

## SECTION 053100

### FLUTED STEEL DECKS

#### PART 1 GENERAL

##### 1.01 REFERENCES

- A. Comply with the following reference standards unless otherwise shown or specified:
  - 1. Design: "Specification for the Design of Cold-Formed Steel Structural Members" by the American Iron and Steel Institute (AISI Specification).
  - 2. Welding: "Structural Welding Code - Sheet Steel, AWS D 1.3", by the American Welding Society (AWS Code).

##### 1.02 SUBMITTALS

- A. Product Data: Manufacturer's printed specifications and installation instructions.
- B. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel within this specification section, if available. A statement of the contractor's good faith effort to obtain the EPD shall be provided if not available.
  - 1. Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services*.
- C. Quality Control Submittals:
  - 1. Certificates: Copy of certificates required under Quality Assurance Article.

##### 1.03 QUALITY ASSURANCE

- A. Certificates: Affidavit by the structural steel manufacturer certifying that structural steel items meet the contract requirements.
  - 1. Submit evidence of steel material compliance with this Specification. Evidence shall consist of certification of source of material, copies of purchase orders and manufacturer's certifications. For stock material, submit copies of latest mill or purchase orders for material replacement.
    - a. Documentation to confirm compliance with General Conditions Article 25.4 Domestic Steel.
  - 2. The Contractor agrees, that if the value of this contract exceeds \$100,000 all structural steel, reinforcing steel and other major steel items to be incorporated in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.

## **1.04 HANDLING AND STORAGE**

- A. Handle and stack materials carefully in order to prevent deformation or damage. During unloading and hoisting, take extra care to prevent damage to ends and sides of individual metal deck panels. Do not place panels in direct contact with the ground. Protect panels from the elements and keep panels dry.
  - 1. If mud, dirt, or other foreign matter is accumulated on panels, remove such accumulation completely prior to installation.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Fluted Deck and Metal Accessories: Sheet steel conforming to ASTM A 611 Grade C or ASTM A 653 SQ Grade 33. Before fabrication, sheet steel shall receive ASTM A653, Class G 90, hot dip zinc coating; or, except where specified or shown to be galvanized, shall receive chemical cleaning, phosphate treatment, and baked on primer. Finish shall be evenly coated with no cracking after fabrication. Accessories shall be fabricated of not lighter than 18 US Standard Gage sheet steel.
- B. Self-Drilling Fasteners: No. 12-14 x 3/4 inch, hex washer head, self-drilling fastener with pilot point.
- C. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber closure strips.

### **2.02 FABRICATION**

- A. Steel deck shall be formed with maximum distance of 2-5/8 inches between flutes at upper faces and a minimum distance of 2 inches at lower flute faces. Furnish units in lengths to be continuous over 3 spans wherever possible.
- B. Steel deck shall conform to the following properties:
  - 1. Unit depth:
  - 2. Minimum section modulus at supports for negative bending in continuous spans:
  - 3. Minimum section modulus for positive bending:
  - 4. Minimum moment of inertia:
  - 5. Minimum US Standard Gage:
  - 6. Flute spacing:
- C. Unless otherwise indicated or approved, fabricate deck for predetermined openings, and reinforce where required to maintain deck strength, alignment, and profile.
  - 1. Small openings, as recommended by the deck manufacturer, may be field cut.

- D. Accessories: Shop fabricated accessories, compatible with steel deck, as required to complete the Work, including, but not limited to, the following:
  - 1. Sheet metal cants beneath flashings when required for roofing over steel deck.
  - 2. Closures to close deck at ridges, valleys, and hips on roof deck slopes exceeding 1/2 inch per foot.
  - 3. Pour stops and girder fillers for concrete fill.
  - 4. Column closures, end closures, Z closures, and cover plates.
  
- E. Progress shop fabrication from “APPROVED” or “APPROVED AS NOTED” detail drawings only.
  - 1. When detail drawings are “APPROVED AS NOTED”, progress fabrication in strict accordance with notes thereon.
  - 2. Fabrication progressed from “DISAPPROVED” or “RETURNED FOR CORRECTION” detail drawings will be rejected. The contractor shall have no claim against the State for any costs or delays due to rejection of items fabricated from “DISAPPROVED” or “RETURNED FOR CORRECTION” detail drawings.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine supporting framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of steel deck.
  
- B. Do not start installation of metal deck until corresponding steel framework has been plumbed, aligned and completed and until temporary shoring, where required, has been installed. Coordinate installation sequence of metal deck with concrete encasement of steel beams.
  
- C. Steel surfaces to which materials, provided under this Section, are to be welded, shall be free of paint, ice, water, oil, dirt, rust and other materials detrimental to welding.
  
- D. Locate decking bundles to prevent overloading of supporting members

### **3.02 INSTALLATION**

- A. Install the Work of this Section in accordance with the manufacturer’s printed instructions except where shown or specified otherwise.
  - 1. Welding shall comply with the AWS Code.
  - 2. Perform welding free of sharp points.
  
- B. Place deck units on supporting steel framework and adjust to final position with ends bearing on supporting members and flutes in straight and true alignment through entire length of run before being permanently fastened. Do not stretch or contract side lap interlocks. Install temporary shoring before placing single span deck panels when required to meet manufacturer’s recommendations.

- C. End Bearing: Install deck units over supporting framing with a minimum end bearing of 1-1/2 inches, with end joints as follows:
  - 1. Non-Composite Deck End Joints: Lapped 2 inches minimum.
  - 2. Composite Deck End Joints: Butted.
  
- D. Deck Fastening: Fasten deck units at ends and intermediate supports with arc spot welds (puddle welds) not less than 3/4 inch diameter, at 12 inches on centers, along the supporting members, unless more stringent requirements are indicated on the drawings or required by the fire resistance ratings indicated on the drawings. Weld the first and last deck flutes. Use welding washers for all deck lighter than 20 gage. Deck units may be fastened to steel supports 0.18 inches or less in thickness (cold-formed metal framing) with No.12-14 x 3/4 inch self-drilling fasteners at 12 inches on center at ends and intermediate supports.
  
- E. Side lap fastening: Fasten side laps at intervals not exceeding 36 inches, using one of the following methods, unless more stringent requirements are indicated on the drawings or required by the fire resistance ratings indicated on the drawings:
  - 1. Mechanically fasten with self-drilling No.12 diameter or larger carbon steel screws.
  - 2. Mechanically button punch.
  
- F. Perimeter Edge Fastening: Weld starting and finishing side edges in bearing to supporting members at 36 inches on centers maximum, unless more stringent requirements are indicated on the drawings or required by the fire resistance ratings indicated on the drawings.
  
- G. Neatly field cut required openings, other than shop fabricated openings, after installation in accordance with the manufacturer's recommendations.

**END OF SECTION**