

**SECTION 05 31 00**  
**STEEL DECKING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SECTION INCLUDES**

- A. Roof deck.
- B. Supplementary framing for openings up to and including 18 inches.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 45 33 - Special Inspections: Code required special tests and inspections.
- B. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches.
- C. Section 05 50 00 - Metal Fabrications: Steel angle concrete stops at deck edges.

**1.04 REFERENCE STANDARDS**

- A. ANSI/ASSE A10.3 - Safety Requirements for Powder-Actuated Fastening System; 2013
- B. ANSI/SDI RD - Standard for Steel Roof Deck, Steel Deck Institute; 2017
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- D. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).
- E. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.
- F. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- G. FM DS 1-28 - Wind Design; 2016.
- H. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2020).
- I. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2016.
- J. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2016.
- K. SDI DDM04 - Diaphragm Design Manual Fourth Edition, including latest errata and addendum; Steel Deck Institute; 2015
- L. SDI COSP - Code of Standard Practice; Steel Deck Institute; 2017
- M. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- N. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
- C. Shop Drawings: Submit detailed shop drawings showing layout and types of deck panels, weld or mechanical fastener types and sizes, weld or mechanical fastener patterns, conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories. Where variances in substrate thickness require the use of multiple mechanical fastener types, the layout locations of each fastener type must be clearly indicated

in plan on the shop drawings. Include calculations and required information if not completely covered by load tables and products data.

- D. Mechanical fasteners shall be permitted to fasten deck to support framing where specifically indicated on the Drawings or in lieu of welding where approved by the Architect Engineer. Where mechanical fasteners are proposed in lieu of welds, include calculations in accordance with SDI Diaphragm Design Manual indicating equivalent diaphragm strength to specified attachment pattern.
- E. Certificates: Certify that products furnished meet or exceed specified requirements.
- F. Submit manufacturer's installation instructions.
- G. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before start of scheduled welding work.

## **1.06 QUALITY ASSURANCE**

- A. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.
- B. An independent special inspector shall:
  - 1. Verify placement of deck for alignment and proper lap.
  - 2. Verify deck gage.
  - 3. The inspector shall verify welding procedures and welder qualifications prior to the start of work.
  - 4. Welds: Visually inspect 100% of welded connections for proper size, quality, and pattern. Measure all weld sizes where adequacy is inconclusive based on a visual inspection. All welds with inadequate size or other deficiencies must be repaired.
  - 5. Mechanical fasteners: Visually inspect 100% of connections for proper type, embedment, and spacing. Examine washer condition and ensure deck is clamped to the supporting steel framing. Measure all fastener embedments where adequacy is inconclusive based on a visual inspection. All deficient mechanical connectors must be corrected by replacing the deficient connector.
  - 6. Verify sidelap connections.
- C. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of documented experience.
  - 1. All personnel installing steel deck mechanical fasteners shall be trained and licensed on the project site by a manufacturer's representative.
- D. Operators of Powder-actuated tools shall be certified in accordance with ANSI/ASSE A10.3.

## **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Cut plastic wrap to encourage ventilation.
- B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Steel Deck:
  - 1. Canam Steel Corporation; \_\_\_\_: [www.canam-steeljoists.ws](http://www.canam-steeljoists.ws).
  - 2. Cordeck, Inc; \_\_\_\_: [www.cordeck.com/#sle](http://www.cordeck.com/#sle).
  - 3. Nucor-Vulcraft Group; \_\_\_\_: [www.vulcraft.com/#sle](http://www.vulcraft.com/#sle).
  - 4. ASC Steel Deck: [www.ascsd.com](http://www.ascsd.com).
  - 5. New Millennium : [www.newmill.com](http://www.newmill.com)
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 STEEL DECK**

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

1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230 minimum, with G90/Z275 galvanized coating.
2. Structural Properties:
  - a. Provide deck type and minimum properties as indicated on the drawings.
  - b. Provide vented deck where required by the lightweight insulating concrete supplier.

## **2.03 ACCESSORY MATERIALS**

- A. Welding Materials: AWS D1.1/D1.1M.
- B. Fasteners: Galvanized hardened steel, self tapping.
- C. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
  1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI design method for roof deck and floor deck applications, ICC-ES AC 43, FM wind uplift resistance, and specified UL fire-rated roof assembly.
  2. Where fasteners are exposed to the elements in their final condition, an AISI 304 stainless steel sealing cap with bonded neoprene washer shall be installed over each fastener. Alternately, fasteners with coatings that have met the requirements of ASTM G85 Annex E for 140 cycles are permitted.
- D. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
  1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of 1SDI design method for roof deck and floor deck applications, 1, and 1/2 wind uplift resistance.
- E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

## **2.04 FABRICATED DECK ACCESSORIES**

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, cover plates, and ridge and valley plates, 20 gauge, 0.0359 inch thick sheet steel; of profile and size as indicated; finished same as deck.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.

### **3.02 INSTALLATION**

- A. Erect metal deck in accordance with manufacturer's instructions and SDI Code of Standard Practice and ANSI/SDI Standards for each deck type . Align and level.
- B. On steel supports provide minimum 1-1/2 inch bearing.
- C. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods indicated on drawings.
- D. At mechanically fastened male/female side laps fasten at 24 inches on center maximum, unless indicated otherwise on drawings.
- E. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and mechanically anchor or puddle weld to deck at each flute.

- H. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Puddle weld 12 inches on center maximum.
- I. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- J. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.
- K. Suspended ceilings, light fixtures, equipment, ducts or other utilities shall not be supported by the steel roof deck.

### **3.03 MECHANICAL FASTENING**

- A. Gauge powder-actuated tool systems to the base material steel type, steel deck type and thickness prior to final installation. Confirm appropriate power regulation and powder-actuated cartridge type prior to final installation.
- B. Verify axis of fastener is within +/- 10 degrees of perpendicular to the deck prior to driving.
- C. Where two panels butt, fasten each deck unit with separate fasteners.

### **3.04 NONCONFORMING WORK AND REPAIRS**

- A. Work not conforming with the contract documents shall be repaired or replaced at the Contractor's expense.
- B. Additional testing and inspection required to determine compliance of corrected work shall be at the Contractor's expense.
- C. Repair damaged galvanized coatings on both surfaces of the deck with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.
- D. Repair damaged paint coatings on painted sides of the deck with repair paint.
  - 1. Wire brush and clean rust spots, welds, and abraded areas.
  - 2. Repair paint shall be of same color as shop-primed deck where exposed to view.
- E. Replace or supplement under-driven and over-driven mechanical fasteners with adjacent, properly installed fasteners.

### **3.05 QUALITY CONTROL**

- A. A qualified representative from the manufacturer of mechanical fasteners used to anchor deck to supporting structure shall conduct a pre-installation conference with all contractors involved in installing the metal deck. The manufacturer's representative shall visit the project site and inspect the start up of deck anchorage to insure that the correct fastener type, location and installation procedures are followed. A written report of the meeting and inspection by the manufacturer's representative shall be forwarded to the Architect Engineer.
- B. All deck fastening to supports and sidelap fastener installation will be visually inspected for quantity and quality by a independent special inspector. See Section 014533 (01410).
  - 1. Connections and welds that are found unsatisfactory by the inspecting laboratory shall be corrected to the satisfaction of the inspector at the Contractor's expense. A copy of the final report shall be submitted to the Architect Engineer for review.
  - 2. Connections, welds, and shear studs shall not be covered or made inaccessible until the final approval is obtained.

**END OF SECTION**