

SECTION 05 31 00 STEEL DECKING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. This section specifies material and services required for installation of steel decking as shown and specified.

1.2 RELATED WORK:

- A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Finish Painting: Section 09 91 00, PAINTING.
- C. Steel Framing: Section 05 12 00, STRUCTURAL STEEL FRAMING.

1.3 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Shop and erection drawings showing decking unit layout, connections to supporting members, and similar information necessary for complete installation as shown and specified, including supplementary framing, sump pans, ridge and valley plates, cant strips, cut openings, special jointing or other accessories. Show welding, side lap, closure, deck reinforcing and closure reinforcing details. Show openings required for work of other trades, including openings not shown on structural drawings. Indicate where temporary shoring is required to satisfy design criteria.
- C. Manufacturer's Literature and Data: Showing steel decking section properties and specifying structural characteristics.
- D. Mill Certificates:
 - 1. The Contractor shall provide Mill Certificates for each heat of each type of metal deck to be used on the project.
 - 2. Mill Certificates shall include name of mill, date of rolling, date of shipping, yield point and minimum tensile strength.
 - 3. Mill Certificates shall be provided with each lot of material shipped to the site and shall be signed by the Contractor which will serve to

certify that all metal deck materials installed comply with specified requirements.

4. When Mill Certificates cannot be provided, the Contractor shall hire a professional testing laboratory to verify compliance and provide laboratory test reports. The cost of the testing shall be paid for by the Contractor.
- E. Laboratory Test Reports: Laboratory test reports shall show the name of testing agency, date of testing, types of tests performed and shall be signed by a principal of the testing agency who is a registered Civil Engineer in the State of California.
- F. ICC or IAPMO Approvals: Each type of metal deck proposed for use on the project shall have ICC or IAPMO approval for vertical load and diaphragm rating capacities in accordance with the requirements shown on the structural drawings or required by these applications.
- G. Insurance Certification: Assist the Government in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance.

1.4 QUALITY ASSURANCE:

- A. FM Listing: Provide metal roof deck units which have been evaluated by Factory Mutual Global and are listed in "Factory Mutual Research Approval Guide" for "Class 1" fire rated construction.
- B. Codes and Standards: The fabrication and erection of metal deck shall comply with all the applicable provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
 1. IBC current governing edition.
 2. Code of Recommended Practice, SDI, current edition.
 3. AISI S100
- C. Sampling, Testing and Inspection
 1. If the inspector, through oversight or otherwise, has accepted material or work which is defective or contrary to specifications, this material or work, regardless of state of completion, may be rejected.

2. The Contractor shall identify and tag each lot of deck to be shipped to the site by heat number in such a manner that it can be accurately identified at the job site.
 3. The Contractor shall remove all unidentified metal deck received at the site.
- D. Installer Qualifications: Company shall specialize in performing the work of this Section and shall be approved by manufacturer as having previous experience in this type of installation.

1.5 APPLICABLE PUBLICATIONS: (EDITIONS ADOPTED BY CURRENT GOVERNING INTERNATIONAL BUILDING CODE)

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
- A36/A36M-08.....Standard Specification for Carbon Structural Steel
 - ASTM A1008/A1008M-12 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
 - A653/A653M-11Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process
 - C423-09a.....Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- C. American Institute of Steel Construction (AISC):
- 360-10Specification for Structural Steel Buildings.
- D. American Iron and Steel Institute (AISI):
- S100-07North American Specification for the Design of Cold-Formed Steel Structural Members, 2007 Edition with Supplement 2.aisc
- E. American Welding Society (AWS):
- D1.3-08.....Structural Welding Code - Sheet Steel

- F. SDI MOC – Manual of Construction with Steel Deck.
- G. (DM)– Publication No. 31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute.
- H. Factory Mutual (FM Global):
 - 1. Loss Prevention Data Sheet 1-28: Wind Loads to Roof Systems and Roof Deck Securement
 - 2. Factory Mutual Research Approval Guide (2002)
- I. Military Specifications (Mil. Spec.)
 - MIL-P-21035B Paint, High Zinc Dust Content, Galvanizing Repair

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Steel Deck
 - 1. Roof Deck: Non-composite type, fluted steel sheet:
 - a. Galvanized Steel Sheet: ASTM A653, Structural Steel (SS) Grade 50, with G60 or G90 Galvanized coating as shown on the plans.
 - b. Structural Properties: The deck type (profile) and thickness (gage) shall be as shown on the plans.
- B. Tolerance:
 - 1. Uncoated thickness shall not be less than 95% of the design thickness as listed in the following table:

Gage No.	Design Thickness (in)	Minimum Thickness (in)
28	0.0149	0.014
26	0.0179	0.017
24	0.0238	0.023
22	0.0295	0.028
20	0.0358	0.034
18	0.0474	0.045

16 0.0598 0.057

2. Panel length shall be within plus or minus ½" of specified length.
3. Panel cover width shall be no greater than minus 3/8" plus ¾".
4. Panel camber and/or sweep shall be no greater than ¼" in 10' length.
5. Panel end out of square shall not be greater than 1/8" per foot of panel width.

C. Galvanizing Repair Paint: Mil. Spec. MIL-P-21035B.

D. Primer for Shop Painted Sheets: Manufacturer's standard primer (2 coats). When finish painting of steel decking is specified in Section 09 91 00, PAINTING primer coating shall be compatible with specified finish painting.

E. Miscellaneous Steel Shapes: ASTM A36.

F. Welding Electrode: E7018.

G. Sheet Metal Accessories: ASTM A653, galvanized, unless noted otherwise. Provide accessories of every kind required to complete the installation of metal decking in the system shown. Finish sheet metal items to match deck including, but not limited to, the following items:

1. Metal Cover Plates: For end-abutting deck units, to close gaps at changes in deck direction, columns, walls and openings. Same quality as deck units but not less than 1.3 mm (18 gauge) sheet steel.
2. Continuous Sheet Metal Edging: At openings, and roof deck edges. Same quality as deck units but not less than 1.3 mm (18 gauge) steel. The deflection of cantilever closures shall be limited to 3 mm (1/8 inch) maximum.
3. Metal Closure Strips: For openings between decking and other construction, of not less than 1.3 mm (18 gauge) sheet steel of the same quality as the deck units. Form to the configuration required to provide tight-fitting closures at open ends of flutes and sides of decking.
4. Ridge and Valley Plates: Provide 1.3 mm (18 gauge), minimum 100 mm (4 inch) wide ridge and valley plates where roof slope exceeds 40 mm per meter (1/2 inch per foot).

5. Cant Strips: Provide bent metal 45 degree leg cant strips where indicated on the Drawings. Fabricate cant strips from 1 mm (20 gauge) metal with a minimum 125 mm (5 inch) face width.
6. Seat Angles for Deck: Provide where a beam does not frame into a column.
7. Sump Pans for Roof Drains: Fabricated from single piece of minimum 1.9 mm (14 gauge) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 75 mm (3 inches) wide. Recess pans not less than 38 mm (1 1/2 inches) below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.

2.2 REQUIREMENTS:

- A. Do not use steel deck for hanging supports for any type or kind of building components including suspended ceilings, electrical light fixtures, plumbing, heating, or air conditioning pipes or ducts or electrical conduits.
- B. Steel decking units used for interstitial levels shall include an integral system.
 1. System to provide a simple point of attachment for light duty hanger devices.
 2. System to allow for flexibility for attaching hangers for support of suspended ceilings, electrical, plumbing, heating, or air conditioning items, weight not to exceed 50 kg/m² (10 psf).
 3. System shall provide for a minimum spacing pattern of 300 mm (12 inches) on centers longitudinally and 600 mm (24 inches) on centers transversely.
 4. Maximum load suspended from any hanger is 23 kg (50 pounds).
 5. System consisting of fold-down type hanger tabs or lip hanger is acceptable.

PART 3 - EXECUTION

3.1 ERECTION:

- A. Do not start installation of metal decking until corresponding steel framework has been plumbed, aligned and completed and until temporary shoring, where required, has been installed. Remove any oil, dirt, paint,

ice, water and rust from steel surfaces to which metal decking will be welded.

- B. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
- C. Do not use deck units for storage or working platforms until permanently secured. Do not overload deck units once placed. Replace any deck units that become damaged after erection and prior to casting concrete at no cost to the Government.
- D. Provide steel decking in sufficient lengths to extend over 3 or more spans. Care shall be exercised to properly fit male-female units of side laps before crimping or connecting.
- E. Place steel decking units at right angles to supporting members. End laps of sheets of roof deck shall be a minimum of 50 mm (2 inches) and shall occur over supports.
- F. Cutting and Fitting:
 - 1. Cut all metal deck units to proper length in the shop prior to shipping.
 - 2. Field cutting by the metal deck erector is restricted to bevel cuts, notching to fit around columns and similar items, and cutting openings that are located and dimensioned on the Structural Drawings.
 - 3. Other penetrations shown on the approved metal deck shop drawings but not shown on the Structural Drawings are to be located, cut and reinforced by the trade requiring the opening.
 - 4. Make all cuts neat and trim using a metal saw, drill or punchout device; cutting with torches is expressly prohibited.
 - 5. Do not make any cuts in the metal deck that are not shown on the approved metal deck drawings. If an additional opening not shown on the approved shop drawings is required, submit a sketch, to scale, locating the required new opening and any other openings and supports in the immediate area. Do not cut the opening until the sketch has been reviewed and accepted by the COR. Provide any additional reinforcing or framing required for the opening at no cost to the Government. Failure to comply with these requirements is cause for rejection of the work and removal and replacement of the affected metal deck.

6. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking, and support of other work shown.
7. Attachment of the metal deck to the steel frame and side lap connections shall be as shown on the structural drawings.
8. Install metal deck and accessories in accordance with manufacturer's instructions and SDI MOC.
9. Any deck which is found to be damaged shall be removed and replaced at the Contractor's expense with no additional cost to the Government.

3.2 WELDING:

- A. Welds shall be made only by welders and welding operators who have been previously qualified by tests as prescribed in AWS D1.3.
- B. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches.
- C. Where welding washers are not used, a minimum visible 5/8 inch diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material at end laps and shall have good fusion to the supporting members.

3.3 FIELD REPAIR:

- A. Areas scarred during erection.
- B. Welds to be thoroughly cleaned and touched-up. Touch-up paint for zinc-coated units shall be zinc rich galvanizing repair paint. Touch-up paint for shop painted units of same type used for shop painting.

END OF SECTION 05 31 00