

- D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

## 1.9 WARRANTY

- A. Building System Warranty
  - 1. Furnish manufacturer's standard warranty for the metal building system, excluding paint.
  - 2. The manufacturer shall warrant the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment.
  - 3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
- B. Standing Seam Roof Weathertightness Warranty.
  - 1. Furnish manufacturer's weathertightness warranty for a maximum of 20 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
- C. Roof and Wall Paint Finish Warranty
  - 1. Paint Systems
    - a. Furnish manufacturer's standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units as set forth in ASTM-D-2244, and chalking in excess of 8 units as set forth in ASTM-D-4214.
    - b. The warranty shall be for a period of 30 years from the date of shipment for PVDF paint systems.
    - c. The warranty shall be for a period of 25 years from the date of shipment for silicone-polyester paint systems.
  - 2. Galvalume® systems
    - a. Furnish manufacturer's standard warranty for the Galvalume® panels against rupture, structural failure, or perforation due to normal atmospheric conditions.
    - b. The warranty shall be for a period of 20 years from the date of shipment for Galvalume® systems.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Nucor Building Systems; <http://www.nucorbuildingsystems.com>.
  - 1. Distributed by FCP Barns & Buildings.

Contact: Mike Regan - (805) 318-4809 / mregan@fcpinc.com.

- B. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

### 2.2 MATERIALS

- A. Primary Framing Steel:
  - 1. Steel for hot rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
  - 2. Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.

3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
  4. Square and Rectangular Tube must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 ksi.
  5. Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.
  6. X-bracing will conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.
- B. Secondary Framing Steel:
1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A-1011 or ASTM A-1039 Grade 55 for primed material or ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
  2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.
- C. Panels:
1. Roll-formed Galvalume®, pre-painted Galvalume® or Galvanized G90 Exterior-Side and G60 Interior-Side. In Canada, Galvanized panel will have a coating thickness of G90 on both sides.
  2. Standing Seam Panels must have:
    - a. (For US and Export) 50 percent minimum aluminum-zinc alloy- coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.
    - b. (For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume® finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.
  3. Through-fastened panels must have:
    - a. (For US and Export) 50 percent minimum aluminum-zinc alloy coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.
    - b. (For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.
  4. Panel Finish:
    - a. SP Finish: Modified Siliconized Polyester paint system with a 25-year finish warranty.
    - b. PVDF Finish: 70% PVDF paint system with a 30-year finish warranty.
- D. Panel Fasteners:
1. For Galvalume® and Painted finished roof panels: Long Life Cast Zinc head.
  2. For wall panels: Coated carbon steel.
  3. Color of exposed fastener heads to match the wall and roof panel finish.
  4. Concealed Fasteners: Self-drilling type, of size required.
- E. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.
- F. Roof Clips:
1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
  2. Short or Tall Sliding clips: shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction, depending on clip choice.
- G. Sealant And Closures:
1. Sidelaps: Factory applied non-skinning Butyl mastic.
  2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
  3. Outside Closures: Closed-cell, plastic or metal.
  4. Inside Closures: Closed-cell, plastic or metal.

## 2.3 PRIMARY FRAMING

- A. Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.
  - 1. Frame Design: Gable Symmetrical.
- B. Rigid Frame Columns:
  - 1. Straight/Uniform depth
  - 2. Tapered
- C. Rigid Frame Rafters:
  - 1. Straight/Uniform depth
  - 2. Tapered
- D. Endwall Frames / Roof Beams: Fabricated as mill-rolled sections or built-up "I" sections depending on design requirements. Fabricate endwall columns of cold-formed "C" sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
- E. Interior Columns: Columns supporting rafters of mainframes shall be of the following cross-section type(s):
  - 1. Pipe (Round HSS).
  - 2. Tube (Square HSS).
  - 3. "I"-Shaped (Built-Up or Mill-Rolled depending on design requirements).
- F. Finish: Red-Oxide or Gray Primer, or galvanized (pre coated galvanized cold-form, hot-dipped otherwise).
- G. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM A-325 or A-490 depending on design requirement.

## 2.4 SECONDARY FRAMING

- A. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI and LGSI. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will install through the purlin/girt webs, not purlin/girt flanges.
- B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
  - 1. Depth: To be determined by design per plans.
  - 2. Maximum Length: Per plans.
  - 3. Finish: Gray Primer.
- C. Girts: Horizontal structural members that support vertical panels.
  - 1. Depth: To be determined by design per plans.
  - 2. Maximum Length: per plans.
  - 3. Finish: Gray Primer.
- D. Eave Struts: Unequal flange, cold-formed "C" sections or "Z" purlins.
  - 1. Depth: To be determined by design per plans.
  - 2. Maximum Length: per plans.
  - 3. Finish: Gray Primer.
- E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
  - 1. Formed base sill.
  - 2. Base channel.
    - a. With flashing.
  - 3. Base angle.
    - a. With flashing.

4. Base girt.
    - a. With flashing.
  5. Finish: Gray Primer.
- F. Nucor Building Systems Roof Joist system.
1. Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
  2. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
  3. Nucor ClearBay® roof joist system with reduced bridging on qualified "CFR" projects.
  4. Roof Joist Seat attachment
    - a. Fully Bolted (no welding required)
  5. Roof Joist Bridging attachment
    - a. Fully Bolted (no welding required)
  6. Roof Joist Flange Brace attachment
    - a. Fully Bolted (no welding required)

## 2.5 ROOF PANELS

- A. Nucor VR16 II™ Roof Panel: A mechanically seamed pan-type standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
1. Gauge: 24 (Std.)
  2. Dimensions: 16 inches (406mm) wide by 2 inches (51mm) high
  3. Clips: Short or Tall Fixed.
  4. Finish/Color: To be selected by owner from manufacturer's standard range.

## 2.6 WALL PANELS

- A. Nucor Accent™ Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.
1. Gauge: 26 (Std.)
  2. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
  3. Finish/Color: To be selected by owner from manufacturer's standard range.

## 2.7 ACCESSORIES

- A. Framed Openings: Used to frame out doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.
- B. Walk Doors: Personnel entry doors.
1. Size: 3 foot by 7 foot (914x2133mm) Single Leaf.
  2. Door Hardware: Per plans.
- C. Overhead Coiling Doors: Steel slat curtain.
1. Size: 14 foot by 14 foot, field verify opening.
  2. Slats: Interlocking, minimum 22-gauge of ANSI/ASTM A653 steel, galvanized to minimum 1.25 oz/sq ft coating in accordance with ASTM A924. Cold roll formed in continuous lengths of 22 ga.
  3. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  4. Guide Construction: Two angles form a curtain guide and are bolted to a continuous wall angle. Sizes of structural steel angles are determined as required to retain curtain in guides under wind load and provide adequate mounting to jambs.
    - a. Provide structural 3-Pc. guides with malleable windlocks.

5. Lock Hardware:
  - a. Slide Bolt: Provide on single-jamb side, extending into slot in guides, with padlock on one side.
  - b. Manual Chain Lift: Provide padlockable chain keeper on guide.
6. Finishes:
  - a. Curtain Slats: Galvanized steel. Pre-finished with zinc phosphate primer at manufacture. 1. Powder coat finish (color as selected from RAL Chart). No field painting allowed.
  - b. Steel Guides: Galvanized steel. Pre-finished with zinc phosphate primer at manufacture.
7. Electric Operation:
  - a. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by UL (DIR) or testing agency acceptable to authorities having jurisdiction. Provide interlock switches on motor operated units.
  - b. Electric Operators: Side mounted gear hoist door operator, Model Pro-GH VFD with Red/Green warning light modification as manufactured by Micanan (or approved equal); 1.5 HP, 110 volt, single phase, mounted in accordance with manufacturer's specifications. Provide push button stations (interior) with radio control option.
  - c. 3-Channel Universal Receiver - Model 850LM.
  - d. Provide three (3) transmitters per door. Model 894LT.
  - e. Controller Enclosure: NEMA 250, Type 4.
  - f. Opening Speed: 7 seconds per 14' opening.
  - g. Brake: Manufacturer's standard type, activated by motor controller.
  - h. Manual override in case of power failure.
  - i. Interior Control Station: Recessed, standard three button (open-close-stop) control for each operator; 24 volt circuit. (NEMA 250, Type 4).
  - j. Commercial Protector System (CPS): Provide "non-contact" photo safety sensors designed to sense an obstruction between jambs and signals for the door operator to reverse to open. (NEMA 250, Type 4).
  - k. Safety Edge: Located at bottom of rolling door, full width, electro-mechanical sensitized type, wired to stop and reverse door direction upon striking object, hollow neoprene covered. Manufacturer: Miller Edge, Inc; - : [www.milleredge.com/#se](http://www.milleredge.com/#se).
- D. Daylighting with Prismatic Skylights:
  1. Curb Mounted Prismatic Skylights.
- E. Pipe Flashings: Pipe flashing shall be of a one piece construction and fabricated from an EPDM membrane and shall have an aluminum base that can be field conformed to any panel configuration. Pipe flashings shall be flexible for mounting on any roof slope. Service temperature ranges shall be from -30°F to +250°F. Three standard flashing sizes shall accommodate pipe sizes from 1/4" diameter up to 13" diameter.
  1. Size: Field verify.

## 2.8 PANEL FINISHES

- A. Roof Panel:
  1. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
    - a. Color: To be selected by owner from manufacturer's standard range.
- B. Wall Panel:
  1. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
    - a. Color: To be selected by owner from manufacturer's standard range.

## 2.9 FABRICATION

- A. General:

1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
  2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
  3. All framing members must carry an identifying mark.
- B. Primary Framing:
1. Plates, Stiffeners and Related Members: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
  2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
  3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
  4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
  5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.
- C. Open-Web Roof Joists:
1. Purlins for 'long-bay' building layouts shall consist of open-web bar joists designed under Steel Joist Institute (SJI) specifications by an SJI-Certified Joist Manufacturer for the prescribed loads.
- D. Zee Purlins:
1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.
- E. Girts
1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.
- F. Bracing:
1. Diagonal Bracing:
    - a. Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind or seismic forces. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.
    - b. Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.
  2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column will be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
  3. Flange Braces: The inside compression flange of all primary framing must be braced laterally with angles connecting to the bottom chords of joists or to the webs of purlins/girts so that the flange compressive stress is within allowable limits for any combination of loading.
  4. Bridging: Laterally bridge the top and bottom chords of the open-web bar joists as required by design thereof and specified on the building erection drawings.
- G. Standing Seam Panels - General:
1. One side of the panel is configured as female, having factory applied hot-melt mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.

2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
3. Maximum panel length is 55 feet (16,764mm) unless otherwise noted in the Contract Documents.
4. Endlaps:
  - a. Endlaps must have a 16 gauge backup plate and have the (8) endlap joint fasteners installed in dimpled locations in the flat with (1) endlap joint fastener installed in each trapezoid shoulder for a total of (10) fasteners at each endlap.
  - b. Apply mastic between the panels and secured with #12-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.
  - c. "Through-the-Roof" fasteners may only be used at endlaps and eaves.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment's to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.
- C. Proceed with erection only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

### **3.3 INSTALLATION**

- A. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
- B. Erection practices shall conform to "Common Industry Practices", Section 6, MBMA (LR)-Building Systems Manual.
- C. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.

### **3.4 PROTECTION**

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

**END OF SECTION**

**SECTION 230010  
BASIC MECHANICAL REQUIREMENTS**

**PART 1. GENERAL**

**1.01 SECTION INCLUDES**

- A. Basic Mechanical Requirements specifically applicable to Division 23 Sections, in addition to Division 01 - General Requirements.

**1.02 DESCRIPTION**

- A. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as required to complete the work of this section, except as otherwise herein specifically excluded.

**1.03 WORK INCLUDED**

- A. The complete Heating, Ventilating and Air Conditioning (HVAC) systems, including but not limited to these major items.
  - 1. Coordinate work of this Section with related trades.
  - 2. Diffusers and registers.
  - 3. Exhaust fans.
  - 4. Shop drawings.
  - 5. Equipment identification.
  - 6. Equipment and systems adjustments and balancing.
  - 7. Written operating and maintenance instructions.
  - 8. Record drawings.
  - 9. Guarantee.

**1.04 WORK SPECIFIED ELSEWHERE**

- A. Concrete, Rough Carpentry, Joint Sealants, Sheet Metal, Flashing and Trim, Access Door and Frames, Acoustical Ceiling Tile, Door Hardware, Paints and Coatings, Plumbing and Electrical.

**1.05 SITE INSPECTION**

- A. Contractor shall familiarize himself with the conditions at the site. No allowance will be made subsequently for any error through negligence in observing the site conditions. Contractor shall observe and make cost allowance for any mechanical and/or electrical items that must be relocated to accommodate the installation or servicing of any item covered under this contract.

**1.06 ORDINANCES, REGULATIONS AND CODES**



A. References to Technical Societies, Trade Organizations, Governmental Agencies is made in Division 15 in accordance with the following abbreviations.

1. AFI - Air Filter Institute
2. AMCA - Air Moving & Conditioning Association
3. ARI - Air Conitioning & Refrigeration Institute
4. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
5. ASME - American Society of Mechanical Engineers
6. ASTM - American Society of Testing Materials
7. AWS - American Welding Society Code
8. ANSI - American National Standards Institute
9. CBC - California Building Code
10. CCR - California Code of Regulations
11. CEC - California Electrical Code
12. CFC - California Fire Codes
13. CMC - California Mechanical Code
14. CPC - California Plumbing Code
15. FIA - Factory Insurance Association
16. NAFM - National Association of Fan Manufacturers
17. NEMA - National Electrical Manufacturer's Association
18. NFPA - National Fire Protection Association
19. ORS - Office of Regulatory Services
20. SCAQMD - South Coast Air Quality Management District
21. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
22. UFC - Uniform Fire Code
23. UL - Underwriter's Laboratories
24. UPC - Uniform Plumbing Code

B. Requirements of Regulatory Agencies: Materials and installation shall comply with applicable local, state, and national codes and ordinances. Rulings and interpretations of the enforcing

agencies shall be considered as part of the local codes. No extras will be permitted for furnishing items required by the local codes but not specified or shown on the drawings.

C. Codes and Standards:

1. IBC and California Amendments (California Building Code - Part 2, Title 24, CCR).
2. UMC and California Amendments (California Mechanical Code - Part 4, Title 24 CCR).
3. UPC and California Amendments (California Plumbing Code - Part 5, Title 24 CCR).
4. Uniform Fire Code with State Amendments (California Fire Code - Part 9, Title 24 CCR).
5. National Fire Protection Associations - National Fire Code.

D. Nothing in these drawings and specifications is to be construed to permit work in violation thereof. Ordinances, regulations and codes are to be construed as minimum requirements.

E. The responsibility of the Architect to conduct construction reviews of the Contractor's performance is not intended to include the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Ventilating, refrigeration and electrical equipment and appliances are required to be approved by the Underwriters' Laboratories, Inc., or other nationally recognized testing agency and installed per the testing agency's specifications.

**1.07 PERMITS, FEES AND INSPECTIONS**

A. Obtain and pay for all necessary permits, fees, assessments, complimentary drawings, required by any legally constituted public authorities having jurisdiction.

**1.08 DRAWINGS AND SPECIFICATIONS**

A. The Architect's decision will be final on interpretation of the Drawings and Specifications.

B. The Drawings and Specifications are complimentary. Any work called for on the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.

C. Piping, ductwork and other equipment shown as existing has been taken from the Owner's drawings. Contractor shall verify exact location in field before proceeding with the work.

D. Where codes, standards, drawings or specifications conflict, the most stringent shall prevail, unless prior approval for variance is obtained. Specific details on the drawings shall supersede the specification in the event of a conflict.

E. Alternate support or seismic detail proposed by contractor shall have prior approval by the Architect; and the Contractor shall obtain agency approval without any additional cost or time to the contract and without any time penalty on the work schedule.

**1.09 SUBMITTALS**

- A. Before starting work, the Contractor shall furnish for the approval of the Architect, Shop Drawings and Submittals with Itemized Equipment Lists, complete in all details that they proposes to install. All items shall be submitted at the same time.
- B. Submittals must be specific to this project with respect to model number, capacities, performance, etc., generic submittals will not be accepted.
- C. Variations or deviations on submitted items from that specified must be clearly tagged and / or identified
- D. Submittals shall include, but not necessarily be limited to the following which are mandatory:
  - 1. Draw Equipment Layouts to ¼" scale, including equipment, piping accessories, and showing clearances for operating and servicing.
  - 2. Fans, fan characteristic curves, fan tests.
  - 3. Dampers, louvers, grilles, registers, diffusers.
  - 4. Exhaust fans.
  - 5. Shop fabrications drawings and calculations.
  - 6. Special and miscellaneous products furnished under this section and not listed herein.

#### **1.10 RECORD DRAWINGS AND MANUALS**

- A. Record Set During the Work: At site maintain at least one set of Drawings as a Field Record Set. Also maintain at least one copy of all Addenda, Modifications, approved submittals, correspondence, and transmittals at site. Keep Drawings and data in good order and readily available to Architect and Owner.
- B. Changes: Clearly and correctly mark Record Drawings to show changes made during the construction process at the time the changed work is installed. No such changes shall be made in the work unless authorized by the Architect.
- C. Final Record Drawings: Conform to Division 01 requirements.
- D. Preparation of Final Record Drawings: Contractor shall transfer recorded changes in the work indicated on the Field Record Set to the record set. Changes shall be neatly and clearly drawn and noted by skilled draftsmen, and shown technically correct.
- E. Approval: Prior to Architect's inspection for Substantial Completion, submit the Final Record Drawings to the Architect for review, and make such revisions as may be necessary for Final Record Drawings to be a true, complete, and accurate record of the work.
- F. Manuals: Obtain data from the various manufacturers and submit instruction, operation, and maintenance manuals as required and to the extent required under other Sections.
- G. Contents: Each manual shall have an index listing the contents. Information in the manuals shall include not less than:

1. General introductions and overall equipment description, purpose, functions and simplified theory of operation.
  2. Specifications
  3. Installation instructions, procedures, sequences, and precautions, including tolerances for level, horizontal and vertical alignment.
  4. Grouting requirements.
  5. List showing lubricants for each item of mechanical equipment and recommended lubrication intervals.
  6. Start-up and beginning operation procedures.
  7. Operational procedures.
  8. Shutdown procedures.
  9. Maintenance and calibration procedures
  10. Parts lists
  11. Name, address and telephone number of each manufacturer's local representative.
- H. Manual Submittals: Unless otherwise specified, each submittal shall include two copies of each manual, one of which will be returned to the Contractor, marked to show the required review. When approved, deliver four copies to Architect unless otherwise specified.
- I. "As-Built" drawings of duct work and piping, including all elbows, transitions, damper and valve locations shall be provided prior to commencement of air and water balance.

#### **1.11 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP**

- A. Unless otherwise specified, equipment and materials used in the installation shall be new and in perfect condition when installed. Articles provided for the same general purpose or use shall be of the same make. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. Furnish the services of an experienced superintendent, who shall be constantly in charge of the work, together with all necessary journeymen, helpers and laborers required.

#### **1.12 SEISMIC DESIGN**

- A. Contractor shall be responsible for anchors and connections of mechanical work to the building structure including calculations for approval by structural engineer or for approval by inspector of record, as applies, for items or work, where approval is deferred or where alternate support or anchorage detail is proposed to prevent damage as a result of an earthquake, including manufactured equipment, the connection and integrity of shop fabricated and field fabricated materials and equipment. The anchorage of all pipes, ducts, conduits, fixtures, equipment, etc. shall withstand the lateral forces and shall accommodate calculated building displacement as required by the California Building Code, and local city/county codes. (Building equipment and

connections therefore shall be designed to resist lateral seismic forces equal to 1.0 of equipment weight to working allowable stress. Cantilever posts supporting equipment shall be designed to resist lateral seismic forces equal to 0.5 of equipment weight to allowable working stress. Conform to the following:

1. In accordance with Title 24, 2019 CBC Chapter 16A, details shall be provided for the seismic anchorage of all mechanical and electrical equipment, anchorage details shall be based upon appropriate design calculations.
2. The seismic anchorage of mechanical and electrical equipment shall conform to C.C.R. Title 24, 2019 CBC Chapter 16A. Anchorage details for roof/floor-mounted equipment shall be shown on plans.

### **1.13 SUBSTITUTIONS AND CHANGES**

- A. The design has been based on data from certain manufacturers, suitable for each application. Recommendations for alternative manufacturers are made for each product, except when "no substitutions permitted" is indicated.
- B. It is the intent of the Owner to have this project constructed with materials, products and system originally designed and specified into the project.
- C. Alternatives that may require the modification, realignment and/or adjustment of other associated components, including impact on other trades, shall be accomplished at no additional cost or time to the contract and shall have the approval of the Architect.
- D. Substitutions shall be submitted addressing all features listed in the specifications. Features that deviate from the plans and specifications shall be clearly identified including justification for deviations. Design West Engineers will review initial submittal on substitutes only. Subsequent submittals made to correct deficiencies in original submittals will be reviewed at Contractor's expense based on Design West Engineer's hourly rate for engineering services.
- E. Should the Contractor elect to propose substitutions for the Owner's interest, the substitutions shall be in compliance with Division 01.

### **1.14 SUBMITTAL REVIEWS**

- A. The Architect and / or Engineer will have the right to accept or reject equipment, materials, workmanship, tests and determine when the Contractor has complied with the requirements herein specified.

### **1.15 SELECTION AND ORDERING OF EQUIPMENT AND MATERIALS**

- A. Immediately after award of the Contract and after the final review of submittals by the Architect and / or Engineer, the Contractor shall arrange for the purchase and delivery of equipment and materials required, in ample quantities and at the proper time to meet the construction schedule. The contractor shall deliver to the Architect and Owner a complete list of equipment and materials ordered, giving descriptions, plate numbers, brochures, name of the wholesalers, date of the orders and approximate delivery dates.

**1.16 LOCATIONS AND ACCESSIBILITY**

- A. Drawings show pipe and ductwork diagrammatically. Conform to Drawings as closely as possible in layout work. Vary run of piping, run and shape of ductwork and make offsets during progress of work as required to meet structural and other interferences as reviewed by Architect and / or Engineer. Install piping and ductwork to best suit field conditions after coordinating with other trades. Run exposed piping and ductwork parallel to, or at right angle to, building walls. Keep horizontal lines as close to bottom of structures as possible. Conform to ceiling heights established on Drawings.
- B. Install equipment in such a manner as to be readily accessible for maintenance and repairs. Install piping, ducts and conduit in such a manner as to preserve headroom, avoid obstructions and keep openings and passageways clear.
- C. Installation at valves, thermometers, gauges, cleanouts, dampers, controls, steam and water specialties, duct access doors or any other indicating equipment or specialties requiring reading, adjustment, inspection, maintenance shall be conveniently and accessibly located with reference to the finished building.
- D. Where wall and ceiling access doors are required but not shown, such doors shall be furnished under other sections and as directed by the Architect. Coordinate this requirement with appropriate trade.
- E. If changes in the indicated locations or arrangements are required, they shall be made without additional charges.
- F. In an existing area, where required, remove, reinstall, reconnect or replace, etc., any existing work to accommodate new work without any additional cost to the Owner. Material shall match existing, unless otherwise specified or approved in writing by the Architect.
- G. Provide sheaves and belts if required, to Test, Adjust and Balance Agency, to allow air moving equipment to meet flow requirements specified at no additional cost to the Owner.

**1.17 COORDINATION OF TRADES**

- A. Contractor shall coordinate all trades in the interest of obtaining the most practical overall arrangement of equipment, piping, conduit, and ducts and to maintain maximum headroom and accessibility.
- B. No extras will be allowed for changes made necessary by interference or coordination between trades.
- C. Submit Composite Coordination Drawings in accordance with Submittal Procedures. Include dimensioned plans, elevations, sections and details and give complete information particularly as to the kinds and types of materials and equipment, size and location of sleeves, inserts, attachments, chases, openings, conduits, ducts, boxes, lighting, structural interferences. Coordinate these Composite Coordination Drawings and field layouts in the field for proper relationship to work of applicable trades based on field conditions. Contractor shall have competent personnel readily available for coordinating, checking, and supervision of field layouts. The procedures for submittals and resubmittals, and final distribution shall be as

specified in Division 01. Do not start installation of work involved under Composite Coordination Drawings until the Architect reviews applicable submittal. Discrepancies between the Drawings and Composite Coordination Drawings shall be specifically noted and identified on the Composite Coordination Drawings. Drawings for the various trades involved shall be submitted as required and reviewed prior to preparation of Composite Coordination Drawings.

1. Equipment Foundations and Bases: Furnish certified details and drawings for approval before fabrication. Furnish parts necessary for each foundation subbase and support.
2. Pipe Sleeves and Inserts: Furnish and install pipe sleeves and pipe support inserts before concrete is poured.
3. Roof, Wall and Floor Openings: Furnish Shop Drawings showing exact locations and sizes of openings through roofs, walls and floors.
4. Concrete: Conform to Concrete Section of the Specifications.

#### **1.18 GUARANTEES**

- A. Contractor shall guarantee workmanship, equipment and materials installed under his contract for a period of not less than one (1) year from the date of Substantial Completion. Should any defects occur during this period, the Contractor shall promptly repair or replace the defective item and any other damage caused to the building free of charge to the Owner, including cost of labor and materials.
- B. Guarantee included in this section to cover:
  1. Faulty or inadequate design of equipment or material installed
  2. Improper assembly or erection
  3. Defective workmanship or material
  4. Incorrect or inadequate operation or other failure
- C. The contractor shall guarantee the complete and perfect operation of the entire system and that equipment will be supported in such a way as to be free of objectionable vibration and noise
- D. Furnish the parts and labor to replace any items found to be defective in the mechanical equipment with the guarantee period.
- E. In addition to other guarantees, furnish free maintenance for the refrigeration equipment, including replacement of refrigerant and oil, for a period of one (1) year. This shall include regular monthly maintenance and "On Call" service if required.
- F. For equipment bearing a manufacturer's warranty in excess of one year, furnish a copy of the warranty and proof of shipment date or purchase date per terms of warranty to the Owner, who shall be named as beneficiary.

#### **1.19 PROTECTION OF EQUIPMENT AND MATERIALS**

- A. Provide adequate storage facilities for equipment and materials on the site and shall make provisions to protect such materials and equipment from damage.

#### **1.20 CLOSING-IN OF UNINSPECTED WORK**

- A. Contractor shall not allow or cause any of the work, specifically ductwork and piping, to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Should any of work be covered up or enclosed before such inspection and test, he shall at his own expense, uncover the work and after it has been inspected, tested, and approved, make repairs with such materials as may be necessary to restore work to its original and proper condition.

#### **1.21 BUILDING FOOTING CLEARANCES**

- A. Under no circumstances shall pipes, ducts, or conduits penetrate footings. They shall cross below footings or through sleeves above footings. Those running parallel to footings shall have the minimum clearance from the cone of influence indicated on the Drawings or as required by Code.

#### **1.22 DAMAGE BY LEAKS**

- A. Contractor shall be responsible for all damage to any part of the premises caused by rain leaks through or around ducts or pipes, leaks or breaks in piping, equipment or fixtures furnished or installed by him for a period of one (1) year from the date of Substantial Completion.

#### **1.23 EQUIPMENT LABELS**

- A. Equipment provided under this Section shall be provided with the manufacturer's metal identification labels attached to each individual piece of equipment showing complete performance characteristics, size, model and serial number.

#### **1.24 PRELIMINARY OPERATION**

- A. Should the Owner request that any portion of the plant, apparatus, or equipment be operated for the Owner's beneficial use prior to the final completion and acceptance of the work, the Contractor shall conform to Beneficial Occupancy Provisions of the General Conditions. Such operation shall be under the supervision and direction of the Contractor. Such preliminary operation shall not be construed as an acceptance of any of the work.

#### **1.25 ELECTRICAL WORK**

- A. Coordinate with Division 26 in making the line and low voltage electrical connections and be responsible for the operation of the equipment furnished under this section.
- B. Voltage for electrical work will be included in Division 26. However, any control wiring which is required that is not shown on the control diagram shall be as described under this Section. In the event that the Contractor chooses to provide equipment that requires extra expense in the power or control wiring, he shall pay additional electrical costs.



- C. Safety switches, starters, circuit breakers, unless provided as a portion of package equipment, and the electrical connections of mechanical equipment to the electrical power service shall be provided under Division 26.
- D. Interconnecting wiring, safety switches, relays, controllers and motor starters which are integral components of packaged equipment shall be provided as an integral part of that equipment.
- E. All interconnecting power wiring and conduits shall be provided by Division 26.
- F. Control wiring shall be provided by Division 23, unless otherwise indicated on the drawings.
- G. Conduit for control wiring shall be provided by Division 26.

NOT FOR BID