

**SECTION 0 530 00**

**STEEL DECK**

**PART 1 - GENERAL**

**1.1 GENERAL**

Work of this Section shall conform to the requirements of Drawings and general provisions of the Contract, including General Conditions, Supplementary General Conditions and Division 1 Specification sections.

**1.2 SCOPE**

The work covered by this Section shall include all labor, material, equipment, permits, engineering and other services necessary for the installation of composite and non-composite structural steel floor deck systems, steel roof deck systems and related work with all attachments, flashings, metal closures, concrete stops, accessories and fittings as required for a complete installation in accordance with the Drawings and as specified herein.

**1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS:**

Submittals	Division 1
Quality Control	Division 1
Cast-In-Place Concrete	Section 033000
Structural Steel	Section 051200
Steel Joists	Section 053000
Miscellaneous Metals	Division 5
Fireproofing	Division 7
Painting	Division 9

**1.4 CODES AND STANDARDS**

- A. Building Code: Steel deck work shall conform to the requirements of the Building Code identified on the Structural General Notes, and OSHA requirements, except where more stringent conditions or criteria occur in the standards referenced below and on the Drawings.
- B. Standards:
  - 1. All steel floor and roof deck manufacturers shall be listed in the Underwriter's Laboratories "Fire Resistance Index of Companies".
  - 2. American Iron and Steel Institute (AISI) "Specification for the Design of Cold-Formed Steel Structural Members", latest edition.
  - 3. American Welding Society AWS D1.3 , "Structural Welding Code – Sheet Steel."
  - 4. American Society for Testing and Materials "ASTM Standards in Building Codes", various standards as referenced herein, latest edition.

5. Steel Deck Institute (SDI) "Design Manual for Composite Decks, Form Decks and Roof Decks", latest edition.

C. Definitions:

1. See Section 051200.

## 1.5 STEEL DECK MANUFACTURER AND CONTRACTOR QUALIFICATIONS

- A. The Manufacturer and the Steel Deck Erector ("Erector") shall each demonstrate a minimum of ten (10) years of experience with the specified steel deck systems.
- B. The Erector shall use prequalified welding processes in accordance with the AWS Structural Welding Code and shall provide certification that those welders to be employed in the Work are currently qualified for those processes and have satisfactorily passed the applicable AWS qualification tests.

## 1.6 SUBMITTALS

- A. Required Submittals - Where the SUBMITTALS section of this Specification is in conflict with Division 1 Submittals, the more stringent requirements for the Contractor apply. Required submittal items are listed here; see below for detailed requirements. Do not submit items not requested.

- (1) Submittal Schedule
- (2) Shop Drawings and Erection Drawings
- (3) Manufacturer's Certification
- (4) Manufacturer's Installation Instructions
- (5) Welder Certifications
- (6) Research Reports or Evaluation Reports
- (7) LEED Submittals

1. **Submittal Schedule:** The Steel Deck Contractor shall submit a schedule of drawing and calculation submissions at least twenty (20) working days prior to commencing submission of drawings and calculations. The schedule will indicate the number of drawings and calculations proposed to be submitted each week. Any modifications to the schedule shall be submitted for approval at least twenty (20) working days prior to modification is proposed to take place.
2. **Shop Drawings and Erection Drawings** (including Field Work Drawings): Submit for approval shop drawings and erection drawings for all steel deck indicated on the Contract Documents.
  - a) Materials shall not be fabricated or delivered to the site before the shop drawings have been approved or approved as noted by the Design Professionals and returned to the Contractor.
  - b) Shop Drawings shall clearly indicate:
    - i. Deck types (profiles), steel gauges, and deck finishes.
    - ii. Deck layout, including panel locations, number of deck spans per panel, structural support locations and joint locations.

- iii. Deck dimensions and sections keyed to layout plans, including side and end details and bearing requirements.
  - iv. Deck fastener types (welds, screws, pins, proprietary systems) and layout patterns at panel sides, ends and interior supports.
  - v. Details and locations of accessories including hardware, framing reinforcement anchorage, sump pans, cant strips, ridge plates, valley plates and closure plates. Show dimensioned location at edges of closure plates.
  - vi. Fabrication necessary to incorporate steel deck into the job.
  - vii. Correlation with other requirements, openings and flashings.
  - viii. Contractor-coordinated openings for mechanical, electrical, plumbing, fire protection and other trades.
- c) The Contractor shall have reviewed and approved the shop drawings prior to submission to the Design Professionals for their review, representing that the Contractor has verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog number and similar data with respect thereto and reviewed or coordinated each drawing and sample with the work of other trades and with the requirements of the project and the Contract Documents.
- 3. **Manufacturer's Certification:** Submit for record a letter of certification from the deck manufacturer stating that the fabrication of the steel deck to be installed under this Section are in accordance with the SDI Design Manual for Composite Decks, Form Decks and Roof Decks.
- 4. **Manufacturer's Installation Instructions:** Submit for record Manufacturer's literature providing recommended installation instructions.
- 5. **Welder Certifications:** Submit for record welder certificates signed by the Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.
- 6. **Research or Evaluation Reports:** Submit for record research reports or evaluation reports of the model code organization acceptable to authorities having jurisdiction that evidence steel deck's compliance with the building code in effect for the Project.
- B. Submittal Process: See Section 051200
- C. SER Submittal Review: See Section 051200
- D. Substitution Request: See Section 051200
- E. Request for Information (RFI): See Section 051200
- 1.7 COORDINATION AND TEMPORARY SUPPORT
  - A. Consult and cooperate with Contractors for other trades whose work affects or is affected by work under this Section in order that all phases of the work are

properly coordinated to avoid delays, errors, omissions, or damage to any part of the work.

- B. Steel Deck Contractor shall inform General Contractor of any special support requirements such as shoring of deck for wet concrete loads.
- C. General Contractor shall coordinate with Steel Deck Contractor regarding any construction loads on deck before concreting, and on completed deck in excess of the design loads shown. Such conditions may include both gravity and lateral loads.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Do not bend or mar decking.
- B. Store off ground with one end elevated for drainage.
- C. Cover decking with waterproof material, ventilated to avoid condensation.
- D. Do not store deck bundles on framing unless material is securely tied down and the framing has been analyzed to ensure that such storage will not cause an overload.

#### 1.9 STRUCTURAL STEEL PRE-ERECTION CONFERENCE

See Section 051200

#### 1.10 QUALITY ASSURANCE BY OWNER'S TESTING AGENCY

- A. Owner's Testing & Inspection Agency ("Testing Agency"):
  - 1. Reports: The Testing Agency shall include in the daily reports of the structural steel, steel deck progress and description/area of work, tests made and results.
  - 2. Prior to erection, the Owner's Testing Agency will:
    - a) Review all analysis and certificates of compliance
    - b) Test samples of thickness at base metal thickness at galvanized coating as required by applicable ASTM standards.
  - 3. Coordination: The Contractor shall have sole responsibility for coordinating his work with the Testing Agency to assure that all test and inspection procedures required by the Contract Documents and/or Public Agencies, are properly provided. The Contractor shall cooperate fully with the Testing Agency in the performance of their work.
  - 4. Cost: Except as specifically noted otherwise, the Testing Agency shall be engaged and paid by the Owner.
- B. Decking is subject to inspection and testing once connected in place:

1. Expense of removing and replacing any portion of decking for testing purposes will be borne by the Owner if connections are found to be satisfactory.
2. Contractor shall remove work found to be defective and provide acceptable work at no additional cost to the Owner.

**C. Field Inspection:**

1. All steel deck shall be inspected after erection to ascertain the following relative to approved shop drawings:
  - a) Deck profile, type (acoustic, cellular, vented), gage and finish
  - b) Deck orientation, alignment, bearing and laps (if applicable)
  - c) Supplementary items including secondary supports, closures, pour stops, sumps and their connections to deck and to other members
  - d) Damage of members during transportation, storage and erection
  - e) Installation for proper erection
  - f) Connections (for quantity, size and spacing, and quality of welds) including continuous inspection of deck welding, fit-up and welding equipment.
2. Headed studs (shear connectors):
  - a) Do not weld studs through more than one layer of steel deck, except where cellular deck is specified.
  - b) For pre-production and production testing requirements see Section 051200.

**D. Testing Agency Reports & Certifications:**

1. Indicate to the Contractor where remedial work must be performed. Track and retest all locations of remedial work.
2. Upon completion of work and resolution of remedial items, certify in a letter to the Design Professionals and Owner that the installation is in accordance with the design and Specification requirements (including applicable codes).

**1.11 QUALITY CONTROL BY CONTRACTOR**

See Section 051200.

**1.12 OBSERVATIONS AND CORRECTIONS BY DESIGN PROFESSIONALS**

See Section 051200.

**1.13 PERMITS AND WARRANTY**

See Section 051200.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

The work specified herein is based on the products of Verco Manufacturing Co. and ASC Profiles, Inc., in order to establish design quality and function in the installed work. Products of other manufacturers shall be subject to the approval of the Design Professionals. All steel deck units shall be of the same depth and profile as shown on the Drawings and the product of one manufacturer.

### **2.2 DESIGN**

- A. Section properties of the steel deck units shall be calculated in accordance with the AISI North America "Specification for the Design of Cold-Formed Steel Structural Members", latest edition.
- B. Steel Decking shall be approved by ICC or IAPMO for lateral shear resistance.

### **2.3 MATERIALS**

- A. Prime Painted Cold Rolled Steel Sheet for deck and accessories: ASTM A1008 SS Grade 33 (minimum) with minimum yield strength of 33ksi (230MPa). Surface in contact with concrete (typically top) to be phosphatized. Exposed surface (typically bottom) to have oven cured gray or white lead- and chromate-free rust-inhibitive primer to 0.3 mil nominal dry film thickness.
- B. Galvanized Steel: steel deck and all closures and flashings shall be formed from steel sheets conforming to ASTM A653, Structural Quality Grade 33 (minimum) with minimum yield strength of 33 ksi (230MPa). Before forming, the steel sheet shall be coated with a zinc coating conforming to ASTM A653 G60.
- C. Floor decking shall be formed with integral locking lugs or embossments to provide a mechanical lock between the steel floor and the concrete slab sufficient to resist at least twice the design shear force. Minimum depth of embossments or locking lugs shall be .050"(1.3mm).
- D. All steel decking shall be roll formed for uniformity in dimension and strength.
- E. Floor and roof decking shall be classified by Underwriters' Laboratories, Inc. Each unit or bundle shall be labeled and marked as required by UL, indicating manufacturer, testing, and inspection.
- F. Decking use with insulating and conventional fills shall have factory punched vents.

### **2.4 ACCESSORIES**

- A. General: Provide accessory materials for steel deck that comply with requirements indicated and recommendations of the steel deck manufacturer.
- B. Pour Stops and Girder Fillers: Steel sheet, of same material as deck panels, and of thickness and profile indicated, but not less than the deck gauge.

- C. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material and thickness as deck panels, unless otherwise indicated.
- D. Hanger Tabs: Manufacturer's standard UL rated piercing steel sheet hanger attachment devices for floor deck panels.
- E. Recessed Sump Pans: Manufacturer's standard size, single piece steel sheet 0.071-inch (1.8mm) thick minimum, of same material as deck panels, with 1-1/2-inch (40mm) minimum deep level recessed pans and 3-inch (75mm) wide flanges. Cut holes for drains in the field.
- F. Flat Receiver Pan: Manufacturer's standard size, single-piece steel sheet, 0.071" (1.8mm) thick minimum units, of same material as deck panels.
- G. Miscellaneous Roof Deck Accessories: Steel sheet ridge and valley plates, finish strips, and reinforcing channels, of same material and thickness as roof deck unless otherwise indicated.
- H. Headed Studs (shear connectors) shall be per Structural General Notes.
- I. Steel Sheet Accessories: ASTM A 653, galvanized to G 90 coating class.
- J. Galvanizing Repair Paint: SSPC Paint 20 or MIL-P-21035, with dry film containing a minimum of 94% zinc dust by weight.
- K. Flexible Rib Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- L. Sound-Absorbing Insulation: As required by the Contract Documents, provide manufacturer's standard premolded roll or strip glass fiber or mineral fiber.

**2.5 SIDE JOINT HANGER SYSTEM FOR USE IN COMPOSITE STEEL FLOOR DECK ONLY**

- A. Provide hanger tabs along the side joints of units at 1'-0" (300mm) centers.
- B. Side joint hanger tabs shall have a minimum allowable static load capacity of at least 100 lbs (45kg). and shall accommodate a flat bar hanger (no rod hangars).
- C. All hangers, their installation, and tab activation shall be by trades requiring the tabs.
- D. No plastered ceilings shall be hung from side joint hanger tabs.
- E. No mechanical, electrical, plumbing or fire protection loads shall be hung from deck side joint hanger tabs.

**2.6 MISCELLANEOUS MATERIALS**

- A. Arc-Welding Electrodes: AWS A5.1 E60XX or E70XX Series, as required for the conditions of use.
- B. Touch Up Paint: use galvanized repair paint specified above.

- C. Closure Tape as required to maintain cells clear of concrete at abutting panel ends.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Work by Others: Examine all work prepared by others to receive work of this Section, especially plan and elevation locations of supporting frames and walls. Report any defects affecting installation to Design Professionals. The Contractor alone shall be responsible for checking the dimensions and coordination of the steel deck work with other trades.
- B. Do not place deck units on supports with debris or unapproved coatings that could affect full, level bearing and proper connections.
- C. Do not place deck units on concrete supporting structures until concrete has cured and is dry.
- D. Coordinate the location of decking bundles with a structural steel erector to prevent overloading of structural members.

### **3.2 ERECTION – PLACEMENT**

- A. Erect steel deck in accordance with the decking manufacturer's recommendations and the requirements of the Drawings and these Specifications.
- B. Place steel deck on the supporting framework and adjust to final position with ends accurately aligned and bearing on supporting members before making permanent connections. Do not stretch or contract sidelap interlocks. Provide in lengths to be continuous for not less than three spans and to rest on minimum of four supports where structural steel framing permits.
- C. Place deck units flat, square, without warping or excessive deflections, in straight alignment for entire length of run of cells and align within ¼ inch between the cells at ends of abutting units. Install with ribs at right angles to supporting members where possible.
- D. Abutting ends of deck panels shall occur over supports. End bearing shall be a minimum of 2 inches (50mm), or greater if required (web crippling) by deck manufacturer and the requirements of the drawings and these specifications.
- E. Where deck panels nest, laps shall be a minimum of 2" (50mm) and shall occur over supports. Nesting is permitted only where profiles are designed to nest and are fabricated with offset ends.
- F. Install slab edge closures and pour stops at the theoretical position with maximum tolerance of + 3/8" (10mm). Closures and pour stops shall have adequate adjustments to maintain this tolerance while accommodating the structural steel frame tolerances.



**3.3 ERECTION - CONNECTIONS**

- A. Connect steel deck to the steel framework at ends of units and at intermediate supports as shown on the Contract Documents and approved shop drawings.
- B. Deck to support welds shall be puddle welds of diameter and spacing shown on Contract Documents and/or approved shop drawings.
- C. Use welding washers for puddle welding at deck thinner than 22 gauge (0.85mm) and where recommended by the manufacturer
- D. Where headed studs occur, if fused to deck for full weld perimeter each headed stud may be considered to replace one puddle weld
- E. Fasten side laps and perimeter edges of panels between supports by button punching, side seam welding or screws, or as noted on Construction Drawings.

**3.4 ERECTION – OPENINGS AND CLOSURES**

- A. Contractor to coordinate location of all openings with other trades (see Submittals).
- B. Cut and install sleeves and holes through decking for openings indicated on the Architectural, Structural, and/or Mechanical-Electrical-Plumbing-Fire Protection Drawings. Cost shall be paid by the trade requiring such sleeves and holes. Sleeves will be furnished by the various trades requiring them. Provide and install reinforcement as required around sleeves. Where possible, leave deck intact and use block outs to hold back concrete at openings. Cut deck after concrete cures.
- C. Provide miscellaneous headers and other steel reinforcing and supports welded to decking and structural steel as required at penetrations, around columns, etc. per typical details and manufacturer's recommendations.
- D. Field cutting parallel to flutes shall be done in the low flutes, taking care to leave sufficient horizontal material to permit satisfactory welding of deck to supporting steel.
- E. Openings required for work of other trades and not indicated on Architectural, Structural, Mechanical / Electrical / Plumbing / Fire Protection / Telecom Drawings shall be permitted only upon approval of the Design Professionals as to size and location.
- F. Furnish and install tight-fitting closures at locations including but not limited to
  - 1. Open ends of flutes and sides of decking (neoprene or sheet steel)
  - 2. Open ends of all flutes at columns, walls and openings shown on Contract Drawings
  - 3. Panel ends where panels change direction or abut (sheet steel or closure tape)
  - 4. Between deck units and columns (sheet steel)
  - 5. Between columns and exterior cladding (sheet steel)

6. Welding hole cover, with friction fastening, to close excess holes when required (sheet steel).

### 3.5 WELDING

- A. Welding of steel deck shall follow the technique outlined by the steel deck manufacturer, AISI NAS and AWS D1.3.
- B. Welding of headed studs shall conform to all AWS requirements, including workmanship, quality control, and inspection, which shall be performed by the Contractor and observed by the Owner's testing agency.

### 3.6 ROOF SUMP PANS

Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches (300mm) o.c. with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size shown, coordinate with Plumbing Drawings.

### 3.7 CONCRETE PLACEMENT

- A. Concrete with admixtures containing chloride salts or other deleterious materials shall not be used with steel deck.
- B. Steel deck used to support concrete buggy runways shall be adequately protected against wheel damage. Decking and any runways or shoring shall be evaluated and designed by Contractor's Engineer.

### 3.8 TOUCH-UP

- A. After installation touch-up welds on galvanized decking with specified galvanized repair paint to a dry film thickness of 2 mils, at all locations that will not receive concrete fill.
- B. Touch-Up Painting: Where exposed to view, wire brush, clean, and paint scarred areas, welds, and rust spots on both surfaces of installed deck panels.
  1. Touch up painted surfaces with same type of shop paint used on adjacent surfaces.
  2. Where shop-painted surfaces are exposed in-service, apply touch-up paint to blend into adjacent surfaces.

END OF SECTION