the stamp of certification by the Contractor as evidence that the Contract Documents (Specifications and Drawings) have been thoroughly checked.
  - c. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.
2. Review. Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

- a. If deviations, discrepancies or conflicts between shop drawings and design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. Submittals for products and equipment offered as an alternate to that specified will require, if accepted by the Engineer, resubmission of the Title 24 Energy Compliance Calculations if the specified product or equipment was included within the scope of the approved calculations on file with the reviewing authority. The cost of preparing resubmission will be the responsibility of the Contractor.

### OPENINGS, CUTTING AND PATCHING

1. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Restoration of all surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect and Engineer.

### DEMOLITION

1. Existing equipment, ducts, piping, valves, fittings, devices, etc., requiring removal shall be removed and delivered to the Owner at a location on the job site to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense.
2. Existing piping, ducts, and services, etc., requiring capping or plugging shall be capped or plugged below floors, behind walls, above ceilings or above roof unless otherwise noted.

### EXCAVATION AND BACKFILLING

1. Excavation and backfilling for work to be done under this Specification Section shall be done under this Section. All underground lines outside buildings shall be 2'-0" minimum backfill cover unless a greater depth of cover is recommended by the pipe manufacturer for the particular application. Width at top of pipe shall be 16" plus the outside width of pipe. Provide all shoring where required by site conditions.
2. Backfill
  - a. 6" Below, Around, and to 12" Above Pipe. Material shall be sand. Place Carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
  - b. One Foot Above Pipe to Grade. Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is

demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.

3. Compaction. Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at 8" above top of pipe. Perform test at every 100' of trench. If a test fails, the compaction shall be re-worked in both directions back to test points that passed, before re-testing.
4. Electrical conduit shall not be run in excavations provided for mechanical systems.
5. Excavation and backfilling in a public right-of-way shall be done in strict accordance with the agency having jurisdiction.

### **HANGERS AND SUPPORTS.**

1. Provide all hangers, bracing, and supports for the proper installation of equipment and materials under this Section of the Specification.
2. Any structural element required to properly hang or support piping, ducts, or equipment, etc., provided under this Specification Section and not shown on the Architectural or Structural Drawings shall be provided under this Specification Section.
3. All ductwork and mechanical piping shall be supported and seismically braced in compliance with OSHPD / HCAI Pre-Approval No. OPM-0542 the "nVent Caddy Seismic Bracing System". Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.

### **CONTINUITY OF SERVICES**

1. All existing services and systems shall be maintained except for short intervals when connections are to be made. The contractor shall be responsible for any interruptions of services and shall repair damage done to any existing service caused by the work.
2. If utilities not indicated on the drawings are uncovered during excavation, the Contractor shall notify the architect immediately for further instructions.

### **ELECTRICAL CONNECTIONS**

1. Provide under Specification Division 230000 all required control conduit, wiring, controls and control panels as indicated on the drawings or as may be required for system operation.
2. No control device shall be mounted with rigid connections on vibration isolated mechanical equipment. No field furnished control device shall be mounted on any piece of equipment so that it interferes with physical access of air or water flow, or covers any portions of nameplates or access doors.
3. Electrical Coordination



- a. Prior to commencing construction arrange a conference with the electrical and mechanical trades as well as equipment suppliers and verify types, sizes, locations, voltage requirements, controls and diagrams of all equipment furnished by them. In writing, inform the Architect that all phases of coordination of this equipment have been covered and if there are any unusual conditions or problems they shall be enumerated at this time.

**FLASHING**

1. Whenever any part of the Mechanical System(s) must penetrate the roof or outside wall, the openings shall be flashed and counter-flashed absolutely water tight with minimum 22 gauge galvanized sheet metal, prime coated. Flashing aprons shall extend not less than eight inches (8") from the duct, pipe, or supporting member in all directions unless detailed otherwise. All penetrations shall be flashed following the procedures of the National Roofing Contractor's Association

**PAINTING**

1. Paint all black iron supports, hangers, anchors, etc., and all uninsulated black iron pipe work installed in weather exposed locations with one coat of rust resisting primer.

**ACCESS DOORS AND PANELS**

1. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings or as required to match wall construction. 16-gauge steel frame and 14-gauge steel panel with paintable finish, except in ceramic tile, where panel shall be 16-gauge stainless steel with satin finish. Continuous hinge. Screwdriver latch. Deliver panels to the General Contractor for installation. Provide Zurn Z-1460-4 for square doors and Z-1460-5 for rectangular doors, Karp, or equivalent. Unless otherwise noted , the minimum sizes shall be as follows:

- |                               |         |
|-------------------------------|---------|
| a. 1 valve up to 1-1/2"       | 12"x12" |
| b. 1 valve up to 3"           | 16"x16" |
| c. Fire damper, VAV box, coil | 24"x24" |

**SYSTEM IDENTIFICATION**

1. Above Grade Piping. Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, by stenciled marking or decals, and include arrows to indicated direction of flow. Locate markers at end of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches of equipment connections are not required. Decals pasted, glued, or adhered to piping or insulation shall be Seton "Setmark", or

equivalent. Decals or stencils shall be applied after the painting of all piping systems is complete and after preliminary acceptance of piping system. Decals and stencils shall comply with ANSI and OSHA specifications with respect to marker size, color, and legend.

2. Equipment. All equipment shall be identified with a plastic laminated engraved nameplate which bears the unit number marked as indicated on the drawings (e.g. AC-4, WH-1) Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the unit.

**DEFINITIONS**

1. Provide. The term "provide" as used in these specifications or on the Drawing shall mean furnish and install.
2. Piping. The term "piping" as used in these Specifications or on the Drawings shall mean all pipe, fittings, nipples, valves, unions, hangers, and thermal insulation, etc., as may be required for a complete and functional system.
3. Ductwork. The terms "duct" or "ductwork" as used in these Specifications or on the drawings shall mean all ducts, fittings, joints, dampers, hangers, and thermal insulation, etc., and other devices as may be required to make a complete and functional system.
4. Wiring. The term "wiring" shall include the provision of all necessary products which are required for a complete installation and shall include products such as conduit, electrical boxes, connections, transformers, relays and switches.

**PROJECT CLOSE-OUT**

1. Record Drawings
  - a. Provide in accordance with general conditions of the specifications.
2. Operation and Maintenance Manual for Mechanical Systems
  - a. Provide three (3) copies of Operation and Maintenance Manuals to the Engineer for review and acceptance. Provide the Owner's designated representative with one copy of the approved O & M manual. Bind Operation and Maintenance Manuals for each Mechanical System (Plumbing, Air Conditioning, etc.) in a hard-backed binder. Cover of each binder shall have the following lettering:

OPERATION  
AND  
MAINTENANCE  
MANUAL  
CAFETERIA MODERNIZATION  
HIGHLAND HIGH SCHOOL  
2900 ROYAL SCOTTS WAY  
BAKERSFIELD, CALIFORNIA

Provide a transmittal letter at the beginning of the manual on the Contractor's letterhead. Letter shall be signed by a contractor principal (Owner or Corporate Officer) and shall be countersigned by the Owner's designated representative and shall indicate the date when the mechanical systems were shown and explained in detail to the Owner's designated representative. (The Engineers office shall be notified 48 hours minimum prior to the owner-contractor meeting.)

Provide a master index at the beginning of Manual showing items included. Use plastic tab indexes for the sections of the Manual.

Section 1, General. Provide:

Name of Architect, Mechanical Engineer, Contractor and Mechanical Sub-Contractor.

A complete list of installed equipment with project mark number, indicating name of vendor, address and phone number.

A sub-section with manufacturer's descriptive literature for each item of installed equipment with model, capacities, and all other pertinent information highlighted.

Section 2, Operating instructions. Provide:

General description of each separate system and sub-system.

Step by step procedure to follow in putting each piece of mechanical equipment into operation. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's written instruction.

Schematic as-built control diagrams for each separate system. Diagrams shall bear the date of the acceptance of the project. Include all temperature control panels and their respective functions.

Section 3, Maintenance Instructions. Provide:

Summary list of mechanical equipment used indicating name, model, serial number, and nameplate date of each item together with number and name associated with each system item.

Manufacturer's maintenance instructions for each piece of mechanical equipment installed in project. Instructions shall include name of vendor, installation instructions, parts numbers and lists, operation instructions of equipment and maintenance and lubrication instructions.

Section 4, Air Conditioning System Balance and Test Run Reports. Provide:

One-half size reproduction of air conditioning plans annotated to match tabulated measurements.

Tabulated and summarized measurements.

Section 5, Warranties. Provide:

A copy of each manufacturer's warranty statement, completely filled out and indicating date forwarded to the respective manufacturer.

## PART 2 - MATERIALS.

### Ductwork.

1. General.
  - a. Construct ductwork to meet all functional criteria defined in section VII, of the SMACNA "HVAC Duct Construction Standards Metal and Flexible". This shall subsequently be referred to as the SMACNA manual.
  - b. Interior ducts shall be constructed with G-60 or better galvanized steel (ASTM 527) LFQ, chem treat. Exterior ductwork or any duct exposed to high humidity conditions (i.e. dishwasher exhaust) shall be G-90 or better.
  - c. Support, access doors not part of ducts, bar or angle reinforcing damper rods and items made of uncoated mild steel shall be painted with two coats of primer or provide galvanized equivalent.
2. Rectangular Ducts.
  - a. Construct ductwork and supports to meet all functional criteria defined in section VII, of the SMACNA "HVAC Duct Construction Standards Metal and Flexible" 2005 Edition. Hanger spacing shall not exceed 8'.
3. Ells. Rectangular ells of ninety degrees shall be mitered and fitted with AERO/DYNE, "HEP" or equivalent, adjustable turning vane of airfoil contour design. Side rails shall be installed so that vane at heel of elbow shall fit snugly without air passing on the back side. Spacing of vanes according to manufacturers recommendations.
4. Round Ducts.
  - a. Galvanized.
    - i. Spiral lockseam with standing rib duct. For round ducts, 8" diameter or less, provide Noll or Young and company snap-lock galvanized steel.
    - ii. Round elbows shall be pleated or welded gore (5 piece ells). Non-welded gore elbows for use with snap lock ducts shall be taped at gore intersections.
5. Grease Duct.

- a. Captive Aire Double Wall DW-2R / 3R ETL tested listed grease duct with one inch clearance to combustibles. Factory welded and dye tested for leaks.

6. Duct Joints.

- a. Rectangular. All ducts shall utilize "Ductmate 25/35" factory fabricated duct joint connectors with #440 gasket tape. Flanged interior gaskets shall be Ductmate #440 or Butyl Rubber Gasket which meets Mil-C 18969B, Type II Class B, and TTS-S-001657 must also pass UL-723. The material must not contain any vehicle that will support fungal or bacterial growth. Formed on flanges shall not be accepted for any duct exceeding 42" in width or any duct subjected to greater than 2" W.G..
- b. Round. All round ducts shall utilize male-female slip joints with minimum three (3) sheet metal screws. 0-20" ducts shall utilize sealing compound applied continuously around joint before assembling and after fastening. Wrap joints with 3" wide duct tape. 21" – 72" ducts, use 3-piece, gasketed, flanged joints consisting of two internal flanges (with integral mastic sealant), and one external closure band. Ductmate Spiralmate or equal.

7. Sealing.

- a. Interior to Building - Hardcast fiber tape and liquid adhesive. DT-5300 or DT-540 tape. FTA-20 adhesive. Ductmate PROseal.
- b. Exterior to Building - For joints exposed to weather, sealant shall be G.E. silicone. For joints not exposed to weather, sealant shall be Eco-Duct Seal 44-60, or United Sheet Metal.
- c. Exposed Ducts. All joints shall use Hardcast Galva-Grip or equivalent. Joint shall be finished clean from outward appearance.

8. Flexible Insulated Ducts.

- a. Shall be J.P. Lamborn Company Type AMF or Thermoflex M-KE acoustical low pressure duct. Duct shall be listed and labeled UL-181 Air Duct; meet NFPA-HUD minimum standards and comply with UMC 6. Duct factory R-value 4.2 minimum. In un-conditioned spaces, R-8 minimum.
- b. Hangers shall consist of minimum 3" wide 28 gauge galvanized steel and shall be spaced a maximum of 36" on center. Flexible duct shall be installed in compliance with the manufacturer's latest installation instructions. No kinks or sharp bends allowed. Turning radius shall be a minimum of 1.5 times diameter of duct. A copy of which shall be at the site during and after installation. Provide a minimum of at least one hanger per duct section.
- c. Connections to round ducts or collars shall be made with galvanized or stainless steel worm clamps or "Panduit" adjustable clamps listed by UL-181.

- d. Unless indicated otherwise on the drawings, flexible duct shall be limited to the final 5 foot portion of the duct system connecting to the supply diffuser or return grille. Flex duct shall be limited to factory cut pieces with factory applied end connections.
- e. No flex duct in exposed conditions.

**9. Fire Dampers.**

- a. Fire damper assembly shall bear the U.L. 555 Label and the California State Fire Marshall listing number. Provide duct access door to fire damper as required by job conditions in compliance with Title 24, California Mechanical Code. Fire dampers shall be installed in all rated walls and ceilings penetrated by ducts, grilles and diffusers. Fire damper shall have rating equivalent to construction. Dampers shall be installed in strict compliance with manufacturer's installation instructions.

**10. Fire/Smoke Dampers.**

- a. Damper Assembly shall bear the U.L. 555S Label and State Fire Marshall listing number. Provide access door to smoke damper as required by job conditions in compliance with Title 24, California Mechanical Code. Means of disconnect shall be provided between detector and damper(s), where detector is included as factory mounted and wired. Dampers shall meet most current standard for UL testing. UL555 and UL555S. Dampers shall be suitable for a dynamic system. See details on plans for leakage and velocity requirements. If not listed on plans, provide leakage class I and velocity level at 3,000 FPM.

**11. Volume Dampers.**

- a. Branch Duct Volume Damper - Volume control damper (VCD) in square or rectangular ducts shall be as follows: Opposed blade, 6" maximum blade width, 16- gauge blade, 48" maximum length, nylon or oil impregnated bronze bearings, 1/2" diameter pin shaft, 16-gauge channel frame, actuating rod out of air stream. VCD in round duct shall be as follows: Damper blade full height of branch and 1" less than branch width. All branch dampers shall have regulator with spring loaded shaft nut and serrated self-locking die cast core. Ventlok 640. Provide remote ceiling operator with chrome plated or painted cover where shown on drawings or where damper control is otherwise inaccessible.

**12. Back-draft Dampers.**

- a. Unless otherwise noted on drawings: .025 aluminum counter-balanced blades with felt strip on mating edges, and machined brass mounted in six gauge steel channel frame, Pacific Model PRO 1100AI or equal. Normally closed back-draft dampers are required at all roof exhaust fans and all outside air intakes.

**13. Duct Fire Caulking.**

- a. All ductwork passing through rated assemblies that do not have a fire or fire/smoke damper shall be installed with a U.L. listed fire caulking assembly. Exact details of U.L. listed assembly shall be followed. Provide inspector of record and project engineer

submittal showing U.L. listed fire caulking detail that the contractor intends to use for each condition. In lieu of fire caulking, at contractors option, provide fire damper installed in accordance with U.L. listing

**14. Filters.****a. Pre-Filters.**

- i. Minimum of MERV 13 filter, consisting of a nominal 2" thick, pleated type, panel filter, CSFM listed. Initial resistance at 500 feet per minute face velocity shall not exceed 0.30" w.g. Provide one complete change of all filters after air balance is completed and prior to final acceptance

**Piping.****1. Refrigerant Piping.**

- a. General. Copper Type "L", hard drawn, ASTM B88 with wrought copper fittings, silver alloy brazed 1100°F., joints, Sil-Fos or equal. Size 3/8" O.D. and smaller to be refrigerant tube ASTM B 280. All elbows to have long radius.
- b. Line Valves. Full port ball valves.

**INSULATION.**

1. All insulation shall be in strict compliance with California Building Energy Efficiency Standards, 2022 Edition, Title 24.
2. Refer to table 120.3-A for pipe insulation thickness required. This shall be a minimum. If construction documents call for a higher rating, the higher rating shall apply.
3. Insulation shall have a flame spread of not more than 25 and a smoke developed rating of not more than 50.
4. Ducts.
  - a. General. All supply, return, exhaust ducts and plenums shall be insulated externally and/or lined internally as specified herein or as indicated on the drawings. Ducts in directly or indirectly conditioned spaces shall be insulated to a minimum level of R4.2 Ductwork in unconditioned spaces such as an attic where the roof insulation is at the ceiling level or where located outdoors shall have an insulation level of R8 minimum.
  - b. Ducts in Attics. All supply and return ducts shall be insulated externally with 2" thick fiberglass 3/4# density. Where rectangular ducts are lined internally, they shall be wrapped on the exterior with 1" thick fiberglass, 3/4# minimum density.
  - c. Exposed Ducts Within Conditioned Spaces. Shall not require external insulation unless noted on the drawings.

- d. Ducts Exposed to Weather All supply and return ducts shall be lined internally with 2" thick Manville "Permacote Linacoustic" glass fiber and thermosetting resin duct liner, R-8. Provide with antimicrobial edge coating, Johns Manville Superseal Edge Treatment or Superseal HV. Coating edges with adhesive is not acceptable. All field cut edges must be coated prior to delivering duct to job site. Any lined duct left untreated that has been subjected to dirt and / or dust will be rejected, and will not be accepted for installation. Edges must be treated so that complete coverage is obtained, with no raw edges. Apply as directed by manufacturer's literature.
- e. Interior Duct Surfaces. All supply, return, or exhaust duct connections to air conditioning units or fans shall be internally lined for a minimum distance of ten lineal feet upstream and downstream of fan unless otherwise indicated on the drawings. Interior duct liner where applied for attenuation purposes only shall be 1" thick Manville "Permacote Linacoustic" glass fiber and thermosetting resin duct liner, R-4.2. Provide with antimicrobial edge coating. See paragraph above.
- f. Duct Wrap. Shall be tightly wrapped around ducts to prevent sagging with longitudinal and transverse lap of at least 6". Laps shall be wired or stapled to eliminate gaps. Insulation shall be secured by wrapping with 18 gauge galvanized wire 12 o.c. adhesive. Insulation shall be applied with density identification exposed.
- g. Duct Liner Shall be adhered to clean metal with minimum 100% coverage of adhesive such as 3M Adhesive #38, additionally secured with approved mechanical clips or welded pins per SMACNA standards. Provide with antimicrobial edge coating. Apply per paragraph 2 d) above. Coating edges with adhesive is not acceptable.

#### 5. Piping

- a. Refrigerant Suction. Cover suction piping with foamed plastic insulation. Longitudinal and end seams shall be thoroughly cemented with adhesive in accordance with manufacturer's recommendations. Cover all fittings, unions, valves and connections. Piping exposed to weather shall be covered with .016" aluminum jacket.

### **PART 3- EQUIPMENT.**

#### **General Requirements**

1. See equipment schedules on Mechanical Plans for capacities and details.
2. Start-up. All equipment shall included factory start-up. Start-up and tested in strict accordance with the manufacturer's written instructions. Provide the inspector of record factory start-up literature for each mechanical item. Demonstrate to inspector that strict compliance to the start-up procedure has been completed for each item. Start-up sheets must be completed and turned in with the O&M manuals. Start-up sheets must be signed by the owner of the installing contractor certifying that the start-up has been completed per manufacturer's written instruction.
3. Acceptance Testing. Complete acceptance testing of all systems and equipment as required under the Building Energy Efficiency Standards, 2022 Edition, Title 24. Submit all completed



and signed forms to the building department or the Division of the State Architect, where applicable.

4. Capacity. Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
5. Dimensions. Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Where architectural screening is indicated, equipment shall not extend above or beyond screening. Equipment is not acceptable that does not readily conform with the space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
6. Ratings.
  - a. Gas. Natural gas burning equipment shall be furnished with 100% safety gas shut-off, intermittent pilot ignition, and be approved by AGA.
  - b. Electrical. Electrical equipment shall be in accordance with NEMA Standards and UL listed where applicable standards have been established.
7. Piping. Each item or assembly of items shall be furnished completely piped for connection to services. control valves and devices shall be provided. Equipment requiring domestic water for none-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
8. Electrical.
  - a. General. Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be provided. Provide terminal blocks for controls and interlocks not included in equipment package.
  - b. Wiring. Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each underground conductor. Switches, contacts and other devices shall be in undergrounded conductors.
  - c. Motors. Shall be rated, constructed and applied in accordance with NEMA and ANSI Standards without using service factor. Single-phase motor shall be of type to suit application. Three- phase motors shall be of type to suit application. Three-phase motors shall be open drip proof, NEMA B design on pumps and fans, NEMA C on reciprocating equipment, sealed ball bearing, three-phase indication. Insulation shall be double dip and bake with Class F thermal polyester non-hygroscopic epoxy base insulating materials. Design shall limit starting inrush current and running current to values shown on drawings. Motors exposed to weather shall be open drip-proof approved by manufacturer for this type of service. All motors 1 horsepower and larger shall be the high efficiency type with efficiency and power factor equal or exceeding Century E-Plus.

9. Fan Selection.
- a. Fan Curves. Performance curves shall be submitted for all units of 3000 CFM or greater. Operating point for forward curved fans shall be from point of maximum efficiency toward increased CFM limited by horsepower scheduled. Operating point for backward inclined fans shall be selected near point of maximum efficiency. Curves shall plot CFM versus static pressure with constant brake horsepower, RPM and efficiency lines.
  - b. Static Pressure. Unless otherwise noted, pressure scheduled as external static pressure (ESP) includes all ductwork and accessory losses external to the unit housing. Unless otherwise noted, pressure scheduled as total static pressure includes all ductwork, filter, coil, cabinet, damper and other accessory losses. Unless otherwise noted, pressure scheduled as duct static pressure includes all supply and return ductwork and accessory losses external to the unit housing and plenum (as applicable). The allowance for filter losses is 0.3" WC, unless otherwise noted. Submit itemized static pressure losses for all components.
10. Screens. All duct or louver openings to the outside shall be covered with 1/4" galvanized screen.
11. Mixing Dampers. Opposed blade, 16-gauge. Six-inch maximum blade width, 48" maximum length. Nylon or oil impregnated bronze bearings. One-half inch diameter pin shaft. 16-gauge channel frame. One percent maximum leakage at 4" WC in accordance with AMCA 500 for outside air dampers. Actuating rod out of air stream.
12. Coils:
- a. Construction: Copper tube. Copper or aluminum 0.0075" min. thickness fins hydraulically or mechanically bonded to tube. 16-gauge galvanized steel rigid channel coil casing. Rated working pressure 200 psig minimum.
  - b. Capacity: Ratings certified by ARI in accordance with ARI standard 410. Cooling Coil face velocity shall not exceed manufacturer's published ratings or 550 fpm. Include coil selection calculations (including expansion valve selection) in shop drawings.
  - c. Direct Expansion Coils: Copper suction header silver brazed tubes, distributing tubes and expansion valve. Working pressure 250 psig minimum. 10 fins per inch maximum.

## PART 4 - INSTALLATION

### Ductwork.

1. All ductwork shall be supported and seismically braced in compliance with OSHPD / HCAI Pre-Approval No. OPM-0542 the "nVent Caddy Seismic Bracing System". Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.

2. Installation shall conform with NFPA 90A and SMACNA Low Pressure Duct Construction Standards 2005 Edition. Provide mounting and supporting of Ductwork and accessories including, but not limited to, structural supports, hangers, vibration isolators, stands, clamps and brackets, access doors, and dampers. Install ductwork accessories as indicated in accordance with the manufacturer's printed instruction. Allow clearance for inspection, repair, replacement, and service. Ductwork and accessories shall be installed in a manner to prevent vibration and rattling.
3. Deflectors. Provide in rectangular elbows, duct mounted supply outlets, take-off or extension collars to supply outlets, and tap-in branch take-off connections. 45 degree take-off is an acceptable alternative for low velocity systems (below 1,500 FPM).
4. Grilles. Each air inlet and outlet shall be flush with finished surface of wall or ceiling and shall be securely attached thereto. Provide plaster grounds at locations of all wall and hard surfaced ceiling grilles.
5. Branch Take-Offs. All branch ducts from main supply air and to return air trunk duct shall be provided with splitter blade full height of branch take-off and 1" less than branch width. Regulators to be Young or equal. Dampers located in inaccessible areas shall have extended shafts with concealed regulator in adjacent ceiling or wall.
6. Dampers. Install volume control damper and damper regulator on all branch ducts.
7. Flexible Glass Fiber Duct. The use of flexible duct is limited to the last 5 feet of each branch duct (i.e. one 5 foot section of flexible duct may used to connect the grille to the sheet metal branch duct). No joints permitted in 5' length. Joints shall be installed with metal bands and fiber tape and adhesive. Minimum turn radius shall be in accordance with SMACNA Standards (turn radius of duct centerline not less than 1.5 times the duct diameter).
8. All ducts and mechanical equipment and piping shall be supported and seismically braced in compliance with OSHPD Pre-Approval No. OPM-0052-13 the "B-Line / Tolco Seismic Restraint System" or other OSHPD pre-approved system. Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.

**Piping.**

1. General. Piping Layout:
  - a. Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by Engineer. (No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed.) All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted.

2. All mechanical piping shall be supported and seismically braced in compliance with OSHPD / HCAI Pre-Approval No. OPM-0542 the "nVent Caddy Seismic Bracing System". Copies of the above publication and details shall be provided by the Contractor and maintained at the project site until final acceptance.
2. Hangers. Support at intervals with hangers as specified elsewhere within these Specifications or as indicated on the Drawings. No piping shall be in contact with any part of the building structure including sub-assemblies.
3. Obstructions. Piping shall be installed to clear beams, etc., unless sleeving is particularly indicated. Constantly coordinate work with that of other trades so as to prevent any interference with this installation.
4. Rough-in. Rough-in work shall proceed as rapidly as general construction will permit and shall be completely tested before any lathing, plastering or any other finished work has started. Work shall be fitted to the available space and shall be accurately roughed-in.
5. Refrigerant Piping.
  - a. Pipe shall be cut square. Joint surfaces shall be thoroughly cleaned, fitted and erected before brazing. After installation, evacuate to 29 inches of mercury, ambient temperature during evacuation, fill with dry nitrogen to 250 psi and maintain for two-hour period without additional charge. After nitrogen test, purge with refrigerant charged through dryer and maintain holding charge in system and equipment.

**Insulation.**

1. See materials section of this specification for installation requirements.

**Equipment Installation.**

1. It shall be the responsibility of the equipment installer to ensure that no work done under other specification sections shall in any way block or otherwise hinder the equipment. All equipment shall be securely anchored in place.

**System Air and Water Balance.**

1. General.
  - a. The contractor shall employ the services of an independent system balancing company registered by AABC, NBC, or NEBB. The balancing contractors shall be limited to one of the following:
    - i. Air Control Services 515 E. 19th St., Bakersfield, CA 93305 (661) 327-8755

- ii. Air Control Balancing 1959 N. Gateway #103, Fresno, Ca. 93727 (559) 454-8000
  - iii. American Air Balance 4721 E. Hunter, Anaheim, Ca. 92807 (714) 693-3700
  - iv. Los Angeles Air Balance Co. 1848 W. 11 St., Upland, Ca. 91786 (909) 931-1114
  - v. RS Analysis 111 Natoma Street, Folsom, Ca. 95630 (916) 351-9842
  - vi. National Air Balance 4171 Business Center Drive, Fremont, Ca. 94538 (510) 623-7000
- b. Submit within thirty (30) days after receipt of contract, submittal data forms of the selected balance company for the testing and balancing of the air conditioning, heating, and ventilation systems.
  - c. After development of the balancing procedure to be followed for each respective system, a representative of the system balancing company shall periodically visit the jobsite, particularly before any insulation is applied to ducts or piping, and confirm the suitability of the ducts, piping, accessories, hardware, and access panels installed for balancing. Any noted deficiencies shall be reported to the Contractor in writing with a copy to the Engineer. Noted deficiencies shall be corrected at this time by the Contractor.
  - d. Final system testing and balance shall not begin until the system has been completed and is in full working order. The Contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation and shall continue the operation each working day during the balancing procedure. The balancing company shall be responsible for all adjustments to the heating, cooling and ventilating equipment necessary for the system to operate as specified. Upon completion conduct a running test under substantial load conditions demonstrating to the satisfaction of the Owner's representative that all equipment and controls are operating as intended and have been properly adjusted for these conditions.
  - e. The system balance company shall include an extended warranty of one hundred eighty (180) days after completion and acceptance of test and balance work, during which time the Engineer at his discretion may request a recheck, or resetting of any outlet, fan, etc., as listed in report. The system balance company shall provide technicians to assist the Engineer in any re-test required during this period. Seasonal re-balance during the first year of operation is part of the scope of this specification.
  - f. The flow quantities shown on the drawings are not to be considered absolute. If changes in flow quantities are required to attain comfort conditions in any area, the balancing company shall make the required changes at no extra cost.

2. Procedure.

- a. The testing and balancing of the systems, including all equipment, ducts, piping, and accessories shall be done in strict compliance with the latest edition of the Procedural

Standards for Testing, Adjusting, Balancing of Environmental Systems as published by National Environmental Balancing Bureau or equivalent AABC standard.

3. Acceptance of Tests.

- a. In the event any tests or inspections prove unsatisfactory, such shall be made a matter of record. Acceptance of the system shall be postponed until all defects or improper adjustments have been corrected and the work is again inspected and tests satisfactorily repeated.

4. Data to be Furnished.

- a. At completion of running tests two (2) complete sets of data listed below for all items of equipment shall be furnished for incorporation in Owner's Equipment Manual for the project:
- b. Manufacturer's equipment outline drawings.
- c. Manufacturer's performance curves for fans, pumps, and flow control devices and capacity tables for equipment.
- d. Pertinent running test data; such as system test points, test point data, horsepower, RPM, FLA, etc., including final instrument set points and adjustments as left.

5. Fan Drives.

- a. Shall be changed as necessary to obtain the desired flow rate at minimum brake horsepower and to avoid objectionable fan or air noise in any part of the building. As a part of the work of this contract, the Contractor shall make any changes in the pulleys, belts, and dampers or the addition of dampers, required for the correct balance as recommended by system balancing company, at no additional cost.

**Temperature Controls (refer to specification 230900)**

**END OF SECTION**

05/22/2024

**BUILDING MANAGEMENT SYSTEM**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.1 MECHANICAL GENERAL PROVISIONS

- A. This contractor shall conform to the General and Supplementary Conditions Provisions under Division 1 of the Specifications.
- B. This contractor shall conform to the Specifications Section 23 00 00: Mechanical.

## 1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Products Not Furnished or Installed But Integrated with the Work of This Section:
  - 1. In-line Meters (gas, water, power).
  - 2. VRF/VRV Systems.
  - 3. Variable Frequency Drives.
- B. Work Required Under Division 26 Related to This Section:
  - 1. Power wiring to line side of motor starters, disconnects or variable frequency drives.
  - 2. Provision and wiring of smoke detectors and other devices relating to fire alarm system.
  - 3. Campus LAN (Ethernet) connection adjacent to JACE network management controller.

## 1.3 SUMMARY

- A. Scope: Furnish all labor, materials and equipment necessary for a complete and operating Building Management System (BMS), utilizing Direct Digital Controls as shown on the drawings and as described herein. Drawings are diagrammatic only. All controllers furnished in this section shall communicate on a peer-to-peer bus over a single open protocol bus.
  - 1. The intent of this specification is to provide a system that is consistent with BMS systems throughout the owner's facilities running the Niagara 4™ Framework.
  - 2. System architecture shall fully support a multi-vendor environment and be able to integrate third party systems via existing vendor protocols including, as a minimum, LonTalk, BACnet, and Modbus.
  - 3. System architecture shall provide secure Web access using MS Internet Explorer from any computer on the owner's LAN.
  - 4. Any control vendor that must provide additional BMS server software shall be unacceptable. Only systems that utilize the WEBs Niagara 4™ Framework shall satisfy the requirements of this section.
  - 5. The BMS server shall host all graphic files for the control system. All graphics and navigation schemes for this project shall match those that are on the existing campus Niagara 4 framework server.
  - 6. Each new campus or site shall have a new hierarchy modeled using the industry standard Haystack dictionary (site-building-equipment-points) and (equipment-serving equipment).
    - a. All hierarchy models must be approved by Kern High School District before any server integration work begins.

7. Each new data point shall be tagged using the industry standard Haystack dictionary point tags. No customer dictionaries allowed.
  - a. All point tags and data models must be approved by Kern High School District before any server integration work begins.
8. A laptop computer including engineering/programming software to modify Operating System Server BMS programs and graphics shall be included.
9. **OPEN NIC STATEMENTS - All Niagara 4 software licenses shall have the following NiCS: "accept.station.in=\*"; "accept.station.out=\*"and "accept.wb.in=\*"and "accept.wb.out=\*". All open NIC statements shall follow Niagara Open NIC specifications**

B. **Approved Manufacturers:** KMC, Honeywell, or Vykon

C. **Approved Installation Contractors:**

#### 1.4 SUBMITTALS:

- A. Submit documentation of contractor qualifications, including those indicated in paragraph 1.9 "Quality Assurance" if requested by the A-E.
- B. Electronic copies of shop drawings of the entire control system shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers' catalog data sheets and installation instructions.
- C. Shop drawings shall also contain complete wiring and schematic diagrams, sequences of operation, control system bus layout and any other details required to demonstrate that the system has been coordinated and will properly function as a system. Terminal identification for all control wiring shall be shown on the shop drawings.
- D. Upon completion of the work, provide complete sets of 'as-built' drawings and other project-specific documentation in electronic format.
- E. Any deviations from these specifications or the work indicated on the drawings shall be clearly identified in the Submittals.

#### 1.5 AGENCY AND CODE APPROVALS

- A. All products of the BMS shall be provided with the following agency approvals. Verification that the approvals exist for all submitted products shall be provided on request, with the submittal package. Systems or products not currently offering the following approvals are not acceptable.
  1. Federal Communications Commission (FCC), Rules and Regulations, Volume II -July 1986 Part 15 Class A Radio Frequency Devices
  2. FCC, Part 15, Subpart J, Class A Computing Devices
  3. UL 504 - Industrial Control Equipment
  4. UL 506 - Specialty Transformers
  5. UL 910 - Test Method for Fire and Smoke Characteristics of Electrical and Optical-Fiber Cables Used in Air-Handling Spaces
  6. UL 916 - Energy Management Systems All
  7. UL 1449 – Transient Voltage Suppression
  8. Standard Test for Flame Propagation Height of Electrical and Optical - Fiber Cables Installed Vertically in Shafts
  9. EIA/ANSI 232-E - Interface Between Data Technical Equipment and Data Circuit Terminal Equipment Employing Serial Binary Data Interchange



10. EIA 455 - Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices
11. IEEE C62.41- Surge Voltages in Low-Voltage AC Power Circuits
12. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems
  - a. 13. NEMA 250 - Enclosures for Electrical Equipment
13. NEMA ICS 1 - Industrial Controls and Systems
14. NEMA ST 1 - Specialty Transformers
15. NCSBC Compliance, Energy: Performance of control system shall meet or surpass the requirements of ASHRAE/IESNA 90.1-1999.

#### 1.6 SOFTWARE OWNERSHIP

- A. The Owner shall have full ownership and full access rights for all network management, operating system server, engineering and programming software required for the ongoing maintenance and operation of the BMS.

#### 1.7 DELIVERY, STORAGE AND HANDLING

- A. Maintain integrity of shipping cartons for each piece of equipment and control device through shipping, storage, and handling as required to prevent equipment damage. Store equipment and materials inside and protected from weather.

#### 1.8 JOB CONDITIONS

- A. Cooperation with Other Trades: Coordinate the Work of this section with that of other sections to insure that the Work will be carried out in an orderly fashion. It shall be this Contractor's responsibility to check the Contract Documents for possible conflicts between his Work and that of other crafts in equipment location, pipe, duct and conduit runs, electrical outlets and fixtures, air diffusers, and structural and architectural features.

#### 1.9 QUALITY ASSURANCE

- A. The manufacturer of the BMS digital controllers shall, if requested, provide documentation supporting compliance with ISO-9001 (Model for Quality Assurance in Design/Development, Production, Installation and Servicing).
- B. The Control System Contractor shall have a DDC office within 20 miles of the project location. This office shall be staffed with minimal of one technician/engineer with both Niagara 4 TCP and Vykon Pro Certifications.
- C. The Control System Contractor shall have a Full Service DDC office within 150 miles of the project location. This office shall be staffed with applications engineers and field technicians. This office shall maintain parts inventory and shall have all testing and diagnostic equipment necessary to support this Work, as well as staff trained in the use of this equipment. This office shall be staffed with a minimal of three (3) Niagara 4 TCP Certified employees.
- D. Single Source Responsibility of Supplier: The Control System Contractor shall be responsible for the complete installation and proper operation of the control system. The Control System Contractor shall exclusively be in the regular and customary business of design, installation and service of computerized building management systems similar in size and complexity to the system specified. The Control System Contractor shall be the manufacturer of the primary DDC system components or shall have been the authorized representative for the primary DDC components manufacturer for at least 5 years.

- E. Equipment and Materials: Equipment and materials shall be cataloged products of manufacturers regularly engaged in the production and installation of HVAC control systems. Products shall be manufacturer's latest standard design and have been tested and proven in actual use.

1.10 SPECIFICATION NOMENCLATURE - Acronyms used in this specification are as follows:

A. Actuator:	Control device that opens or closes valve or damper in response to control signal.
B. AI	Analog Input
C. AO	Analog Output
D. Analog	Continuously variable state over stated range of values
E. BMS	Building Management System
F. DDC	Direct Digital Control
G. Discrete Binary or digital state	
H. DI	Discrete Input
I. DO	Discrete Output
J. FC	Fail Closed position of control device or actuator. Device moves to closed position on loss of control signal or energy source.
K. FO	Fail open (position of control device or actuator). Device moves to open position on loss of control signal or energy source.
L. GUI	Graphical User Interface
M. HVAC	Heating, Ventilating and Air Conditioning
N. IDC	Interoperable Digital Controller
O. ILC	Interoperable Lon Controller
P. LAN	Local Area Network
Q. Modulating	Movement of a control device through an entire range of values, proportional to an infinitely variable input value.
R. Motorized	Control device with actuator
S. NAC	Network Area Controller
T. NC	Normally closed position of switch after control signal is removed or normally closed position of manually operated valves or dampers.
U. NO	Normally open position of switch after control signal is removed; or the open position of a controlled valve or damper after the control signal is removed; or the usual position of a manually operated valve.
V. OSS	Operating System Server, host for system graphics, alarms, trends, etc.
W. Operator	Same as actuator
X. PC	Personal Computer
Y. Peer-to-Peer	Mode of communication between controllers in which each device connected to network has equal status and each shares its database values with all other devices connected to network
Z. P	Proportional control; control mode with continuous linear relationship between observed input signal and final controlled output element.
AA. PI	Proportional-Integral control, control mode with continuous proportional output plus additional change in output based on both amount and duration of change in controller variable (reset control).
BB. PICS	BACnet Product Interoperability Compliance Statement
CC. PID	Proportional-Integral-Derivative control, control mode with continuous correction of final controller output element versus input signal based on proportional error, its time history (reset) and rate at which it's changing (derivative).

DD. Point	Analog or discrete instrument with addressable database value
EE. WAN	Wide Area Network

## PART 2 MATERIALS

### 2.1 GENERAL

- A. The Building Management System (BMS) shall be comprised of a network of interoperable, stand-alone digital controllers, a network area controller, graphics and programming, and other control devices for a complete system as specified herein.
- B. The installed system shall provide secure password access to all features, functions and data contained in the overall BMS.

### 2.2 OPEN, INTEROPERABLE, INTEGRATED ARCHITECTURE

- A. The intent of this specification is to provide a peer-to-peer networked, stand-alone, distributed control system utilizing the LonWorks technology communication protocol in one open, interoperable system.
- B. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. Physical connection of any BACnet control equipment, such as chillers, shall be via Ethernet or RS485 MSTP.
- C. All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices. Components or controllers requiring "polling" by a host to pass data shall not be acceptable.
- D. The supplied system must incorporate the ability to access all data using Java enabled browsers without requiring proprietary operator interface and configuration programs. An Open Database Connectivity (ODBC) or Structured Query Language (SQL) compliant server database is required for all system database parameter storage. This data shall reside on the existing Operating System Server currently located in the Facilities Office on the LAN. Systems requiring proprietary database and user interface programs shall not be acceptable.
- E. A hierarchical topology is required to assure reasonable system response times and to manage the flow and sharing of data without unduly burdening the customer's internal Intranet network. Systems employing a "flat" single tiered architecture shall not be acceptable.
  - 1. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 5 seconds for network connected user interfaces.
  - 2. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed 60 seconds for remote or dial-up connected user interfaces.

### 2.3 BAS SERVER HARDWARE (If no existing Niagara 4 Server)

- A. Minimum Computer Configuration (Hardware Independent)
  - 1. Central Server. Owner shall provide a dedicated BAS server with configuration that includes the following components as a minimum:
  - 2. 2 GHz, P4 or higher CPU – Dual Processor
  - 3. 8 Gb of RAM minimum.

4. 80 gigabyte hard disk, SVGA Card with 1024 x 768, 24-bit True Color, Back-up system 24X CD Rom Drive, 19" Flat Screen Color Monitor, Keyboard and mouse
  5. Operating system for the server shall be Microsoft Windows 7 Professional & Enterprise, Windows Server 2008 or Windows Server 2012.
  6. Internet Explorer 8.0 or later
  7. 10/100Base-T Ethernet Port
- B. Standard Client: The thin-client Web Browser BAS GUI shall be Microsoft Internet Explorer (8.0 or later) running on Microsoft 98, 2000, NT, XP, or 7. No special software shall be required to be installed on the PCs used to access the BAS via a web browser.

#### 2.4 SYSTEM NETWORK CONTROLLER (SNC)

- A. These controllers are designed to manage communications between the programmable equipment controllers (PEC), application specific controllers (ASC), and advanced unitary controllers (AUC) which are connected to its communications trunks, manage communications between itself and other system network controllers (SNC) and with any operator workstations (OWS) that are part of the BAS, and perform control and operating strategies for the system based on information from any controller connected to the BAS.
- B. The controllers must be fully programmable to meet the unique requirements of the facility it must control.
- C. The controllers must be capable of peer-to-peer communications with other SNC's and with any OWS connected to the BAS, whether the OWS is directly connected, connected via modem or connected via the Internet.
- D. The communication protocols utilized for peer-to-peer communications between SNC's will be Niagara 4, BACnet TCP/IP and SNMP. Use of a proprietary communication protocol for peer-to-peer communications between SNC's is not allowed.
- E. The SNC shall be capable of executing application control programs to provide:
  1. Calendar functions
  2. Scheduling
  3. Trending
  4. Alarm monitoring and routing
  5. Time synchronization
  6. Integration of LonWorks, BACnet, and ModBus controller data
  7. Network management functions for all SNC, PEC and ASC based devices
- F. The SNC must provide the following hardware features as a minimum:
  1. One Ethernet Port-10/100 Mdps
  2. One RS-232/485 port
  3. Battery Backup
  4. Flash memory for long term data backup (If battery backup or flash memory is not supplied, the controller must contain a hard disk with at least 1 gigabyte storage capacity)
- G. The SNC shall support standard Web browser access via the Intranet/Internet. It shall support a minimum of 16 simultaneous users.
- H. The SNC shall provide alarm recognition, storage, routing, management and analysis to supplement distributed capabilities of equipment or application specific controllers.
- I. The SNC shall be able to route any alarm condition to any defined user location whether connected to a local network or remote via dial-up, telephone connection, or wide-area network.
  1. Alarm generation shall be selectable for annunciation type and acknowledgement requirements including but not limited to:
    - a. Alarm,
    - b. Return to normal,

- c. To default.
- 2. Alarms shall be annunciated in any of the following manners as defined by the user:
  - a. Screen message text,
  - b. Email of complete alarm message to multiple recipients.
  - c. Pagers via paging services that initiate a page on receipt of email message.
  - d. Graphics with flashing alarm object(s).
- 3. The following shall be recorded by the SNC for each alarm (at a minimum):
  - a. Time and date
  - b. Equipment (air handler #, accessway, etc.)
  - c. Acknowledge time, date, and user who issued acknowledgement.
- J. **Approved Manufacturers: Vykon J8000 series or Honeywell WEB 8000**

## 2.5 PROGRAMMABLE EQUIPMENT CONTROLLER (PEC)

- A. HVAC control shall be accomplished using BACnet based devices. Where existing Lon Bus is to be maintained, devices based on LonWorks shall be acceptable. For each LonWorks device that does not have LonMark certification, the device supplier must provide an XIF file for the device. The controller platform shall provide options and advanced system functions, that allow standard and customizable control solutions required in executing the "Sequence of Operation".
- B. All PECs shall be application programmable. All control sequences within or programmed into the PEC shall be stored in non-volatile memory, which is not dependent upon the presence of a battery to be retained.
- C. The PECs shall communicate with the SNC at a baud rate of not less than 38.4K baud. The PEC shall provide LED indication of communication and controller performance to the technician, without cover removal.
- D. The following integral and remote Inputs/Outputs shall be supported per each PEC:
  - 1. Integral dry contact digital inputs.
  - 2. Any two digital inputs may be configured as pulse counters with a maximum pulse read rate of 15 Hz.
  - 3. Integral analog inputs (configurable as 0-10V, 0-10,000 ohm or, 20K NTC).
  - 4. Integral 0-10V analog outputs.
  - 5. Integral 24 Vac Triac or Relay digital outputs, configurable as maintained or floating motor control outputs.
  - 6. Integral 20 Vdc, 65-mA power supply for auxiliary devices.
  - 7. If a 20 Vdc 65-mA power supply terminal is not integral to the PEC, provide at each PEC a separate, fully isolated, enclosed, current limited and regulated UL listed auxiliary power supply for power to auxiliary devices
- E. PEC Controllers shall support the following control techniques:
  - 1. Ten configurable general-purpose control loops that can incorporate Demand Limit Control strategies, Setpoint reset, adaptive intelligent recovery, and time of day bypass.
  - 2. Ten general-purpose, non-linear control loops.
  - 3. Eight start/stop Loops.
  - 4. Thirty-two If/Then/Else logic loops.
  - 5. Thirty six Math Function loops (MIN, MAX, AVG, SUM, SUB, SQRT, MUL, DIV, ENTHALPY).

## 2.6 ADVANCED UNITARY CONTROLLER

- A. The advanced unitary controller (AUC) platform shall be designed specifically to control HVAC - ventilation, filtration, heating, cooling, humidification, and distribution. Equipment includes: constant

volume air handlers, VAV air handlers, packaged RTU, heat pumps, unit vents, fan coils, natural convection units and radiant panels. Control shall be accomplished using BACnet based devices. Where existing Lon Bus is to be maintained, devices based on LonWorks shall be acceptable. For each LonWorks device that does not have LonMark certification, the device supplier must provide an XIF file for the device. The controller platform shall provide options and advanced system functions, that allow standard and customizable control solutions required in executing the "Sequence of Operation".

B. Minimum Requirements:

1. The controller shall be fully functional on any Niagara 4 brand platform.
2. The controller shall be capable of either integrating with other devices or stand-alone operation.
3. The controller shall have two microprocessors. The Host processor contains on-chip FLASH program memory, FLASH information memory, and RAM to run the main HVAC application. The second processor for network communications. Controller memory minimum requirements include:
  - a. FLASH Memory Capacity: 60 Kilobytes with 8 Kilobytes for application program.
  - b. FLASH Memory settings retained for ten years.
  - c. RAM: 2 Kilobytes.
4. The controller shall have Significant Event Notification, Periodic Update capability, and Failure Detect when network inputs fail to be detected within their configurable time frame.
5. The controller shall have a visual indication (LED) of the status of the device:
  - a. Controller operating normally.
  - b. Controller in process of download.
  - c. Controller in manual mode under control of software tool.
  - d. Controller lost its configuration.
  - e. No power to controller, low voltage, or controller damage.
  - f. Processor and/or controller are not operating.
6. The minimum controller Environmental ratings.
  - a. Operating Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).
  - b. Storage Temperature Ambient Rating: -40 degrees to 150 degrees F (-40 degrees to 65.5 degrees C).
  - c. Relative Humidity: 5% to 95% non-condensing.
7. The controller shall have the additional approval requirements, listings, and approvals:
  - a. UL/cUL (E87741) listed under UL916 (Standard for Open Energy Management Equipment) with plenum rating.
8. The controller housing shall be UL plenum rated mounting to either a panel or DIN rail (standard EN50022; 7.5mm x 35mm).
9. The controller shall have a mix of digital inputs (DI), digital Triac outputs (DO), analog outputs (AO), and universal inputs (UI).
  - a. Analog outputs (AO) shall be capable of being configured as digital outputs (DO).
  - b. Input and Output wiring terminal strips shall be removable from the controller without disconnecting wiring.
  - c. Input and Output wiring terminals shall be designated with color coded labels.
  - d. Universal inputs shall be capable of being configured as binary inputs, resistive inputs, voltage inputs (0-10 VDC), or current inputs (4-20 mA).
10. The controller platform shall have standard HVAC application programs that are modifiable to support both the traditional and specialized "sequence of operations".

2.7 COMPLETE EQUIPMENT INTEGRATION

- A. Any VRV/VRF/Mini-split/Chiller/Boiler/VFD system shall be integrated into the site's SNC controller via BACnet IP or BACnet MSTP. No stand-alone system allowed.

## 2.8 OTHER CONTROL SYSTEM HARDWARE

- A. BACnet MSTP to IP routers are acceptable within each school site and must follow district's BACnet networking guidelines.
  - 1. **Approved Manufacturers: Contemporary Controls BASRT-B**
- B. Control damper actuators shall be furnished by the Control System Contractor. Two-position or proportional electric actuators shall be direct-mount type sized to provide a minimum of 5 in-lb torque per square foot of damper area. Damper actuators shall be spring return type. Operators shall be heavy-duty electronic type for positioning automatic dampers in response to a control signal. Motor shall be of sufficient size to operate damper positively and smoothly to obtain correct sequence as indicated. All applications requiring proportional operation shall utilize truly proportional electric actuators.
- C. Control Valves: Control valves shall be 2-way or 3-way pattern as shown and constructed for tight shutoff at the pump shut-off head or steam relief valve pressure. Control valves shall operate satisfactorily against system pressures and differentials. Two-position valves shall be 'line' size. Proportional control valves shall be sized for a maximum pressure drop of 5.0 psi at rated flow (unless otherwise noted or scheduled on the drawings). When specified, shall be furnished with integral switches for indication of valve position (open-closed).
- D. Control Valve Actuators: Actuators for VAV terminal unit heating coils shall be "drive-open; drive-closed" type. All actuators shall have inherent current limiting motor protection. Valve actuators shall be 24-volt, electronic type, modulating or two-position as required for the correct operating sequence. Actuators on valves needing 'fail-safe' operation shall have spring return to Normal position. Modulating valves shall be positive positioning in response to the signal. All valve actuators shall be UL listed.
- E. All control valves 2 1/2" or larger shall have position indication. All hot water control valves shall be Normally-Open arrangement; all chilled water control valves shall be Normally-Closed arrangement.
- F. Wall Mount Room Temperature sensors: Thermistor temperature sensors with and accuracy of  $\pm 1\%$  accuracy. Each room temperature sensor shall provide temperature indication to the digital controller, provide the capability for a software-limited occupant set point adjustment (warmer-cooler slider bar or switch) and limited operation override capability. The sensor shall be complete with a decorative cover and suitable for mounting over a standard electrical utility box. These devices shall have an accuracy of 0.5 degrees, F., over the entire range.
- G. Duct-mounted and Outside Air Temperature Sensors: Thermistor temperature sensors with and accuracy of  $\pm 1\%$  accuracy. Outside air sensors shall include an integral sun shield. Duct-mounted sensors shall have an insertion measuring probe of a length appropriate for the duct size, with a temperature range of -40 to 160 degrees F. The sensor shall include a utility box and a gasket to prevent air leakage and vibration noise. For all mixed air and preheat air applications, install bendable averaging duct sensors with a minimum 8 - foot long sensor element. These devices shall have accuracy of 0.5 degrees, F., over the entire range.
- H. Humidity sensors shall be thin-film capacitive type sensor with on-board nonvolatile memory, accuracy to plus or minus two percent (2%) at 0 to 90% RH, 12 - 30 VDC input voltage, analog output (0 - 10 VDC or 4 - 20mA output). Operating range shall be 0 to 100% RH and 32 to 140 degree F. Sensors shall be selected for wall, duct or outdoor type installation as appropriate.
- I. Carbon Dioxide Sensors (CO<sub>2</sub>): Sensors shall utilize Non-dispersive infrared technology (N.D.I.R.), repeatable to plus or minus 20 PPM. Sensor range shall be 0 - 2000 PPM.

Accuracy shall be plus or minus five percent (5%) or 75 PPM, whichever is greater. Response shall be less than one minute. Input voltage shall be 20 to 30 VAC or DC. Output shall be 0 - 10 VDC. Sensor shall be wall or duct mounted type, as appropriate for the application, housed in a high impact plastic enclosure.

- J. Current Sensitive Switches: Solid state, split core current switch that operates when the current level (sensed by the internal current transformer) exceeds the adjustable trip point. Current switch to include an integral LED for indication of trip condition and a current level below trip set point.
- K. Differential Analog (duct) Static Pressure Transmitters Provide a pressure transmitter with integral capacitance type sensing and solid-state circuitry. Accuracy shall be plus or minus 1% of full range; range shall be selected for the specific application. Provide zero and span adjustment capability. Device shall have integral static pickup tube.
- L. Differential Air Pressure Switches: Provide SPDT type, UL-approved, and selected for the appropriate operating range where applied. Switches shall have adjustable setpoints and barbed pressure tips.
- M. Water Flow Switches: Provide a SPST type contact switch with bronze paddle blade, sized for the actual pipe size at the location. If installed outdoors, provide a NEMA-4 enclosure. Flow switch shall be UL listed.
- N. Temperature Control Panels: Furnish temperature control panels of code gauge steel with locking doors for mounting all devices as shown. A complete set of 'as-built' control drawings (relating to the controls within that panel) shall be furnished within each control panel.
- O. Pipe and Duct Temperature sensing elements: Thermistor temperature sensors with and accuracy of  $\pm 1\%$  accuracy. Their range shall be -5- to 250 deg. F. Limited range sensors shall be acceptable provided they are capable of sensing the range expected for the point at the specified accuracy. Thermal wells with heat conductive gel shall be included.
- P. Relays: Start/stop relay model shall provide either momentary or maintained switching action as appropriate for the motor being started. All relays shall be plugged in, interchangeable, mounted on a subbase. Relays installed in panels shall all be DPDT with indicating lamp. Relays installed outside of controlled devices shall be enclosed in a NEMA enclosure suitable for the location. Relays shall be labeled with UR symbol. RIB-style relays are acceptable for remote enable/disable.
- Q. Transducers: Differential pressure transducers shall be electronic with a 0-10V output signal compatible to the Direct Digital Controller. Wetted parts shall be stainless steel. Unit shall be designed to operate in the pressure ranges involved.
- R. Control Power Transformers: Provide step-down transformers for all DDC controllers and devices as required. Transformers shall be sized for the load, but shall be sized for 50 watts, minimum. Transformers shall be UL listed Class 2 type, for 120VAC/24VAC operation.
- S. Line voltage protection: All DDC system control panels that are powered by 120 VAC circuits shall be provided with surge protection. This protection is in addition to any internal protection provided by the manufacturer. The protection shall meet UL, ULC 1449, IEEE C62.41B. A grounding conductor, (minimum 12 AWG), shall be brought to each control panel.

### **PART 3 BAS SERVER & WEB BROWSER GUI**

#### **3.1 SYSTEM OVERVIEW**

- A. The BAS Contractor shall provide system software based on server/thin-client architecture, designed around the open standards of web technology. The BAS server shall communicate using Ethernet and TCP\IP. Server shall be accessed using a web browser over Owner intranet and remotely over the Internet.
- B. The intent of the thin-client architecture is to provide the operator(s) complete access to the BAS system via a web browser. The thin-client web browser Graphical User Interface (GUI)



shall be browser and operating system agnostic, meaning it will support Microsoft and Netscape Navigator browsers (6.0 or later versions), and Windows as well as non-Windows operating systems. No special software, other than free public domain programs such as "JAVA VIRTUAL MACHINE" shall be required to be installed on PC's used to access the BAS via a web browser.

- C. The BAS server software must support at least the following server platforms (Windows). The BAS server software shall be developed and tested by the manufacturer of the system stand-alone controllers and network controllers/routers.
- D. The web browser GUI shall provide a completely interactive user interface and must offer and be configured with the following features as a minimum:
  - 1. Trending
  - 2. Scheduling
  - 3. Electrical demand limiting
  - 4. Real time 'live' Graphic Programs
  - 5. Parameter change of properties
  - 6. Setpoint Adjustments
  - 7. Alarm / Event information
  - 8. Configuration of operators
  - 9. Execution of global commands
  - 10. Add, delete, and modify graphics and displayed data
- E. Software Components: All software shall be the most current version. All software components of the BAS system software shall be provided and installed as part of this project. BAS software components shall include:
  - 1. Server Software, Database and Web Browser Graphical User Interface
  - 2. System Configuration Utilities for future modifications to the system, and controllers.
  - 3. Graphical Programming Tools
  - 4. Direct Digital Control software
  - 5. Application Software
  - 6. Any required third party software
  - 7. If licensing credits are required provide a minimum of 10% additional to as built control system requires.
- F. BAS Server Database: The BAS server software shall utilize a Java DataBase Connectivity (JDBC) compatible database such as: MS SQL 8.0, Oracle 8i or IBM DB2. BAS systems written to Non -Standard and/or Proprietary databases are NOT acceptable.
- G. Database Open Connectivity: The BAS server database shall allow real time access of data via the following standard mechanisms:
  - 1. Open protocol standard like SOAP
  - 2. OLE/OPC (for Microsoft Client's/Server platform only)
  - 3. Import/Export of the database from or to XML (eXtensible Mark-up Language)
- H. Communication Protocol(s): The native protocol for the BAS server software shall be TCP/IP over Ethernet. Proprietary protocols over TCP/IP are NOT acceptable.
- I. Thin Client – Web Browser Based: The GUI shall be thin client or browser based and shall meet the following criteria:
  - 1. Web Browser's for PC's: Only a 5.5 or later browser (Explorer/Navigator) will be required as the GUI, and a valid connection to the server network. No installation of any custom software shall be required on the operator's GUI workstation/client. Connection shall be over an intranet or the Internet.

### 3.2 WEB BROWSER GRAPHICAL USER INTERFACE

- A. Web Browser Navigation: The Thin Client web browser GUI shall provide a comprehensive user interface. Using a collection of web pages, it shall be constructed to "feel" like a single

application, and provide a complete and intuitive mouse/menu driven operator interface. It shall be possible to navigate through the system using a web browser to accomplish requirements of this specification. The Web Browser GUI shall (as a minimum) provide for navigation, and for display of animated graphics, schedules, alarms/events, live graphic programs, active graphic setpoint controls, configuration menus for operator access, reports, and reporting actions for events.

- B. Login: On launching the web browser and selecting the appropriate domain name or IP address, the operator shall be presented with a login page that will require a login name and password. Navigation in the system shall be dependent on the operator's role privileges, and geographic area of responsibility.
- C. Action Pane: The Action Pane shall provide several functional views for each HVAC or mechanical/electrical subsystem specified. A functional view shall be accessed by clicking on the corresponding button:
  - 1. Graphics: Using graphical format suitable for display in a web browser, graphics shall include aerial building/campus views, 3D thermodynamic color building floor-plans, equipment drawings, active graphic setpoint controls, web content, and other valid HTML elements. The data on each graphic page shall automatically refresh.
  - 2. Properties: Shall include graphic controls and text for the following: Locking or overriding objects, demand strategies, and any other valid data required for setup. Changes made to the properties pages shall require the operator to depress an 'accept/cancel' button.
  - 3. Schedules: Shall be used to create, modify/edit and view schedules.
  - 4. Alarms: Shall be used to view alarm information geographically), acknowledge alarms, sort alarms by category, actions and verify reporting actions.
  - 5. Trends: Shall be used to display associated trend and historical data, modify colors, date range, axis and scaling
  - 6. Logic - Live Graphic Programs: Shall be used to display 'live' graphic programs of the control algorithm, (micro block programming) for the mechanical/electrical system selected in the navigation tree.
- D. Color Graphics: The Web Browser GUI shall make extensive use of color in the graphic pane to communicate information related to setpoints and comfort. Animated .gifs or .jpg, vector scalable, active setpoint graphic controls shall be used to enhance usability. Graphics tools used to create Web Browser graphics shall be non-proprietary and conform to the following basic criteria:
  - 1. Display Size: The GUI workstation software shall graphically display in 1024 by 768 pixels 24 bit True Color.
  - 2. General Graphic: General area maps shall show locations of controlled buildings in relation to local landmarks.
  - 3. Color Floor Plans: Floor plan graphics shall show heating and cooling zones throughout the buildings in a range of colors, as selected by Owner. Provide a visual display of temperature. The colors shall be updated dynamically as a zone's actual comfort condition changes.
  - 4. Mechanical Components: Mechanical system graphics shall show the type of mechanical system components serving any zone through the use of a pictorial representation of components. Selected I/O points being controlled or monitored for each piece of equipment shall be displayed with the appropriate engineering units. Animation shall be used for rotation or moving mechanical components to enhance usability.
  - 5. Minimum System Color Graphics: Color graphics shall be selected and displayed via a web browser for the following:
    - a. Each piece of equipment monitored or controlled including each terminal unit
    - b. Each building
    - c. Each floor and zone controlled

- E. Alarms: Alarms associated with a specific system, area, or equipment, shall be displayed in the Action Pane by selecting an 'Alarms' view. Alarms, and reporting actions shall have the following capabilities:
1. Alarms View: Each Alarm shall display a date/time of occurrence, current status and alarm report. An operator shall easily be able to sort events, edit event templates and categories, acknowledge or force a return to normal in the Events View as specified in this section.
  2. Alarm Summary Counter: The view of Alarm in the Graphic Pane shall provide a numeric counter, indicating how many Alarms are active (in alarm), require acknowledgement, and total number of Alarms in the BAS Server database.
  3. Alarm Reporting Actions: Alarm Reporting Actions specified shall be automatically launched (under certain conditions) after an Alarm is received by the BAS server software. Operators shall be able to easily define these Reporting Actions using the Graphic Pane through the web browser GUI. Reporting Actions shall be as follows:
    - a. Print: Alarm information shall be printed to the BAS server's PC or a networked printer.
    - b. Email: Email shall be sent via any POP3-compatible e-mail server (most Internet Service Providers use POP3). Email messages may be copied to several email accounts. Note: Email reporting action shall also be used to support alphanumeric paging services, where email servers support pagers.
- F. Trends: Trends shall both be displayed and user configurable through the Web Browser GUI. Trends shall comprise analog, digital or calculated points simultaneously. A trend log's properties shall be editable using the Navigation Tree and Graphic Pane.
1. Viewing Trends: The operator shall have the ability to view trends by using the Navigation Tree and selecting a Trends button in the Graphic Pane. The system shall allow y- and x-axis maximum ranges to be specified and shall be able to simultaneously graphically display multiple trends per graph.
  2. Local Trends: Trend data shall be collected locally by Multi-Equipment/Single Equipment general-purpose controllers, and periodically uploaded to the BAS server if historical trending is enabled for the object. Trend data, including run time hours and start time date shall be retained in non-volatile module memory. Systems that rely on a gateway/router to run trends are NOT acceptable.
  3. Resolution. Sample intervals shall be as small as one second. Each trended point will have the ability to be trended at a different trend interval. When multiple points are selected for displays that have different trend intervals, the system will automatically scale the axis.
  4. Dynamic Update. Trends shall be able to dynamically update at operator-defined intervals.
  5. Zoom/Pan. It shall be possible to zoom-in on a particular section of a trend for more detailed examination and 'pan through' historical data by simply scrolling the mouse.
  6. Numeric Value Display. It shall be possible to pick any sample on a trend and have the numerical value displayed.
  7. Copy/Paste. The operator must have the ability to pan through a historical trend and copy the data viewed to the clipboard using standard keystrokes (i.e. CTRL+C, CTRL+V).
- G. Security Access: Systems that Security access from the web browser GUI to BAS server shall require a Login Name and Password. Access to different areas of the BAS system shall be defined in terms of Roles and Privileges of responsibility as specified:
1. Roles: Roles shall reflect the actual roles of different types of operators. Each role shall comprise a set of 'easily understood English language' privileges. Roles shall be defined in terms of View, Edit and Function Privileges.
    - a. View Privileges shall comprise: Navigation, Network, and Configuration Trees, Operators, Roles and Privileges, Alarm/Event Template and Reporting Action.
    - b. Edit Privileges shall comprise: Setpoint, Tuning and Logic, Manual Override, and Point Assignment Parameters.

- c. Function Privileges shall comprise: Alarm/Event Acknowledgement, Control Module Memory Download, Upload, Schedules, Schedule Groups, Manual Commands, Print, and Alarm/Event Maintenance.

### 3.3 GRAPHICAL PROGRAMMING

- A. The system software shall include a Graphic Programming Language (GPL) for all DDC control algorithms resident in all control modules. Any system that does not use a drag and drop method of graphical icon programming shall not be accepted. All systems shall use a GPL is a method used to create a sequence of operations by assembling graphic microblocks that represent each of the commands or functions necessary to complete a control sequence. Microblocks represent common logical control devices used in conventional control systems, such as relays, switches, high signal selectors, etc., in addition to the more complex DDC and energy management strategies such as PID loops and optimum start. Each microblock shall be interactive and contain the programming necessary to execute the function of the device it represents.
- B. Graphic programming shall be performed while on screen and using a mouse; each microblock shall be selected from a microblock library and assembled with other microblocks necessary to complete the specified sequence. Microblocks are then interconnected on screen using graphic "wires," each forming a logical connection. Once assembled, each logical grouping of microblocks and their interconnecting wires then forms a graphic function block which may be used to control any piece of equipment with a similar point configuration and sequence of operation.
- C. Graphic Sequence: The clarity of the graphic sequence must be such that the operator has the ability to verify that system programming meets the specifications, without having to learn or interpret a manufacturer's unique programming language. The graphic programming must be self-documenting and provide the operator with an understandable and exact representation of each sequence of operation.
- D. GPL Capabilities: The following is a minimum definition of the capabilities of the Graphic Programming software:
  - 1. Function Block (FB): Shall be a collection of points, microblocks and wires which have been connected together for the specific purpose of controlling a piece of HVAC equipment or a single mechanical system.
  - 2. Logical I/O: Input/Output points shall interface with the control modules in order to read various signals and/or values or to transmit signal or values to controlled devices.
  - 3. Microblocks: Shall be software devices that are represented graphically and may be connected together to perform a specified sequence. A library of microblocks shall be submitted with the control contractors bid.
  - 4. Wires: Shall be Graphical elements used to form logical connections between microblocks and between logical I/O.
  - 5. Reference Labels: Labels shall be similar to wires in that they are used to form logical connections between two points. Labels shall form a connection by reference instead of a visual connection, i.e. two points labeled 'A' on a drawing are logically connected even though there is no wire between them.
  - 6. Parameter: A parameter shall be a value that may be tied to the input of a microblock.
  - 7. Properties: Dialog boxes shall appear after a microblock has been inserted which has editable parameters associated with it. Default parameter dialog boxes shall contain various editable and non-editable fields, and shall contain 'push buttons' for the purpose of selecting default parameter settings.
  - 8. Icon: An icon shall be graphic representation of a software program. Each graphic microblock has an icon associated with it that graphically describes its function.
  - 9. Menu-bar Icon: Shall be an icon that is displayed on the menu bar on the GPL screen, which represents its associated graphic microblock.

10. Live Graphical Programs: The Graphic Programming software must support a 'live' mode, where all input/output data, calculated data, and setpoints shall be displayed in a 'live' real-time mode.

### 3.4 LONWORKS NETWORK MANAGEMENT

- A. Systems requiring the use of third party LonWorks network management tools shall not be accepted.
- B. Network management shall include the following services: device identification, device installation, device configuration, device diagnostics, device maintenance and network variable binding.
- C. The Network configuration tool shall also provide diagnostics to identify devices on the network, to reset devices, and to view health and status counters within devices.
- D. These tools shall provide the ability to "learn" an existing LonWorks network, regardless of what network management tool(s) were used to install the existing network, so that existing LonWorks devices and newly added devices are part of a single network management database.
- E. The network management database shall be resident in the Network Area Controller (NAC), ensuring that anyone with proper authorization has access to the network management database at all times. Systems employing network management databases that are not resident, at all times, within the control system shall not be accepted.

## PART 4 INSTALLATION

### 4.1 GENERAL

- A. Install system and materials in accordance with manufacturer's instructions, and as detailed on the project drawing set.
- B. Line and low voltage electrical connections to control equipment shown specified or shown on the control diagrams shall be furnished and installed by the Control System Contractor in accordance with these specifications.
- C. Equipment furnished by the Mechanical Contractor that is normally wired before installation shall be furnished completely wired. Control wiring normally performed in the field will be furnished and installed by the Control System Contractor.
- D. All control devices mounted on the face of control panels shall be clearly identified as to function and system served with permanently engraved phenolic labels.

### 4.2 WIRING

- A. All electrical control wiring = to the control panels shall be the responsibility of the Control System Contractor.
- B. All wiring shall be in accordance with the Project Electrical Specifications (Division 16), the National Electrical Code and any applicable local codes.

## PART 5 PROJECT CLOSEOUT

### 5.1 ACCEPTANCE TESTING

- A. Upon completion of the installation, the Control System Contractor shall load all system software and start-up the system. The Control System Contractor shall perform all necessary calibration, testing and de-bugging and perform all required operational checks to insure that the system is functioning in full accordance with these specifications.

- B. The Control System Contractor shall perform tests to verify proper performance of components, routines, and points. Repeat tests until proper performance results. This testing shall include a point-by-point log to validate 100% of the input and output points of the DDC system operation.
- C. System Acceptance: Satisfactory completion is when the Control System Contractor has performed successfully all the required testing to show performance compliance with the requirements of the Contract Documents to the satisfaction of the Owner's Representative. System acceptance shall be contingent upon completion and review of all corrected deficiencies.

## 5.2 OPERATOR TRAINING

- A. During system commissioning and at such time acceptable performance of the Control System hardware and software has been established, the Control System Contractor shall provide on-site operator instruction to the owner's operating personnel. Operator instruction shall be done during normal working hours and shall be performed by a competent representative familiar with the system hardware, software and accessories.
- B. The Control System Contractor shall provide 8 hours of comprehensive training in two separate sessions (16 hours total) for system orientation, product maintenance and troubleshooting, programming and engineering, if not provided under a previous contract at the site using the same brand and type of controllers within the previous 3 years.
- C. The Control System Contractor shall provide 16 hours (total) of instruction to the owner's designated personnel on the operation of the BMS and describe its intended use with respect to the programmed functions specified. Operator orientation of the BMS shall include, but not be limited to; the overall operation program, equipment functions (both individually and as part of the total integrated system), commands, systems generation, advisories, and appropriate operator intervention required in responding to the System's operation

## 5.3 WARRANTY PERIOD SERVICES

- A. Equipment, materials and workmanship incorporated into the work shall be warranted for a period of one year from the time of system acceptance.
- B. Within this period, upon notice by the Owner, any defects in the BMS due to faulty materials, methods of installation or workmanship shall be promptly repaired or replaced by the Control System Contractor at no expense to the Owner
- C. Maintenance of Computer Software Programs: The Control System Contractor shall maintain all software during the warranty period.
- D. Service Documentation: A copy of the service report associated with each owner-initiated service call shall be provided to the owner.

## 5.4 WARRANTY ACCESS

- A. The Owner shall grant to the Control System Contractor reasonable access to the BMS during the warranty period. Remote access to the BMS (for the purpose of diagnostics and troubleshooting, via the Internet, during the warranty period) will be allowed.

## 5.5 OPERATION & MAINTENANCE MANUALS

- A. See Division 1 for requirements. O&M manuals shall include the following elements, as a minimum:
  1. As-built control drawings for all equipment.
  2. As-built Network Communications Diagram.
  3. General description and specifications for all components.

4. Completed Performance Verification sheets.
5. Completed Controller Checkout/Calibration Sheets.

END OF SECTION  
05/22/2024

**ELECTRICAL SCOPE & GENERAL REQUIREMENTS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. All work under Section 26 01 00, Electrical Scope and General Requirements Specifications, are subject to the General, Supplementary, Special Conditions and other Division I Specification Sections preceding this section. This Contractor will be responsible for and govern by all requirements. Drawings indicate the general arrangement of the electrical layout and work included. The Contractor will follow Drawings in laying-out and checking of Drawings of other trades to verify locations and spaces in which work will be installed.

**1.02 SCOPE**

- A. This portion of the work includes furnishing of all labor and materials necessary for a complete wiring system to outlets and all equipment shown on the Drawings or covered by this section of the Specifications. In general, the work includes the following:
  - 1. Complete system of branch circuit wiring and equipment including all wiring devices and plates on all outlets.
  - 2. A new lighting fixture system complete with lamps as shown on Plans including all appurtenances as required.
  - 3. Raceways, wiring, fused disconnect switches, etc., for equipment covered by other sections of these Specifications.
  - 4. All hangers, anchors, sleeves, chases and supports for fixtures, electrical equipment and materials including earthquake bracing.
  - 5. All disconnection and removal of existing electrical facilities not to be reused.
  - 6. Include payment of all required insurances, electrical permits, fees and taxes unless specifically shown "BY OTHERS".

**1.03 SITE VISITATIONS**

- A. The Contractor will carefully examine the site and existing buildings, compare the Drawings with the existing electrical installations and thoroughly familiarize himself with all existing conditions within the scope of this work. By the act of submitting a



bid, the Contractor will be deemed to have made such examination, accepted such conditions and to have made allowance in preparing his figure.

**1.04 RULES AND REGULATIONS**

- A. All work and materials shall be in full accordance with the latest rules and regulations of the following:
  - 1. California Electric Code, 2022 Edition
  - 2. California Building, Mechanical and Plumbing Codes
  - 3. California Code of Regulations
  - 4. California State Fire Marshal Rules
- B. Before the Final Certificate of Payment will be issued, the Contractor shall deliver to the Owner all Certificates, Permits, Record Drawings and Instructions/Parts Manuals.
- C. Nothing in these Plans and Specifications is to be construed to permit work not conforming to these codes.

**1.05 MATERIALS AND SUBSTITUTIONS**

- A. All equipment and materials shall be new and UL (Underwriters Laboratories) approved and of the best quality. When specific trade names are used in connection with materials they are mentioned as standards but, this implies no right upon the part of the Contractor to substitute other materials or methods without prior approval.
- B. When approval is given for use of equipment differing from that shown on the Drawings regarding foundations, space of piping, duct work, wiring, insulation, etc., changes required to accommodate such differences shall be accomplished at no cost to the Owner.
- C. This Contractor shall order equipment in a timely manner to prevent any delays in the construction schedule and he shall bear any penalty by vendors to meet schedules.
- D. Submittals:
  - 1. Shop Drawings and Product Data: Within ten days after an award of this contract, but prior to manufacture or installation of any equipment, prepare complete Shop Drawings and Brochures for materials/equipment as required by each section of the Specification. Submit eight complete sets for review.
  - 2. Prior to submission of the Shop Drawings and Project Data review and certify that they meet the Contract Documents and conform to existing field conditions. Field verify installation methods, voltage requirements and coordinate with other trades.

3. Verify all dimensional information to ensure proper clearance installation of equipment. Check all materials and equipment after arrival on the jobsite and verify compliance with the Contract Documents. A minimum period of two weeks, exclusive of transmittal time, will be required each time Shop Drawings and/or Brochures are submitted or resubmitted for review. This time shall be considered by the Contractor when scheduling a submittal date.
4. Review of Shop Drawings and Brochures shall not relieve the Contractor of responsibility for dimensions and/or errors that may be contained therein or deviations from the Contract Documents requirements. It shall be clearly understood that noting of some errors, but overlooking others, does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings and Brochures the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the review of the Shop Drawings and Brochures.
5. Certifications shall be written or in the form of rubber stamp impressions as follows:

I hereby certify that these Shop Drawings and/or Brochures have been checked prior to submittal, and that it complies in all respects with the requirements of the Contract Drawings, Specifications, and existing field conditions for this project.

(Name of Contractor)

Signed \_\_\_\_\_  
Title \_\_\_\_\_ Date \_\_\_\_\_

6. Observe the following rules when submitting the Shop Drawings or Brochures:
  - a) Each Shop Drawing shall indicate in the lower right-hand corner and each brochure shall indicate on the front cover the following:
    - 1) Title of the sheet or brochure
    - 2) Name and location of the building
    - 3) Names of the Architect
    - 4) Name of the Electrical Engineer
    - 5) Name of Contractor
    - 6) Subcontractor's Manufacturer, Supplier and Vendor
    - 7) Date of submittal
    - 8) Date of correction and revision.
7. Unless the above information is included, the submittal will be returned for resubmittal.
8. Shop Drawings shall be done in legible scale and shall contain sufficient plans, elevations, sections and isometrics clearly describing the equipment or

apparatus and the Engineer/ Draftsmen skilled in this type of work. Shop Drawings shall be drawn to at least 1/4" = 1'-0" scale.

9. The manufacturers shall publish brochures to be submitted which contain complete and detailed engineering and dimensional information. Brochures submitted shall contain only information relevant to the particular equipment or materials to be furnished. The Contractor shall not submit catalogs that describe several different items in addition to those items to be used unless all irrelevant information is marked out or unless each manufacturer is identified and submitted separately.

#### 1.06 GENERAL COORDINATION

- A. The Drawings indicate diagrammatically the desired location or arrangement of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. It shall be the Contractor's responsibility to verify and coordinate the location of all outlets and raceways with other trades.

#### 1.07 CUTTING, PATCHING AND MATCHING

- A. This Contractor shall do all cutting required for the proper installation of his work and shall repair any damage done by himself or his workmen. The Contractor shall coordinate with that of other parties.
- B. Wherever possible, work shall be done in a concealed and neat workmanlike manner requiring the least amount of cutting of studs, plates and woodwork. Such cutting or notching is allowed only after consultation with and by permission of the Engineer.
- C. All patching shall be of the same materials, workmanship and finish as existing and shall accurately match all surrounding work. All work shall be done under the Architect's instructions and when required by the trade that did the original work.

#### 1.08 INTERPRETATION OF Drawings AND Specification

- A. The Engineer's decision will be final on interpretation of the Drawings and Specifications. Whenever the words "AS MAY BE DIRECTED", "SUITABLE" or "APPROVED EQUAL" or other words of similar intent and meaning are used inferring that judgment is to be exercised, it is understood that it is the judgment of the Engineer referred to.

#### 1.09 CLEANING OF EQUIPMENT, MATERIALS AND PREMISES

- A. All electrical equipment shall be thoroughly cleaned of dirt, rust, cement, plaster, etc., and all cracks and corners scraped out clean. Surfaces to be painted shall be carefully cleaned of grease and oil spots and left smooth and clean and in proper condition to receive paint finish.

## 1.10 RECORD Drawings

- A. At the beginning of the project, one full-sized print of each applicable Drawing will be issued to the Contractor for use in preparing Record Drawings. "RECORD" conditions shall be recorded on the prints as the project progresses. Upon completion of the work, the Contractor shall forward it to the Architects' Office after first securing the Inspector's verification by signature.

## 1.11 EARTHQUAKE RESTRAINT

- A. All electrical equipment shall have a means to prohibit excessive motion during an earthquake. Equipment that vibrates during normal operation shall have isolators with mechanical stops. All transformers are considered to vibrate during operation.
- B. All electrical equipment and connections shall be designed to resist lateral seismic forces equal to value shown on Drawings of equipment weight with allowable working code capacity increased by 1/3 or 1.5 times the same value for the weight yield capacity. Connections shall be the same except the 1/3 increase will not be allowed.

## 1.12 IDENTIFICATION

- A. Conductors:
  - 1. All power and signal conductors shall be identified in accordance with the following schedule:
    - a) 120/208 Volts, 3-phase, 4-wire Wye: Red-Black-Blue, Neutral White.
    - b) 277/480 Volts, 3-phase, 4-wire Wye: Brown-Orange-yellow, Neutral Grey.
    - c) Bond or grounding conductor (GWG): Green
    - d) Special system conductors shall be color coded and labeled
  - 2. Brady Labels shall be used to identify terminals and destination of feeders, branch circuits, signal and control circuits, etc., at all terminations and junction boxes and shall be coordinated with the nameplates in all boxes and equipment.

3. All terminals in the switchboards, panels, relays, switches, devices, starter terminals, etc., shall have Brady Labels for identification to identify both ends of all wiring. Wires #8 and smaller to be terminated on terminal strips squared-type 9080K with white marking strip and screw lugs for wire size.
- B. Nameplates: The Contractor shall furnish and install 1" x 3" x 3/32" thick laminated black Bakelite nameplates with a white core, unless specifically shown as red with a white core, engraved to produce white letters on black background for all items of electrical equipment including 2-pole and 3-pole circuit breakers, panelboards, starters, relays, time switches and disconnect switches. They shall screw them in place.
  - C. Panels: Panels having single-pole circuit breakers shall be provided with typed schedules mounted in welded metal holders behind plastic.
  - D. Devices: All devices shall have their branch circuit identified on the back side of device plate with a permanent type black marker, i.e., CT A-21.

### 1.13 MECHANICAL AND OTHER SPECIAL EQUIPMENT

- A. Mechanical Coordination: PRIOR to commencing construction, this Contractor shall arrange a conference with the Mechanical/Plumbing Contractors and equipment suppliers to verify type, sizes, locations, requirements, controls and diagrams of all equipment furnished by them. In writing, he shall inform the Electrical Engineer that all phases of coordination of this equipment have been covered. If any unusual conditions or problems, they are to be enumerated them at this time.
- B. Mechanical Wiring: All electrical line voltage wiring, fused disconnects and conduits shall be furnished and installed by this Contractor unless otherwise shown.
- C. Miscellaneous Equipment: Contractor shall be responsible for electrical hook-up and connection to all electrical equipment whether furnished by this Contractor or others. This includes all special mechanical equipment and equipment furnished by the Mechanical Contractor.

### 1.14 GUARANTEE

- A. This Contractor agrees to replace or repair to the satisfaction of the Owner, any part of the installation that may fail due to defective material and/or workmanship, or failure to follow Plans and Specifications for one year after final acceptance. He shall further obtain from the manufacturers of special equipment (i.e., control systems) their respective guarantees and service manuals and deliver to Owner.

## PART 2 PRODUCTS

### 2.01 RACEWAYS

- A. Unless specifically shown otherwise, this Contractor shall furnish and install a complete steel conduit system for all wiring, including control and signal wiring.
- B. All conduits shall be rigid threaded hot dipped galvanized type.
- C. All conduits installed underground shall have a minimum coverage of 1'-6" below finished grade and shall have a 4" concrete envelope.
- D. Steel conduit Joints shall be sealed with conductive pipe compound T & B Kopr-Shield before making up.
- E. Steel conduits installed below grade shall be wrapped with Minnesota Mining Company Scotch Wrap #51 using half-lap for double thickness. Conduit surfaces shall be clean and dry before wrapping.
- F. Minimum size for lighting, power and signal shall be a 3/4" conduit.
- G. Steel EMT sizes 4" and smaller may be used within hollow dry spaces of the building, and shall not be run exposed below 8' above a finished floor.
- H. All raceway fittings, locknuts, couplings, elbows, etc., shall be hot dipped galvanized steel finish with plastic throats or bushings. No cast-type fittings shall be used.
- I. Seal-type flexible conduit shall be used in lengths not greater than 18" at motors and other machinery to prevent the transmission of vibration. All flexible conduits shall have a copper bond wire either integral or pulled in. Flexible conduit shall be supported at both ends and every 24".
- J. All conduit fittings, locknuts, couplings, elbows, etc., shall be hot dipped galvanized finish with plastic bushings. No competitive type fittings shall be used.
- K. Non-Metallic Conduit.
  - 1. Rigid non-metallic PVC, UL Labeled conduit with factory ells and fittings approved for the purpose may be used under the following conditions:
    - a) Where the voltage is 600 Volts or less.
    - b) All conduits in earth under buildings or protected by permanent paving may be Schedule 40 PVC.
    - c) Any conduit running through planters or unprotected in earth shall be encased in 3" of concrete. All raceways above grade shall be steel.
    - d) All non-metallic runs shall have a bond wire for the interconnection of all conducting portions per Table 250-94 of the California Electric Code (CEC).
    - e) Use factory elbows. PVC shall not be bent in the field.

## 2.02 CONDUCTORS

- A. All conductors shall be delivered to the site in their original unbroken packages plainly marked or tagged as follows: UL Labels, size, kind and insulation of wire, name of the manufacturing company and trade name of the wire.
- B. All conductors to be a minimum of 98% conductivity soft drawn copper, minimum #12 AWG unless shown otherwise. Conductors #8 and larger shall be stranded type "THHN/THWN" 600 Volt insulation. Conductors #10 and smaller shall be solid copper "THHN/THWN".
- C. All branch circuits, fixture wiring joints, splices and taps for conductors #10 and smaller to be made with "SCOTCHLOCK" connectors.
- D. Two bolt type solderless connectors or T & B "color keyed" compression lugs shall be used on #8 and larger conductors.

### 2.03 WIRING DEVICES

- A. Furnish and install wiring devices and plates as shown on the Drawings and described in these Specifications. Where more than one wiring device is mounted in the same location, such devices shall be mounted in a multi-gang plate. Single-gang combination interchangeable devices shall not be used. Wiring devices shall be Specification grade or better.
- B. Convenience outlets shall consist of a Specification grade duplex receptacle mounted in an outlet box in the wall flush with the finished plaster or surface rated 20 AMPS, 125 Volts, 3-wire, back and side wired.
- C. Local switches shall be quiet toggle-type, totally enclosed, AC rated ,20 AMPS, 120/277 Volt.
- D. Device plates shall be provided for all devices with the number of gangs and openings necessary. They shall be satin brushed stainless steel in toilets and kitchens with plastic to match devices in other finished areas.

### 2.04 OUTLET BOXES

- A. Outlet boxes for concealed work shall be one piece pressed steel knock out type with zinc or cadmium coating. Boxes shall not be smaller than 4" square nominal size unless otherwise indicated. Provide extension rings, plaster rings and covers necessary for flush finish.
- B. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs. Use expansion shields to concrete and masonry.

- C. Provide approved knock-out seals on all unused open knock-out holes. Where used for lighting fixtures outlet boxes shall be equipped with fixture studs.

## 2.05 DISCONNECTING DEVICES

- A. Disconnecting devices shall be provided as shown or as required by NEC. Switches shall be motor rated and in proper NEMA enclosure.
  1. Motors 1/3 HP and less: Switches shall be of the toggle-type quick make and break rated 2 HP, 250 Volts AC with the number of poles required provided with flush mounting wall plates or in suitable surface mounting NEMA enclosures.
  2. Motors 1/2 HP and larger: Disconnecting switches shall be Type HD fused 3-pole, 600 Volts in proper NEMA enclosures with proper size FRN fuses. Provide three spare fuses of each type to the Owner.
- B. Circuit breakers utilized as disconnecting devices shall comply with the requirements stated in other articles of this section and NEC.

## 2.06 PULL BOXES AND WIREWAYS

- A. Pull and junction boxes shall be installed as shown to ease the pulling of wire and to comply with NEC requirements.
- B. Wireways to be constructed in accordance with UL 870 for wireways, auxiliary gutters and associated fittings. Every component including lengths, connectors and fittings shall be UL listed.

## 2.07 TERMINAL CABINETS AND CLOSETS

- A. Cabinets and fronts shall be in accordance with NEMA Standard Publication No. PB1-1971 and UL Standards No. 67. Fronts shall include doors and have flush brushed stainless steel cylinder tumbler-type locks with catches and spring loaded door pulls. The flush lock shall not protrude beyond the front of the door. All locks shall be keyed like the panelboard locks. Fronts shall have adjustable indicating trim clamps completely concealed when the doors are closed. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with the door in the locked position. A frame and card with a clear plastic covering shall be provided on the inside of the door. Fronts shall be of code gauge full finished steel with rust inhibiting primer and bake enamel finish.

## 2.08 PANELBOARDS

- A. Furnish panelboards shown on Plans and described herein. All cans shall be a minimum of 20" wide and 5.75" deep unless otherwise shown. They shall be totally flat or equal with flush keyed locks.



- B. Panelboards shall be UL listed.
- C. Breakers for switching lights shall be rated for switching duty.
- D. Fronts shall be sheet steel painted standard gray over a rust inhibitor. They shall be equipped with a door, flush hinges, flush proper cylinder tumbler lock; metal circuit card holder and quarter turn adjustable trim clamps.
- E. The panel shall consist of reinforced galvanized sheet steel frame with copper bus bars and circuit breakers properly supported to prevent vibration breakage in handling. All terminals shall be solderless type suitable for specified conductors of size indication. Bus bars shall be sequence phased.
- F. Branch circuit breakers shall be "bolt-on" and fully interchangeable without disturbing adjacent units. All 2 and 3-pole breakers shall have common trips with a minimum IC of 10,000 AIC.
- G. All breakers applying fluorescent or HID fixtures shall have padlock handle lock-off devices.
- H. All spaces shall have hardware.
- I. Provide separate blocks for neutrals and grounds as required.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. The layout and installation of electrical work shall be coordinated with the overall construction schedule to prevent delay in completion of the project.
- B. Dimensions and information regarding accurate locations of equipment and structural limitations and finish shall be verified with other sections.
- C. The Drawings do not show all the offsets, bends, special fittings or junction pull boxes necessary to meet job conditions and shall be provided as required.
- D. Electrical equipment, outlets, junction and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving headroom and keeping openings and passageways clear.
- E. Minor adjustments in the locations of equipment shall be made where necessary providing such adjustments do not adversely affect function of the equipment. Major adjustments for the location of equipment shall be previously approved and detailed on the Record Drawings.

## 3.02 STRUCTURAL FITTINGS

- A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts and related structural items. Install at the proper time.

## 3.03 NOISE CONTROL

- A. Outlet boxes at opposite sides of partitions shall not be placed back-to-back, nor shall through boxes be employed except where specifically permitted on the Drawings by note to minimize transmission of noise between occupied spaces.
- B. Ballasts, contactors, starters and like equipment that are noticeably noisier than other similar equipment on the project will be deemed defective and shall be replaced at Engineer's request.

## 3.04 RACEWAYS AND FITTINGS

- A. Surface raceways shall be coordinated with cabinet work. It shall be installed plumb and square with adjacent surfaces.
- B. Minimum size of any conduit for lighting, power and signal shall be 3/4" conduit unless shown otherwise.
- C. Furnish and install "seal-offs" in all conduit runs through areas of different temperature.
- D. Where applicable, wiring methods shall be in accordance with requirements for installation in damp and/or hazardous areas.
- E. All concealed conduits shall be installed in as direct a line as possible between outlets. EMT shall be approved for dry locations with steel plastic bushed set screw fittings. No more than four quarter bends or their equivalent will be allowed between outlets. Feeder conduits shall follow arrangements shown on plans unless a change is authorized. Branch circuit conduits shall in general follow arrangement as shown as far as structural conditions permit. All exposed runs shall parallel buildings, walls or partitions and be supported on Kindorf Hangers to meet Title 24, Part 6, CAC.
- F. In general, all conduits shall be sloping to drain. Bends that place a trap in a conduit shall be avoided. Provide drip fitting as required. Dux-Seal high ends of all underground raceways.
- G. All conduit runs shall be mechanically and electrically continuous from outlet to outlet. Conduit size or type shall not be changed between outlets.

- H. Chrome escutcheon plates shall be used on all conduit penetrating walls, floors or ceilings.
- I. Expansion joints shall be provided at building expansion joints or as required due to length of run or difference in temperatures.
- J. Flexible steel conduits shall be used for short runs not over 24" from motors or other vibrating equipment to junction boxes. Where specifically approved by the Engineer, flexible steel conduit may be used when conditions make the use of other conduit impracticable. Fittings shall be of the screwed wedge type. All flex shall have green copper bond wire. Flex conduits shall be independently suspended.
- K. All fittings that are exposed or in damp areas shall have sealing glands and proper gaskets. Fittings in hazardous areas shall be of the type approved for the particular hazard.
- L. Roof Penetrations: Where raceways penetrate roofing or similar structural area, provide 26 galvanized iron roof jacks sized to fit tightly to a raceway for a weather-tight seal and with flange extending a minimum of 9" under roofing on all sides. Completely seal openings between inside diameters of roof flashing and outside diameters if penetrating raceways. Coordinate with work required under Roofing Section of the Specifications.
- M. Fire Penetration Seals: Seal all penetrations for work of this section through fire rated floors, walls and ceilings to prevent the spread of smoke, fire, toxic gas or water through the penetration either before, during or after the fire. The fire rating of the penetration seal shall be at least that of the floor, wall or ceiling into which it is installed so that the original fire rating of the floor or wall is maintained as required by Article 300-21 of the California Electrical Code (CEC).
- N. Where applicable, provide OZ Type CFSF/I and CAFSF/I fire seal fittings for conduit and cable penetrations through concrete and masonry walls, floors, slabs and similar structures. Where applicable, provide 3M fire barrier sealing penetration system and/or Thomas & Bett Flame Safe Fire Stop System and/or ChaseFoam fire stop system including wall wrap, partitions, caps and other accessories as required. All manufacturers' instructions and recommendations for installation of sealing fittings and barrier sealing systems.

### 3.05 CONDUCTORS AND CONNECTORS

- A. All branch circuits and fixture wiring joints, splices and taps for conductors #10 and smaller shall be made with 3M "Scotchlocks" or approved equal.
- B. Circuit and signal terminations to single-screw or push-on terminals shall be done with insulated "Sta-Kons" or approved equal terminals.

- C. Bolt-type solderless connectors shall be torqued with a torque wrench according to the manufacturer's recommendations then retightened after 24-48 hours before taping. Owners' inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.
- D. All splices shall be taped with Scotch #88 plastic electrical tape with "Scotch Fill" where necessary for a smooth joint. For other than normal temperatures or conditions Scotch #27 or #2520 shall be used. All connections and splices shall be electrically perfect and in strict accordance with all code requirements.
- E. Wire in panels, cabinets, pull boxes and wiring gutters shall be squared, labeled and neatly grouped with "Ty-Raps" and fanned out to the terminals.
- F. Wiring Devices: Wiring devices shall be securely fastened to the outlet box. Where the outlet box covers are back from the finished walls, device shall be built out with washers so that it is rigidly held in place to the box. Provide metal extenders in flammable construction per CEC. All device screw slots shall be left in a vertical orientation.

### 3.06 OUTLET BOXES

- A. Outlet boxes for concealed work shall be one steel knock-out type with zinc coating. Boxes shall not be smaller than 4" square nominal size unless otherwise indicated. Provide extension rings, plaster rings and covers necessary for flush finish.
- B. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs complemented by expansion shields to concrete and masonry.
- C. Provide approved knock-out seals on all unused open knock out holes. Where used for lighting fixtures, outlet boxes shall be equipped with fixture studs.

### 3.07 JUNCTION AND PULL BOXES AND WIREWAYS

- A. Boxes shall be installed square and plumb. An engraved nameplate shall be installed indicating the function of each box on the exterior in unfinished areas and on the interior in finished areas.
- B. Install wireways with strip-type connectors with self-retained mounting screws. Use hangers with two-piece hook-together features to permit preassembling of wireway and hanger bottom plate before hanging on a preinstalled upper bracket.

### 3.08 TERMINAL CABINETS AND CLOSETS

- A. Install level and identify per schedule.

- B. All conductors shall be squared, labeled and "Ty-Rapped".
- C. Location:
  - 1. Unless otherwise indicated on the Drawings, install all panels with the top of the trip 6'-0" above the finished floor.
  - 2. Space permitting, surface mount panels where they are not visible to the public.
  - 3. Panels to have protective cover over any electrical panel with overhead water piping. Cover to be 18" by width of a panel.
- D. Directory: Mount a typewritten directory behind glass or plastic in a metal holder welded to the inside of each panel door showing circuit numbers and complete description of all outlets (one each circuit).

### 3.09 PRECAST CONCRETE PULL BOXES AND MANHOLES

- A. Contractor shall provide a minimum of 3-6" of sand base material suitable to receive the manhole. The base material shall be impacted and graded level at proper elevation to receive the manhole in relation to the conduit grade or ground cover requirements as designated in the Plans. Sealants used between the joints of the manhole are at the Contractor's discretion unless otherwise specified. If grout is used it should consist of two-parts plaster sand to one-part cement with sufficient water added to make the grout flow under its own weight.
- B. The grout should be poured into a water soaked groove and filled to the top of the groove unless a double amount is to be used as a further precaution against leakage. In this case the mastic sealant should be placed on the two shoulders of the groove. The next section of manhole should be placed while the foaming action is in process. Contractor shall verify grades with the Architect and shall set holes and boxes level at proper grades.
- C. All conduits penetrating the pull box shall have seals to prevent water from entering the raceway.

### 3.10 DISCONNECT DEVICES

- A. Disconnect devices shall be identified as to location of the device controlled.

### 3.11 SUPPORTS AND ANCHORS

- A. Provide inserts, anchors, supports, rods, brackets and miscellaneous items to adequately support and secure the electrical systems and equipment.

- B. Secure hangers, brackets, conduit straps, supports and electrical equipment to surfaces by means of toggle bolts on hollow masonry; expansion shields and machine screws or standard preset inserts on concrete or masonry; machine screws or bolts on metal surfaces; wood screws on wood construction.
- C. Power driven or velocity driven inserts may be not used unless specifically approved by the engineer, and where their use does not affect finished appearance of work. They may not be used in prestressed slabs, beams, purlins, precast members or in tension.
- D. Seismic Requirements: Provide vertical and lateral supporting equipment to resist application of seismic forces per CAC, Title 24.

**END OF SECTION 26 01 00**

**ARC FLASH HAZARD ANALYSIS/SHORT-CIRCUIT/COORDINATION STUDY**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

## 1.01 SCOPE

- A. The contractor shall furnish short-circuit and protective device coordination studies as prepared by an independent electrical testing lab.
- B. The contractor shall furnish an Arc Flash Hazard Analysis Study per the requirements set forth in the current version of NFPA 70E -*Standard for Electrical Safety in the Workplace*. The arc flash hazard analysis shall be performed according to the IEEE Standard 1584 – 2002, the *IEEE Guide for Performing Arc-Flash Calculations*.

## 1.02 RELATED SECTIONS

- A. Drawings and general provisions of the Contract.

## 1.03 REFERENCES

- A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):
  1. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
  2. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
  3. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis
  4. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings
  5. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.
  6. IEEE 1584 -Guide for Performing Arc-Flash Hazard Calculations
- B. American National Standards Institute (ANSI):
  1. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
  2. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
  3. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
  4. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.
- C. The National Fire Protection Association (NFPA)
  1. NFPA 70 -National Electrical Code, latest edition
  2. NFPA 70E – Standard for Electrical Safety in the Workplace

## 1.04 SUBMITTALS FOR REVIEW/APPROVAL

- A. The studies shall be submitted to the design engineer prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study will be provided to verify preliminary findings.

#### 1.05 SUBMITTALS FOR REVIEW/APPROVAL

- A. The studies shall be submitted to the design engineer prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study will be provided to verify preliminary findings.

#### 1.06 SUBMITTALS FOR CONSTRUCTION

- A. The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. A minimum of five (5) bound copies of the complete final report shall be submitted. For large system studies, submittals requiring more than five (5) copies of the report will be provided without the section containing the computer printout of the short-circuit input and output data. Electronic PDF copies of the report shall be provided upon request.
- B. The report shall include the following sections:
  - 1. Executive Summary including Introduction, Scope of Work and Results/Recommendations. Short-Circuit Methodology Analysis Results and Recommendations.
  - 2. Short-Circuit Device Evaluation Table.
  - 3. Protective Device Coordination Methodology Analysis Results and Recommendations.
  - 4. Protective Device Settings Table.
  - 5. Time-Current Coordination Graphs and Recommendations.
  - 6. Arc Flash Hazard Methodology Analysis Results and Recommendations including the details of the incident energy and flash protection boundary calculations, along with Arc Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.



7. Arc Flash Labeling section showing types of labels to be provided. Section will contain descriptive information as well as typical label images.
8. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.

## 1.07 QUALIFICATIONS

- A. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.
- B. The Registered Professional Electrical Engineer shall be an employee of the equipment manufacturer or an approved engineering firm.
- C. The Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.
- D. The approved engineering firm shall demonstrate experience with Arc Flash Hazard Analysis by submitting names of at least ten actual arc flash hazard analyses it has performed in the past year.
- E. The engineering firm shall have a minimum of twenty-five (25) years experience in performing power system studies.

## **PART 2 PRODUCT**

### 2.01 STUDIES

- A. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E -Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also include short-circuit and protective device coordination studies. All studies to be prepared by Square D Engineering Services.

### 2.02 DATA

- A. Contractor shall furnish all data as required for the power system studies. The Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Contractor with a listing of required data immediately after award of the contract. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.
- B. Source combination may include present and future motors and generators.

- C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Owner, or Contractor.
- D. If applicable, include fault contribution of existing motors in the study. The Contractor shall obtain required existing equipment data, if necessary, to satisfy the study requirements.

### 2.03 SHORT-CIRCUIT ANALYSIS

- A. Transformer design impedances shall be used when test impedances are not available.
- B. Provide the following:
  - 1. Calculation methods and assumptions
  - 2. Selected base per unit quantities
  - 3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis
  - 4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.
  - 5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.
  - 6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.
- C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.
- D. Protective Device Evaluation:
  - 1. Evaluate equipment and protective devices and compare to short circuit ratings
  - 2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses

3. Square D shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

**2.04 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS.**

- A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.
- B. Include on each TCC graph, a complete title with descriptive device names.
- C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.
- D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.
- E. Plot the following characteristics on the TCC graphs, where applicable:
  1. Electric utility's overcurrent protective device
  2. Medium voltage equipment overcurrent relays
  3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands
  4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
  5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves
  6. Medium voltage conductor damage curves
  7. Ground fault protective devices, as applicable
  8. Pertinent motor starting characteristics and motor damage points, where applicable
  9. Pertinent generator short-circuit decrement curve and generator damage point
  10. The largest feeder circuit breaker in each motor control center and applicable panelboard.
- F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.
- G. Provide the following:
  1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.

2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
3. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
4. The study shall include a separate, tabular printout containing the recommended settings of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram
5. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.
6. Square D shall notify Owner in writing of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

## 2.05 ARC FLASH HAZARD ANALYSIS

- A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2009, Annex D. The arc flash hazard analysis shall be performed in conjunction with the short-circuit analysis (Section 2.03) and the protective device time-current coordination analysis (Section 2.04)
- B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.
- C. Circuits 240V or less fed by single transformer rated less than 125 kVA may be omitted from the computer model and will be assumed to have a hazard risk category 0 per NFPA 70E.
- D. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.
- E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations

- F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any stand-by generator applications.
- G. The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.
- H. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:
  - 1. Fault contribution from induction motors should not be considered beyond 5 cycles.
  - 2. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.
  - 3. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.
  - 4. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.
- I. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds will be used based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

1. Provide the following:
  - a. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
  - b. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
  - c. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

**PART 3 EXECUTION**

**3.01 FIELD ADJUSTMENT**

- A. Field adjustments to be completed by Square D Services under the separate Startup and Acceptance Testing contract portion of project specifications.
- B. Contractor shall make minor modifications to equipment as required to accomplish conformance with short circuit and protective device coordination studies.
- C. Square D shall notify Owner in writing of any required major equipment modifications.

END OF SECTION

**ELECTRICAL ACCEPTANCE TESTS****PART I - GENERAL**

- A. The General Provisions of the Contract including General, Supplementary, Special Conditions, and General Requirements apply to the work specified in this section.

**1.01 GENERAL REQUIREMENTS**

- A. This Contractor will retain the services of a qualified independent electrical testing Contractor holding a valid current C-10 License to perform all tests and prepare reports enumerated in the following sections.
1. The electrical testing Contractor shall be one of the approved following lists:
    - a) Power Systems Testing Co., Fresno, CA, (559) 275-2171
    - b) Electro Test Co., Danville, CA, (510) 824-0330
  2. Follow all applicable codes, standards and instruction manuals:
    - a) Current California Electrical Code (CEC)
    - b) National Electrical Manufacturer's Association (NEMA)
    - c) Manufacturers' Instructions and Maintenance Manual applicable to each particular apparatus
    - d) Procedures as directed by Engineer
    - e) OSHA Rules and Regulations
    - f) National Electrical Testing Association (NETA) "Acceptance Testing Specifications"
  3. General Test Conditions:
    - a) The testing agency shall perform the following:
      - 1) Test the mains and manual circuit breakers, distribution equipment and all circuit breakers 50 AMPS and larger to ensure the proper installation, operation, connection and calibration in accordance with these Specifications.
      - 2) Provide minor field repairs, adjustments, and wiring modifications at the time of inspection.

- 3) Furnish personnel acceptable to Engineer to conduct all testing. The supervising Engineer shall have a minimum of five years experience in low voltage circuit breaker and switchboard maintenance testing.
  - 4) Furnish all labor required for and incidental to testing.
  - 5) Furnish all necessary test equipment to satisfactorily perform all tests specified.
  - 6) Check all devices for proper operation. Check for wear, tightness, dirt, etc.
  - 7) Check for conformance to published curves.
4. During actual testing the agency will:
- a) Ensure that temporary power terminations are connected in such a manner that commercial power may be restored in forty-five minutes upon request.
  - b) Place temporary power cables out of the way and in a safe manner to ensure no hazard to Personnel or equipment in the area.
  - c) Provide all special connections required.
  - d) Conduct all tests in presence of the representative except where advised this would not be necessary.
5. Prior to actual testing the agency will:
- a) Notify and coordinate with the Owner's representative prior to the commencement of any testing.
  - b) Provide a Method of Operation Schedule (MOP) in conjunction with the Owner's representative.

## 1.02 TEST REPORTS

- A. The Test Report shall include the following:
1. Description of equipment tested
  2. Description of test procedure



3. Test results
  4. Recommendations
  5. Appendixes including all field test reports
- B. The report shall be bound:
1. Furnish six copies of the completed report to the Electrical Engineer no later than ten days after test completion unless requested otherwise by Owner.
  2. Instrumentation-Traceability: The testing agency shall provide calibration labels for all relays and circuit breakers tested.
  3. Labels shall be self-adhesive and placed on covers or frames so as not to obscure a nameplate, tap block or time dial. Labels shall show the date tested and firm names.

#### 1.03 CARE AND PRECAUTIONS

- A. Contractors shall be responsible for any damage to equipment or material due to improper test procedures or test apparatus handling. Contractor shall replace or restore to original condition any damaged equipment or material.
- B. Contractors shall furnish and use safety devices such as rubber gloves, blankets, protective screens, barriers and danger signs to adequately protect and warn all personnel in the vicinity of the tests.
- C. All personnel shall have and wear safety glasses in designated areas.

#### 1.04 TECHNICAL SPECIFICATIONS

- A. Switchboard - General:
1. Switchboard interior will be vacuumed and wiped clean.
  2. Switchboard will be inspected for adequate bus size, bus spacing, bracing and grounding.
  3. All bus bolts will be torqued to their proper value. A mark is to be placed on each tightened bolt to ensure completeness.
  4. Switchboard frame will be inspected for alignment, level and anchorage.
  5. Buses will be meggered to ensure adequate insulation resistance.

**1.05 MOLDED CASE CIRCUIT BREAKERS**

- A. Circuit breakers will be operated several times to ensure smooth operation.
- B. Phenolic case will be inspected for cracks.
- C. Rated current will be passed through each phase and millivolt readings taken across contacts.
- D. Time current characteristic tests will be performed by passing 300% rated current through each phase and monitoring trip time.
- E. Instantaneous pickup current will be determined by finding the current level at which the breaker trips out in less than two cycles. Insulation resistance tests will be performed at 1000 Volts DC.
- F. Circuit breaker covers will be removed on unsealed units and checked for cracks. Interphase barriers and arc chutes are to be inspected. All bolts and lugs will be tightened. All internal auxiliary devices will be inspected.
- G. Contacts, shunts, etc., will be visually inspected for wear and alignment.
- H. Inverse time, instantaneous pickup, millivolt drops across contacts, insulation resistance values as well as deficiencies causing breakers to function outside published limits will be recorded. Times will then be compared with manufacturers or NEMA published values.

**1.06 1.07 CABLES**

- A. Megger all cables #6 and larger.
- B. Tighten joints of cable shown and check for wear and damage.

**1.08 DISCONNECTS**

- A. Check for cleanliness of contacts, operation, etc.
- B. Lubricate contacts and mechanical devices.
- C. Check fuse clip tightness.

**1.09 FUNCTION TEST**

- A. All automatic and manual functions will be checked for proper operation.

- B. New feeders to be meggered. Check cables for damage and tightness.
- C. Feeders: Tighten connections at each new panel only and visually inspect.

#### 1.10 GROUNDING SYSTEM

- A. The test agency shall remove the test link between the ground and neutral and test the neutral for any parallel and/or superfluous ground paths. If any are found, a report is to be provided to the Engineer. No grounds are to be removed unless authorized in writing.
- B. Ground electrode resistance shall be taken using a biddle ground resistance meter and readings given to the report.
- C. All ground connections in switchboard and to cold water pipes shall be checked for tightness and adequacy.

#### 1.11 EQUIPMENT TO BE TESTED

- A. New Main Switchboard: Check automatic operation of panels. Check all bus connections and torque to proper value. Clean panel thoroughly.
- B. The following tests and checks shall be performed before placing in operation:
  - 1. Check all new bus and cable connections for proper contact pressure and mark each bolt with a red "dot" of paint to indicate it has been checked.
  - 2. Check all the new equipment for mechanical adjustment, lubrication and freedom of operation. Remove all shipping blocks.
  - 3. Operate and test trip units for all new breakers.
  - 4. Test all transfer switches and its control circuits for correct connection and operation.
  - 5. Test all panel feeders and main breakers.

#### 1.12 COORDINATION STUDY

- A. Provide a coordination study prepared by an independent registered Engineer. A complete fault current and system protective device study shall be performed for all new equipment. Include a complete set of coordination curves or data from the 480 main breakers including coordination with Utility Company. Provide proper overcurrent and ground fault relay settings.

- B. Provide the data in a table format including One-Line Diagram, device identification, voltage, protection device, device rating, calculated short circuit current, long time, short time and ground fault value and time settings.

END OF SECTION

**LOW VOLTAGE GENERAL PURPOSE TRANSFORMERS**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 The requirements of the Contract, Division 01 , and Division 26 apply to work in this Section.

1.02 SECTION INCLUDES

- A. This specification covers single-phase and three-phase general-purpose individually mounted dry-type transformers, 600V maximum, for general power and lighting applications.

1.03 REFERENCES

- A. The equipment in this specification are designed and manufactured according to latest revision of the following standards (unless otherwise noted).
  1. ANSI/IEEE C57.96, Distribution and Power Transformers, Guide for Loading Dry-Type appendix to ANSI C57.12 standards
  2. ANSI/IEEE C89.2 - Dry Type Transformers for General Applications
  3. ANSI/NFPA 70, National Electrical Code
  4. IEEE C57.12.01, General Requirements for Dry-Type Distribution and Power Transformers Including Those with Solid Cast and / or Resin-Encapsulated Windings
  5. IEEE C57.12.91, Test Code for Dry-Type Distribution and Power Transformers
  6. NEMA ST 20, Dry Type Transformers for General Applications
  7. UL 506, Specialty Transformers
  8. NEMA- TP-1-2002

1.04 SYSTEM DESCRIPTION

- A. Power transformers shall be 2 winding dry type for general power and lighting applications. Transformers rated 1000 KVA or below shall be UL listed and bear required Listing Mark.

1.05 SUBMITTALS

- A. Manufacturer shall provide copies of following documents to owner for review and evaluation in accordance with general requirements of Division 01 and Division 26:
  1. Product data on specified product documenting the following:
    - a. Dimensions

- b. Weight
- c. KVA
- d. Voltage
- e. % Impedance
- f. Taps
- g. Insulation Class
- h. Sound Level

2. Installation Instructions

1.06 PROJECT RECORD DOCUMENTS

- A. Maintain an up-to-date set of Contract documents. Note any and all revisions and deviations that are made during the course of the project.
- B. Provide final as-built drawings and information for items listed in Paragraph 1.06. All changes made during the manufacturing process shall be incorporated.

1.07 OPERATION AND MAINTENANCE DATA

- A. Manufacturer shall provide copies of installation, operation and maintenance procedures to owner in accordance with general requirements of Division 01 and Division 26.
- B. Submit operation and maintenance data based on factory and field testing, operation and maintenance of specified product.

1.08 QUALITY ASSURANCE (QUALIFICATIONS)

- A. The manufacturer of the transformer as indicated by the label on the transformer shall be the manufacturer of the major components within the transformer.
- B. The manufacturers listed within this specification have been selected for use on this project. All others need to be pre-approved by the engineer before submitting.
- C. The manufacturer shall provide Seismic tested equipment as follows: (verify below)
  - 1. The equipment and major components shall be certified to the seismic requirements of IBC-2003 and IEEE-693-1997. Guidelines for the installation consistent with these requirements shall be provided by the transformer manufacturer and be based upon testing of representative equipment. The equipment shall be qualified to an equipment importance factor,  $I_p$ , level of 1.5.
  - 2. For  $z/h > 0$ ,  $S_s$  shall be 150% minimum and  $S_d$ s shall be 1.0g minimum for 3-phase convection and/or fan cooled transformers. For encapsulated transformers,  $S_s$  shall be 300% minimum and  $S_d$ s shall be 2.0g minimum.

## SECTION 26 22 00

3. For  $z/h=0$ ,  $S_s$  shall be 240% minimum and  $S_d$ s shall be 1.6g minimum for dry-type transformers. For encapsulated transformers,  $S_s$  shall be 300% minimum and  $S_d$ s shall be 2.0g minimum.
4. Mounting recommendations shall be provided by the manufacturer based upon approved shake table tests used to verify the seismic design of the equipment.
5. The equipment manufacturer shall certify that the equipment can withstand and will be functional following a seismic event, including both vertical and lateral required response spectra as specified in above codes.
6. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic qualification shall be considered achieved when the capability of the equipment, meets or exceeds the specified response spectra.

### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect, and handle products in accordance with the manufactures recommendations.
- B. Dry type transformers shall be located in well-ventilated areas, free from excess humidity, dust and dirt and away from hazardous materials. Indoor locations shall be protected to prevent moisture from entering enclosure.
- C. Equipment shall be shipped with edge and top protection that is adequate to protect the transformer enclosure from common dents and scratches.

### 1.10 PROJECT CONDITIONS (SITE ENVIRONMENTAL CONDITIONS)

- A. Follow (standards) service conditions before, during and after transformer installation.

### 1.11 WARRANTY

- A. Manufacturer warrants equipment to be free from defects in materials and workmanship for 1 year from date of installation or 18 months from date of purchase, whichever occurs first.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. General Electric Company products have been used as the basis for design. Other manufactures' products of equivalent quality, dimensions and operating features may be acceptable, at the approved by the engineer.

### 2.02 GENERAL REQUIREMENTS

- A. Dry type general purpose transformers shall be rated as indicated in the drawings.

**SECTION 26 22 00**

- B. Transformers supplied to this specification shall be able to operate continuously at 100 percent nameplate rating at ambient temperature not exceeding 40 degrees C. Maximum temperature at top of enclosure shall not exceed 50 degree C rise above 40 degree C ambient.
- C. Transformer shall have self-cooled sound levels equal to or lower than those established by ANSI/IEEE:

<u>KVA</u>	<u>Sound Levels (dB)</u>
0-9	40
10 – 50	45
51 – 150	50
151 – 300	55
301 – 500	60

Measured per ANSI C89.2-1986

- D. Transformer shall be sound tested in the factory prior to shipment. A record of the sound testing shall be retained by the manufacturer.
- E. Transformers shall meet the energy efficiency requirements of NEMA-TP-1-2002.
- F. Transformers shall use properly classified UL approved temperature ratings. Temperature rise ratings shall be in accordance with UL 506. Insulation ratings shall be as indicated in drawings.
- G. Transformer shall carry the fully-rated load continuously when the surrounding air does not exceed 30C/86F average, 40C/140F maximum and adjacent structures do not prohibit the free movement of cooling air.
- H. Transformers 5 KVA and above shall be able to meet ANSI/IEEE C57.96 daily overload requirements listed in drawings. Transformers loaded in accordance with this paragraph shall be capable of long service life under thermal conditions specified. There shall be no need for derating.
- I. Enclosures shall meet UL 506 requirements for the following characteristics:
  - 1. Ventilation Openings;
  - 2. Corrosion Resistance;
  - 3. Cable Bending Space;
  - 4. Surface Temperature Rise;
  - 5. Wiring Compartment Temperature Rise;
  - 6. Terminations.
- J. Transformer Construction



## SECTION 26 22 00

1. Transformer core shall be constructed of high grade, non-aging silicon steel with high magnetic permeability and low hysteresis and eddy current losses. Magnetic flux densities shall be kept well below core saturation point. Transformer core shall be clamped using insulated bolts through the core laminations to provide consistent pressure throughout the core length. Completed core and coil shall be bolted to enclosure base and isolated from base by rubber vibration-absorbing mounts.
2. Transformer core shall be visibly grounded to enclosure.
3. Enclosure shall be constructed of heavy gauge steel.
4. Coils shall be copper unless otherwise noted.

### 2.03 ACCESSORIES

- A. For 150 degree C. rise models:
  1. Wall mounting brackets;
  2. Weathershield kits.

### 2.04 LOAD TAPS

- A. Transformers shall have following high voltage load tap arrangements unless noted otherwise in plans:
  1. Through 2 KVA - no taps;
  2. Through 23 KVA - no taps;
  3. 3 through 25 KVA - 4, 2-1/2 percent taps, 2 above, 2 below nominal voltage;
  4. Through 500 KVA - 6, 2-1/2 percent taps, 2 above, 4 below nominal voltage;
  5. 750 KVA - 4, 3.1 percent taps, 2 above, 2 below nominal voltage;
  6. 1000 KVA - 2, 3.6 percent taps, 1 above, 1 below nominal voltage.

### 2.05 TESTING

- A. Transformers furnished to this specification shall receive the following production tests:
  1. Applied Potential;
  2. Induced Potential;
  3. No Load Losses;
  4. Voltage Ratio;
  5. Polarity;

6. Continuity

B. Manufacturer shall perform the following additional tests on units identical to the design type being supplied to this specification. Manufacturer shall provide on request test data sheets to prove performance of these tests.

1. Sound Levels
2. Temperature Rise Tests
3. Full-Load Losses
4. Regulation
5. Impedance

2.06 FINISH

A. Finish shall consist of degreasing, phosphate cleaning, and an electrodeposit ANSI 61 gray enamel paint.

**PART 3 EXECUTION**

3.01 EXAMINATION

- A. Verify that dry type transformers are ready to install.
- B. Verify field measurements are as instructed by manufacturer.
- C. Electrical Contractor to verify that required utilities are available.

3.02 LOCATION

- A. Electrical Contractor to verify proper location for the unit.
- B. The transformer shall be installed in a location where the sides with ventilated openings are a minimum distance of six inches from noncombustible structures or equipment to ensure adequate air circulation.

3.03 INSTALLATION

- A. Install per manufacturer's instructions.
- B. Install required safety labels.

3.04 FIELD QUALITY CONTROL

- A. Inspect installed dry type transformers for anchoring, alignment, grounding and physical damage.
- B. Check tightness of all accessible mechanical and electrical connections with calibrated torque wrench. Minimum acceptable values are specified in manufacturer's instructions.

3.05 CLEANING

- A. Repaint scratched or marred exterior surfaces to match original finish.

END OF SECTION

**FIRE ALARM SYSTEM****PART 1 GENERAL**

## 1.01 RELATED DOCUMENTS

- A. The general provisions of the Contract, including General and Supplementary, Special Conditions and General Requirements, apply to the work specified in this Section.

## 1.02 FIRE ALARM SYSTEM IN GENERAL

- A. Contractor shall install and furnish a complete and operational fire evacuation and fully automatic detection system, as well as a signal conductor and raceway system as required in accordance with Title 24, Part 2, Section 907.2.1.1 and 907.2.3 and conform to Title 24, Part 3, Article 760. The system shall be monitored by an approved supervising station. The system shall include the following:

1. All equipment, conduit, wire and labor necessary to provide for a complete and operational system as specified herein and shown on the drawings.
2. Contractor shall submit fire alarm system shop drawings to the Engineer for approval **PRIOR** to installation.

- B. All materials, wiring and equipment shall be furnished and installed in strict compliance with the preceding sections and all applicable requirements of:

1. Local fire authority having jurisdiction
2. California Electrical Code (CEC), 2022 Edition
3. National Fire Protection Association Standard 72
4. Manufacturer of the fire alarm system
5. Underwriters' Laboratories, Inc.
6. California State Fire Marshal
7. California Fire Code, latest Edition

## 1.03 FIRE ALARM SYSTEM MANUFACTURER REQUIREMENTS

- A. The manufacturer of the fire control system shall submit as part of his construction submittals:

1. Factory component technical detail showing full compliance with function as

specified.

2. Factory calculations for all power requirements for specified system, including standby power, all certified in writing by the manufacturer's engineer in charge of the project.
3. Manufacturer's certification that it maintains an office within 50 miles of the project, and that it maintains sufficient spare parts and personnel at that location to ensure the Owner of a continually maintained and serviced system.
4. List of factory personnel responsible for jobsite installation and supervision of the system who shall be available as required by the Contractor, Engineer, Architect or Owner.
5. **WRITTEN CERTIFICATION** that all component parts to be used in this system are of his manufacturer, or are California State Fire Marshal listed and to be used for the purposes intended.
6. At the completion of the manufacturer's installation of the system to the contractor's wire backbox and appurtenances, he shall:
  - a) Provide the Engineer with five (5) copies of his final system report which shall be on the manufacturer's standard forms provided by him and contain the following information:
    - 1) Serial numbers and location of all major components.
    - 2) Testing information verifying all annunciation devices and signaling function are as specified and required.
    - 3) Provide the Engineer their copies of his factory logo's Record Drawings of the system, including final labeling, color coding and locations for all devices in the system.
    - 4) Manufacturer's final tests shall be in the presence of the Engineer and Owner, or his representatives, as well as the authorities having jurisdiction.
    - 5)

#### 1.04 OPERATING INSTRUCTION, WARRANTY AND SERVICE

- A. The manufacturer shall provide a qualified representative to instruct the Owner, or his representative, in the operation of the system.
- B. This contractor and the manufacturer shall warranty the systems for a period of one (1) year from the date of acceptance by the Owner. Emergency repair and/or replacement of manufacturer provided equipment for the system shall be

accomplished by this contractor, at **NO** additional cost to the Owner as long as such repair and/or replacement occurs during the warranty period, and is directly or indirectly caused by faulty workmanship or defect of material installed. Upon completion of the installation of the Fire Protective Signaling equipment, a satisfactory test of the entire system shall be made in the presence of the enforcing agency.

**1.05 FIRE ALARM SYSTEM OPERATION**

- A. Activation of any alarm initiating device shall:
1. Activate fire alarm audible and visible devices.
  2. Transmit the alarm condition to an approved remote receiving station.
  3. Report alarm condition and zone on LCD displays of the main fire alarm control panel and remote annunciators.

**END OF SECTION 28 31 11**

**EARTHWORK**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor, materials and equipment required to complete the clearing and grubbing, excavation, backfilling and compacted fill work as indicated on the drawings and as specified herein.

1.02 WORK INCLUDED (But not limited to the following items)

- a. Clearing and removal from site of all vegetation, rubbish and material (concrete, glass, wood, etc.) from previous use of the property not indicated on the drawings to remain.
- b. Excavating soil under buildings for compacted fill, if required.
- c. Preparing of area upon which fill is to be placed and placing of compacted fill.
- d. Furnish imported fill material, if required.
- e. Excavating for all footings, floor slabs, walks, walls, curbs, pits, etc.
- f. Proper bracing and shoring of all excavation where necessary to prevent caving.
- g. Backfilling foundations, placing and compacting fill for slabs and as required for area grading.
- h. Subgrading and preparation of subgrade for asphaltic concrete surfacing.
- i. Applying water to obtain compaction required in fills.
- j. Final finish grading.
- k. Top soil fill in areas indicated.
- l. Cleaning of site of all material excavated and not used and disposing of away from site.

1.03 RELATED WORK

- a. Excavating, trenching and backfilling for the plumbing, electrical or mechanical trades which is specified under the section to which it applies.
- b. Vapor barrier under concrete floor slabs is specified in Section 03 10 00.

**1.04 OWNER'S REPRESENTATIVE**

- a. The earthwork operations will be under the direct inspection of the Geotechnical Engineer of Record for this Project, who shall be registered by the State as a Professional Engineer and who will be employed by the Owner. Refer to Section 01402, Tests and Inspections.
- b. The Geotechnical Engineer shall be the Owner's representative in control of all earthwork. The Geotechnical Engineer will approve or disapprove fill materials; will make appropriate tests and pass or reject compacted fill and will designate for removal any unsuitable materials, which may remain at the bottom of the excavated area after the limits of excavation indicated by the drawings have been reached.
- c. The contractor shall comply with the instructions of the Geotechnical Engineer as to the aspects of the work described above and shall cooperate with the Geotechnical Engineer in his performance of these duties.

**1.05 GEOTECHNICAL REPORT**

- a. Unless otherwise noted, the recommendations found in the soils report for site preparation shall be followed but shall not be considered a part of this section. It shall be incumbent upon this contractor to review the soils report on file in the Architect's office. No additional monies will be allowed for any costs incurred due to negligence of the contractor in not reviewing the soils report.

**1.06 PROTECTION**

- a. Protection of Property: Care shall be taken to prevent damage to adjoining property and this contractor shall make good any damage resulting from this operation.
- b. Maintain protections and barricades as required. Cooperate with other trades requiring access.
- c. Survey work furnished by the owner, such as horizontal and vertical control survey monuments, bench marks, etc., shall be carefully maintained. Said work, if disturbed or destroyed, shall be replaced by the contractor's surveyor at the contractor's expense.
- d. Loads of material moving to or from the site shall be trimmed to prevent droppings along the street.

**1.07 UNDERGROUND PIPES, CONDUITS AND UTILITIES**

- a. Observe applicable regulations in work affecting underground utilities. Protect active utilities from damage and remove or relocate only as indicated or specified. Remove and plug or cap inactive or abandoned utilities encountered in



excavating or grading. In absence of specific requirements, plug or cap at least 5 feet outside building walls.

- b. Excavating or trenching for new pipe, conduit or utility lines within five feet of building lines and under exterior walks, drives or pavement is subject to provisions of these specifications with respect to protection from moisture, backfilling and grading.
- c. Lines Containing Liquid: Check for leaks and certify to owner. Run such lines at least 5 feet outside building lines wherever possible.
- d. Notify utility companies and owner for all utilities to be cut off, modified or relocated. Maintain active utilities and protect same. No utilities shall be cut off without first obtaining permission from the Owner.

**1.08 DRAWINGS AND SPECIFICATIONS**

Cuts and Fills: The grades shown on the drawings do not necessarily indicate a balance of cut and fill. Any excess earth not needed for filling shall be removed from the site. Any earth required for filling shall be furnished by the contractor and shall meet the requirements under materials section for earth fill.

**1.09 INSPECTION OF SITE**

The contractor shall accept the site as he finds it at the time of submitting his bid for this work and no allowances will be made for any error or negligence resulting from his failure to inspect the site prior to submitting his bid proposal.

**1.10 LAWS AND ORDINANCES**

All excavating, bracing, barricading, backfilling, etc., shall be done in accordance with all applicable laws and/or ordinances.

**1.11 ASTM STANDARD SPECIFICATIONS**

Where reference is made to ASTM Standard Specifications, the latest issue of such specifications shall apply, except where other specific issue dates are identified in the Soils Report, T24, Part 2, or the applicable C.B.C. Standard.

**1.12 SURFACE WATER**

Surface water shall be controlled by grading as necessary to prevent erosion, damming or ponding in the bottom of structural excavations.

**1.13 ALLOWABLE TOLERANCES**

Maximum variation from indicated grades shall be 1/10 of one foot.

**PART 2 PRODUCTS**

## 2.01 MATERIALS

- a. Earth for filling and backfilling shall be acceptable to the Architect and Geotechnical Engineer and shall be free from all objectionable material and shall be a clean, granular material suitable for compaction. Must be tested and approved by the Soils Engineer.
- b. Top Soil: A fertile, friable, loamy soil, free from toxic amounts of acids and alkalis, capable of sustaining healthy plant life. To be approved by Architect.
- c. Imported soils shall consist of essentially granular, silty sands with low expansion potential and free of grasses, weeds, debris, rocks larger than 4" in maximum dimension and soluble sulfates in excess of 200 parts per million. Import fill shall contain sufficient silt and clay binders to render them stable in footing trenches and capable of maintaining specified elevation tolerances during paving operations.
- d. Imported soils to be used as engineered fill should also meet the following gradation and quality criteria:
 

(1) Maximum Percent Passing #200 Sieve	50
(2) Maximum Liquid Limit	40
(3) Maximum Plasticity Index	14
(4) Minimum R-Value	50
(a) Pavement Areas Only	
(5) Maximum Expansion Index	20
(a) Per 2010 CBC Standard 18-2	
(b)	
- e. Only soils passing DTSC standards shall be allowed.
- f. Pea Gravel- to be used for drainage course material (backfill) and decorative finishes shall be screened gravel that consists of clean, washed, small round stones which will be retained by a No.4 (4.75mm) sieve and will pass a 3/8"(9.5mm) sieve.

**PART 3 EXECUTION**

## 3.01 SITE CLEARING

Clear the building site of all vegetation and rubbish, including all brush, grass, weeds, trees, roots, concrete slabs and footings, A.C. paving, tin cans, glass, wood, brick and large rocks (1-1/2" or larger), etc. Strip the entire property and easements down to bare earth. All vegetation and rubbish cleared and stripped from the site shall be removed from the site and legally disposed of.

## 3.02 PREPARATION OF AREA UPON WHICH FILL IS TO BE PLACED

- a. **Clearing and grubbing-** should consist of stripping grasses; removing existing structures, foundations, slabs, and miscellaneous concrete; removing buried utility lines; locating and removing or disposing of abandoned septic tanks and seepage pits (dry well) if any are encountered during site clearing and grubbing operations.
- b. **Stripping-** Prior to soil compaction, existing ground surfaces should be stripped of surface vegetation. A stripping depth of one inch should be adequate. In no instances should stripped material be used in engineered fill or blended with and compacted in original ground.
- c. **Slabs and Pavements-** Shall be completely removed. Asphaltic concrete fragments may be used in fill provided they are broken down to a maximum dimension of two inches and adequately disbursed within a friable soil matrix. Soil-AC mixtures should not be used above the elevation bottom of the lowest structure footing.
- d. **Foundations-** Existing at the time of grading should be completely removed.
- e. **Basements and septic tanks-** located in proposed structure areas should be completely removed. Basements or septic tanks situated outside the structure areas may be removed or disposed of by breaking the walls down to not less than two feet below finished grade; breaking the bottom out to provide drainage, and back-filling and compacting the resulting cavity using a sand slurry or by placing and compacting acceptable soils engineered fill. If a sand slurry is used, no compaction tests will be required.
- f. **Seepage pits-** in proposed structure areas should be removed to a minimum depth of five feet below finished grade or two feet below existing ground, whichever is lower. If a portion of the pit liner is to be abandoned in place, the void should be backfilled with sand slurry. In no instances should liners be left in place within a depth of two feet below existing ground.
- g. **Backfilling Cavities-** All voids or depressions created by clearing and grubbing operations should be backfilled with either on-site soils or acceptable imported fill materials. Materials used to backfill cavities should be placed and compacted in accordance with Paragraph 3.06.
- h. After the area to be filled is cleared, it shall be plowed or scarified to the depth of at least twelve (12) inches, and until the surface is free of ruts or uneven features which will tend to prevent uniform compaction. It shall then be compacted to a depth of at least twelve (12) inches in accordance with specifications for compacting fill material in Paragraph 3.03.

### 3.03 PLACING, SPREADING AND COMPACTING FILL MATERIAL

- a. The fill material shall be placed in layers which, when compacted, shall not exceed six inches (6"). Each layer shall be spread evenly and shall be thoroughly mixed

during the spreading to insure uniformity of material in each layer. When the moisture content of the fill material is below that specified by the Engineer, water shall be added until the moisture content is as specified. When the moisture content of the fill material is above that specified by the Engineer, the fill material shall be aerated by blading or other satisfactory methods until the moisture content is as specified.

- b. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted to not less than ninety percent (90%) of maximum dry density in accordance with ASTM D 1557-12, Method A, shall be by self-propelled multiple-wheel pneumatic tired rollers or other approved types of rollers. Rollers shall be of such design that they will be able to compact the fill to the specified density. Rolling shall be accomplished while the fill material is at the specified moisture content. Rolling of each layer shall be continuous over its entire area and the roller shall make sufficient trips to insure that the desired density has been obtained.
- c. Field density tests shall be taken as directed by the Engineer and when these tests indicate that the density of any layer of fill or portion thereof is below the required ninety percent (90%) density, that particular layer or portion shall be reworked until the required density has been obtained.
- d. The fill shall be brought to within 0.1' plus or minus of the finished grades and the surface shall be bladed to a smooth and uniform surface.
- e. **Placing on Slope:** Where the slope of the sub-grade surface on which fill is to be placed is 10:1 or steeper, bench the sub-grade in flat benches or at least ten feet (10'-0") in width prior to filling thereon. Prepare and compact each bench in accordance with the specifications for site preparations. Benching, preparation and compaction of the benched sub-grade may be done simultaneously with the filling operation; and the material excavated in benching may be mixed and compacted with new fill unless deemed unsuitable by the Soils Engineer. All fill materials shall be subject to the approval of the Engineer as excavated and placed.

### 3.04 PREPARATION OF FLOOR SLAB SUBGRADE IN CUT AREAS

Subgrade for concrete floor slabs in cut areas shall be prepared as in 3.02 above. The compacted subgrade shall be bladed to a smooth and uniform surface.

### 3.05 EXCAVATIONS

- a. The bottom of all excavations shall be smooth, level and firm and at the depth called for on the drawings. Any excavation made deeper than indicated on the drawings shall not be backfilled but filled with concrete by the concrete contractor. Concrete mix shall be of the same mix as specified for footings.
- b. All excavations shall be kept free of standing water by pumping, draining or any means necessary to this end.

- c. Sides of footings may be formed by neat excavations if banks will stand without caving. If caving results, footing excavations shall be made to a line not less than 18" beyond each face of the footing to permit installation and removal of forms. Faces of footings abutting a property line shall be formed in all cases.
- d. The contractor shall bear all costs for additional work on account of overexcavation.

### 3.06 BACKFILLING

- a. After forms are stripped and concrete surfaces approved, the space between the earth banks and the concrete shall be filled with clean earth. The backfill material shall be placed in layers, which, when compacted, shall not exceed six (6) inches in depth. It shall be moistened with water to bring it to the optimum moisture content and thoroughly compacted by means of mechanical compactors to indicated grades and to a density equal to that of the soil at the bottom of the footings, but not less than 90% of the maximum dry density in accordance with ASTM D 1557-78T, Method A.
- b. The backfill may be compacted by means of flooding (ponding) and jetting if the backfill and foundation material is granular (sandy) and free draining after compaction. This method shall be used only if approved ahead of time by the Structural Engineer. This method shall *not* be used under areas that will receive concrete slabs or A.C. paving. The backfill shall be placed in layers not over three (3) feet deep. Flooding shall not be used to compact the top foot below finish grade - use two 6" moistened layers as called for above. It may be necessary to use vibratory or other compaction equipment along with the flooding to obtain the required 90% compaction.

### 3.07 TOP SOIL

Place 12" of specified material in planters and planted areas; 6" of same in lawn or turf areas.

### 3.08 GRADING

After fill and backfill work has been completed, the areas outside of the building shall be finish graded to the indicated grades. Finish grades of lawn areas in general: 1" below walk grades; planted areas: 2" below walk grades; in planters: 6" below tops of planter walls. The areas inside of the building to receive slabs or other construction work shall be fine finish graded to the required grades. All grading shall be left even and free of all debris, shall be to the grades indicated on the drawings and shall be raked clean just prior to the owner's acceptance of the completed building.

### 3.09 DISPOSAL AND CLEANUP

- a. Rubbish, Debris, Rocks, Trees, etc.: Hauled away from site promptly and legally disposed of.
- b. Topsoil Strippings: Legally dispose of off site.
- c. Excess earth resulting from cutting and excavation to be legally disposed of off the site or hauled to an area as designated and stockpiled.
- d. Dust and Noise Abatement: During entire period of construction and during loading, keep area and material being loaded sprinkled to reduce dust in air and annoyance to premises and neighborhood. Exercise all reasonable means to abate undue noise.
- e. Clean up site, remove all debris and leave premises in clean and orderly condition.

### 3.10 CERTIFICATION OF GRADES

- a. The contractor and the soils engineer shall, at the conclusion of the grading work, certify to the Architect that the grading has been performed in accordance with the specifications and is satisfactory for its intended use.
- b. Building Pad Certifications - The Contractor shall arrange for and hire a licensed Land Surveyor or Civil Engineer with authority to practice Land Surveying registered in the State of California to verify the depth and extents of all building over excavations. In addition, the Surveyor or Civil Engineer shall record final elevations of building pads and pavement subgrade. These elevations shall be signed and sealed by the Surveyor or Civil Engineer, labeled "As Graded Elevations", and transmitted to the Architect before work commences on the building foundations.

### 3.11 Excess Water Control

- a. Do not place, spread, or roll any fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Engineer.
- b. Provide berms or channels to prevent flooding of subgrade.
- c. Where soils have been softened or eroded by flooding or placement during unfavorable weather, remove all damaged areas and re-compact as specified for Filling below.
- d. Provide and maintain, at all times during construction, ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the work. Dewater by means which will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.
- e. Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil

material. Apply water in manner to prevent free water appearing on surface during or subsequent to compaction operations.

- f. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
- g. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

END OF SECTION  
10/14/2022

**TERMITE CONTROL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this section shall include the furnishing of all labor, materials and equipment required to complete the "preconstruction" soils treatment under and adjacent to structures to provide a uniform toxic barrier in all routes of termite entry.

1.02 PROTECTION

Allow no disturbance of treated soil between application of poison and pouring of concrete.

1.03 GUARANTEE

- a. Furnish to Owner a written five (5) year warranty against subterranean termites.
- b. Warranty shall cover against invasion or propagation of subterranean termites, damage to building or building contents caused by termites; repairs to building or building content so caused.
- c. Areas of infestation appearing within the warranty period shall be retreated at no additional cost to the Owner.
- d. Areas of damage of building or building contents shall be repaired at no additional cost to the Owner for both material and labor to a maximum cost of \$5,000.00 per each building location.
- e. Make an inspection of the Work once each year at no additional cost to the Owner for a total period of 5 years following date of Notice of Completion for the purpose of detecting termite infestation.
- f. If termite infestation is found during that 5 year period, retreat according to prevailing practices of the trade within 10 days after such infestation is discovered.
- g. Owner reserves the right to renew warranty for an additional 5 years. Contractor shall provide the Owner with a proposal prior to beginning work for the cost of the additional 5 year warranty for the Owners review and comments.

**PART 2 PRODUCTS**

2.01 MATERIALS

Apply one of the following chemicals as a water emulsion at concentrations and volume specified. If impervious soils make a reduction in volume of solution necessary, increase percentage of toxicant used in proportion to insure same amount of insecticide be used per linear or square foot.

Demon TC, as manufactured by Zeneca  
Premise  
Dominion



Equal as approved by Architect. See Div. 0, Section 03 Instructions to Bidders and Section 32, General Conditions, Article 19.

**PART 3 EXECUTION**

**3.01 APPLICATION**

- a. Apply in strict conformance with the manufacturer's recommendations.
- b. All termite control must be performed by a state licensed structural pest control company.

**3.02 APPLICATION RATES**

- a. Surface Preparation:
  - 1. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.
- b. Apply in accordance with manufacturer's recommendation.
- c. Apply under all building pads, footings and areas within 2'-0" of buildings.
  - 1. Allow not less than 12 hours for drying after application before beginning concrete placement or other construction activities.
- d. Apply to substrate immediately prior to the installation of the membrane vapor barrier to avoid losses due to evaporation.
  - 1. When substrate is crushed rock fill applied below membrane vapor barrier, apply additional treatment to soil prior to installation of fill.
- e. Footing trenches shall be treated not more than 24 hours prior to concrete pour.
- f. Treat critical locations such as utility footing penetrations and expansion joints with linear treatment at the manufacturer's recommended rate.
  - 1. Treat inside of utility trenches for a minimum of 48" beyond the building pad.
- g. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.
- h. Take precautions to protect adjoining property and areas designated for planting.
- i. Application Rates shall be as follows unless otherwise specified or approved by the Architect:
  - 1. One gallon per 10 sq. ft. as overall treatment under slab and attached porches.
  - 2. 4 gallons per 10 lin. ft. along inside and outside of exterior foundation walls, and around utility services and other features, that will penetrate slab.
  - 3. 2 gallons per 10 lin. ft. in voids of unit masonry foundation walls or piers.

END OF SECTION  
08/05/2022

**VEGETATION CONTROL**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section shall include the furnishing of all labor, materials and equipment required to complete the sterilization to prevent seed germination and plant growth, under paving, sidewalks and other areas indicated on the drawings.

1.02 PROTECTION

Take necessary precautions to protect adjoining property and areas designated for planting on building site.

1.03 Certification

No products shall be sprayed or spread unless the applicator has been licensed and certified by the State of California to disperse product specified in this section or approved by the State of California for the intended use.

**PART 2 PRODUCTS**

2.01 Materials:

- a. Contractor shall submit State of California approved product for weed eradication

**PART 3 EXECUTION**

- 3.01 Apply in accordance with the manufacturer's recommendation, state and federal guidelines.

END OF SECTION  
05/15/2008

**ASPHALTIC CONCRETE**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 SCOPE OF WORK

The work of this Section shall include all labor, material, equipment, and appliances required to complete all the work shown on the drawings and/or specified hereunder.

1.02 WORK INCLUDED

- a. Rolling and preparing the finish sub-grade to receive asphaltic concrete.
- b. Laying of aggregate base and paving with asphaltic concrete of all areas as indicated on the drawings.
- c. Redwood header boards around the areas to be paved with asphaltic concrete unless otherwise noted.
- d. Fog seal.

1.03 RELATED WORK

- a. Vegetation control is specified under Section 32 05 13.02.
- b. Finish grading is specified under Earthwork, Section 31 20 00; however, rolling preparation of finish grade under asphalt paving is part of this contract.

1.04 GUARANTEE

In addition to the guarantee as specified elsewhere in these Specifications, this Contractor shall repair or restore to first class condition any portion of the asphaltic concrete paving in which creeping, shoving, cracking, raveling, softening or other defects that are due to improper placing or defective materials that appear or become apparent within one (1) year from the date of acceptance.

**PART 2 PRODUCTS**

2.01 MATERIALS

- a. Hot-Mix Asphaltic Concrete, Type "B", uniformly graded aggregate to 1/2" maximum medium grading, graded as per State of California Division of Highways, Standard Specifications Section 39 and intimately mixed with 5 - 6-1/2% Asphalt. Asphalt shall be Performance Grade PG64-10. No R.A.P. (Reclaimed Asphalt Pavement) shall be used.
- b. Redwood: All heart foundation grade redwood.
- c. Redwood Headers: 3x6 redwood.

- d. Aggregate Base: Class 2, 3/4" aggregate graded as per State of California Division of Highways, Standard Specifications, Section 26.
- e. Fog Seal: Asphalt emulsion SS-1/SS-1h mixed with water 1:1.

**PART 3 EXECUTION**

**3.01 INSPECTION**

- a. Verify gradients and elevations of sub base are correct.
- b. Beginning of installation means acceptance of substrate.

**3.02 TOLERANCES**

- a. Flatness: Maximum variation of 1/4 inch, measured with 10-foot straight edge.
- b. Compacted Scheduled Thickness: Within 1/4 inch of design thickness.
- c. Variation from True Elevation: Within 1/2 inch.

**3.03 INSTALLATION**

- a. Preparation of Grade: All base over which asphaltic concrete is to be placed shall be rolled with a three (3) to five (5) ton roller, making seven (7) passes over all of the areas to receive asphaltic concrete.
- b. Paving for Vehicular Traffic: Asphaltic concrete and aggregate base shall be placed to thicknesses shown on the plans. Asphalt concrete shall be placed and compacted in accordance with Section 39 and base material shall be spread and compacted in accordance with Section 26 of the State of California, Division of Highways Standard Specifications. The finish shall have no variations greater than one-quarter inch (1/4") in ten feet (10'-0") and the texture of finish shall be uniform and at a maximum density for the type of aggregate used.
- c. Header boards: Unless otherwise noted, place redwood header boards around the areas to be paved with asphaltic concrete. To secure the header boards, use 1" x 4" x 1'-6" long redwood stakes at four feet (4'-0") on center.
- d. Fog Seal: Spray the entire area after the paving is completed at a rate of approximately 0.1 gallon per square yard as per Section 37 of the State specifications.

**3.04 GENERAL REQUIREMENTS**

- a. Layout of Work: This contractor shall lay out his work and be responsible for the accuracy of the measurements.
- b. Cooperation: This contractor shall cooperate with the other trades in establishing the time of commencing and completing the work of this section.
- c. Approvals: The material source from which asphaltic concrete is procured shall be approved by the Architect.

- d. Protection of Other Work: Care shall be taken to prevent damage to existing property, concrete slabs and to any of the new work performed under the contract and shall make good any damage resulting from this operation.
- e. Inspection of Site: This contractor shall be held to have examined the site and satisfied himself to the existing conditions and the conditions under which he will be obliged to operate.

END OF SECTION  
05/15/2008

**CONCRETE PAVING**

DIVISIONS 00 AND 01 ARE A PART OF THIS SECTION

**PART 1 GENERAL**

1.01 WORK INCLUDED

- a. Site concrete paving, including sidewalks, fire lane.
- b. Curbs, gutters.

1.02 RELATED SECTIONS

- a. Site grading
- b. Asphalt concrete paving
- c. Landscaping
- d. Reinforcing steel
- e. Sewerage and drainage (storm sewer)

1.03 QUALITY ASSURANCE

- a. Comply with the latest publications for materials and operations of the following:
  - 1. The American Society for Testing and Materials (ASTM).
  - 2. American National Standards Institute (ANSI).
  - 3. The American Concrete Institute (ACI).
  - 4. The American Welding Society (AWS).
  - 5. Portland Cement Associations (PCA).
  - 6. PER CBC 11B-302.1 General. Floor and ground surfaces shall be stable, firm, and slip resistant and shall comply with Section 11B-302.
  - 7. State of California, Department of Transportation (CALTRANS) Standard Specifications, latest edition.
- b. Certify in writing that Contractor has not less than five years experience in the field of providing specified finishes.
- c. Perform work specified herein under the personal and constant supervision of a competent construction superintendent experienced in this class of work.
- d. Provide slump tests for checking consistency of concrete mixture shall be made in accordance with ASTM C-143.

- e. Pay for any and all re-inspection, re-testing, re-design required due to the failure of concrete to meet requirements.
- f. For additional reference information, consult Portland Cement Association booklet; Cement Mason's Guide to Building Concrete Walks, Drives, Patios, and Steps.
- g. All concrete work: True to lines and grade as indicated on the drawings. Be responsible for proper drainage, without birdbaths, on all concrete paving surfaces. Bring discrepancies or omissions on drawings, or conditions on the site, which prevents proper drainage to the attention of the Architect in writing for corrections before work proceeds.
- h. All Construction: Conform to current applicable codes and ordinances.
- i. Coordinate placement of embedded items to avoid block-outs and cutting in finished work.

#### 1.04 SUBMITTALS

- a. Submit manufacturer's certification that materials meet specification requirements.
- b. Submit concrete mix design.

#### 1.05 PACKAGING, DELIVERY, STORAGE AND HANDLING

- a. Deliver packaged materials in manufacturer's original, unopened containers bearing manufacturer's name and brand.
- b. Protect materials delivered against inclusion of foreign matter.
- c. Store materials in dry location and protect against water.

#### 1.06 JOB CONDITIONS

- a. Inspection:
  - 1. Examine areas for conditions under which work is to be performed. Report in writing to Architect all conditions contrary to those shown on the drawing or specified herein and all other conditions that will affect satisfactory execution of work such as improperly constructed substrates or adjoining work. Do not proceed with work until unsatisfactory conditions have been corrected.
  - 2. Start of work constitutes acceptance of the conditions under which work is to be performed. After such acceptance, be responsible for correcting all unsatisfactory and defective work resulting from such unsatisfactory condition at own expense.
- b. Do not start work until temperature is at least 50 degrees F and rising, or if rain is predicted within eight hours.
- c. Owner will select a qualified testing laboratory to take samples for testing during the course of the work as considered necessary. Cost of such test will be paid for by Owner. Cooperate in making tests and be responsible for notifying the designated laboratory in sufficient time to allow taking of sample at time of placement.

- d. If test shows that concrete is below specified strength, remove all such concrete, as directed by Architect. Pay for removal of low strength concrete and its replacement with concrete of proper specified strength and testing.

## **PART 2 PRODUCTS**

### 2.01 MATERIALS

- a. Cement: Shall conform to ASTM C-150, Type II, low alkali.
- b. Concrete: Shall be 2500 psi, Class B, 5.25 sack mix unless otherwise indicated; conforming to Section 90 of the State Standard Specifications.
- c. Aggregate: Shall be 1 inch maximum, conforming to ASTM C-33.
- d. Water/cement ratio: Shall not exceed 0.50.
- e. Reinforcing: Shall conform to ASTM A-615, Grade 40, deformed bars, or smooth dowels. Smooth Dowels shall be use at expansion joints.
- f. Curing Compound: Shall conform to AASHTO Des. M148, Type 2, Class A, white pigmented, except the loss of water in the water retention test should not exceed 0.04 grams per square centimeter of surface.
- g. Preformed Joint Filler: Shall conform to ASTM D-1751 or ASTM D-994, 1/2 inch thick unless otherwise indicated.
- h. Water: Shall be clean and free from deleterious acids, alkali, oil, and organic matter, and shall be potable.
- i. Slump: Maximum slump shall be 4", conforming to ASTM C-143.
- j. Form Release: Shall be a 100% chemically reactive release agent conforming to Corps of Engineers CEGS-03300, Section 10.8. Form oil, diesel oil or kerosene not allowed.

## **PART 3 EXECUTION**

### 3.01 SUBGRADE PREPARATION

- a. Subgrade for the curb, gutter, fire-lane, valley-gutters, concrete paving, and sidewalks: Grade to plus or minus 0.1 feet. Compact all subgrade on which concrete is to be placed to a depth of 6 inches to a relative compaction of 90 percent prior to placing of any concrete.
- b. Protect the subgrade from damage after the preparation has been completed. This contractor shall be responsible for all additional fine grading as required.
- c. Test the completed subgrade for grade and cross section by means of a template supported on side forms. Wet the subgrade and forms thoroughly, immediately in advance of placing concrete.



## 3.02 FORMS

- a. Forms: Shall be smooth on the side placed next to the concrete, with a true smooth upper edge, and rigid enough to withstand the pressure of fresh concrete without distortion.
- b. All forms shall be thoroughly cleaned and coated with form release to prevent the concrete from adhering to them. Depth of face forms for concrete curbs, equal to the full face height of the curb.
- c. Carefully set forms to alignment and grade; conform to the required dimensions. Hold forms rigidly in place by stakes. Brace at 12" o.c. at plywood (5/8" min.) forms and 24" o.c. at 2x forms. Use clamps spreaders and braces where required to insure rigidity in the forms.
- d. Do not remove the form on the front of curbs in less than one hour nor more than six hours after the concrete has been placed. In no event shall forms be removed while the concrete is sufficiently plastic to slump. Do not remove side forms for gutters and sidewalks in less than 12 hours after the finishing has been completed.

## 3.03 CURB AND GUTTER CONSTRUCTION

- a. Expansion joints 1/2 inch wide shall be constructed in curbs and gutters at 30-foot intervals, at each side of structures and at the ends of curb returns. Expansion joints shall be filled with pre-molded joint filler conforming to the provisions in State Standard Specifications, Section 51-01.12C, "Premolded Expansion Joint Fillers". Expansion joint filler shall be shaped to the cross section of the curb and gutter. Reinforcing Dowels shall be smooth. Contraction joints shall be constructed at 10-foot maximum spacing. Cut contraction joints minimum 1-1/4 inch deep with a jointing tool after surface has been finished. Joints shall be constructed at right angles to the curb lines. Concrete shall be placed and compacted in forms without segregation.
- b. Prior to the removal of the forms, the surface shall be finished true to grade by means of a straightedge float, not less than 10 feet in length, operated longitudinally over the surface of the concrete. Form clamps shall be so constructed as not to interfere with the operation of this float.
- c. Immediately after removing the front curb forms, the face of the curb shall be troweled smooth to the flow line of the integral curb and gutter, and then finished with a steel trowel. The top shall be finished and the front and back edges rounded as shown on the plans.
- d. After the face of the curb has been troweled smooth, apply a final fine brush finish with brush strokes parallel to the line of the curb. Give gutters a broom finish with strokes parallel to the line of the gutter.
- e. Top and face of the finished curb: Shall be of uniform width, free from humps, sags, or other irregularities. When a straightedge 10 feet long is laid on the top of face of the curb or on the surface of gutters, the surface shall not vary more than 0.01 foot from the edge of the straightedge, except at grade changes or curves.
- f. Depress curbs to provide entrances for driveways and wheelchair ramps. The entrances shall be of the dimensions shown on the plans.

- g. Clean, at own expense, all discolored concrete. The concrete may be cleaned by abrasive blast cleaning or other methods approved by the Architect.
- h. Make repairs by removing and replacing the entire unit between scoring lines or joints.

#### 3.04 VALLEY GUTTER, CONCRETE PAVING MOW STRIPS AND SIDEWALKS

- a. Fresh concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. The surface shall be finished to grade and cross-section with a float, troweled smooth and finished with a broom. The float shall not be less than 10 feet in length and not less than 6 inches in width. Brooming shall be transverse to the line of traffic and, if water is necessary, it shall be applied to the surface immediately in advance of brooming. Test all valley gutters to prove conformance with Article 3.03 e.
- b. Expansion joints 1/2 inch wide shall be constructed at all turns and opposite expansion joints in adjacent curb. Where curb is not adjacent, expansion joints shall be constructed at intervals of 30 feet. Expansion joints shall be filled with pre-molded joint filler conforming to the provisions in Section 51-1.12c, "Premolded Expansion Joint Fillers". Contraction joints shall be constructed at 10-foot maximum spacing. Cut contraction joints minimum 1-1/4 inch deep with a jointing tool after surface has been finished.
- c. Where concrete borders are to be placed around or adjacent to manholes, drop inlets, or other miscellaneous structures in gutter depressions, island paving, or driveway areas, such structures shall be constructed to final grade before the borders are constructed.

#### 3.05 CONCRETE FINISHES

Broom Finish: Texture with medium broom finish to produce a uniform, non-skid (broom) finish on all surfaces with less than a 6% slope. Texture shall be a heavy broom finish on all surfaces with greater than 6% slope.

#### 3.06 CONCRETE CURING

- a. Spray the entire surface of the concrete uniformly with a white pigmented curing compound. Should the film of compound be damaged from any cause before the expiration of 72 hours, repair the damaged portions immediately with additional compound.
- b. Surface so newly placed concrete to be cured by the pigmented curing compound shall be kept moist or wet until the curing compound is applied and the curing compound shall not be applied until all patching or surfacing finishing has been completed.
- c. The curing compound shall be delivered to the work in ready-mixed form. At the time of use, the compound shall be in a thoroughly mixed condition with the pigment uniformly dispersed throughout the vehicle. The compound shall not be diluted or altered in any manner.

- d. Curing compound that has become chilled to such an extent that it is too viscous for satisfactory application shall be warmed to a temperature not exceeding 100 degrees F.
- e. Apply the curing compound to the exposed surface at a uniform rate of one gallon per 150 square feet of area.

**3.07 CLEAN UP**

- a. Upon completion of other work in buildings, all concrete paving surfaces shall be swept clean and all mortar and stains removed therefrom.
- b. The Contractor shall remove from the premises all surplus material, equipment, and debris as a result of work in this Section.

END OF SECTION  
10/24/2013