



AMERICAN NATIONAL STANDARDS INSTITUTE/ STEEL DECK INSTITUTE

NC - 2017 Standard for

Non-Composite Steel Floor Deck

INCLUDES ERRATA #1 - 11.07.17



Documents

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1. General

1.1 Scope:

- A. This Standard for Non-Composite Steel Floor Deck, hereafter referred to as the Standard, shall govern the materials, design, and erection of cold formed steel deck which is used as a form for structural concrete slabs in floor and roof applications, or as the primary load carrying element without a structural concrete slab, in buildings and similar structures.
- B. The Appendices shall be part of the Standard.
- C. The User Notes and Commentary shall not be part of the Standard.

User Note: User Notes and Commentary are intended to provide practical guidance in the use and application of this Standard.

- D. Where the Standard refers to “designer,” this shall mean the entity that is responsible to the Owner for the overall structural design of the project, including the steel deck.

User Note: This is usually the Structural Engineer of Record.

- E. Equations that appear in this Standard are compatible with the US Customary System (USCS) of units. However, any consistent system of units shall be permitted to be used. SI units or equations shown in parenthesis in this Standard are for information only and are not part of this Standard.

User Note: The USCS is also referred to as English Units or the inch-pound system.

- F. Terms not defined in this Standard, AISI S100 or AISI/AISC shall have the ordinary accepted meaning for the context for which they are intended.
- G. It shall be permitted to specify deck base steel thickness either by dimensional thickness, or by gage when the relationship of base steel thickness to gage has been defined by the deck manufacturer. However, for the purpose of design, the dimensional thickness shall be used.

Commentary: Both AISI and SDI now specify steel thickness in terms of design thickness in lieu of gage thickness. Gage thicknesses, however, are still commonly referred to in the metal deck industry. Table UN-1.1 shows common gages and corresponding uncoated design and minimum steel thicknesses.

Table UN-1.1

Gage No.	Design Thickness		Minimum Thickness ¹	
	in.	mm.	in.	mm.
22	0.0295	0.75	0.028	0.71
20	0.0358	0.91	0.034	0.86
18	0.0474	1.20	0.045	1.14
16	0.0598	1.52	0.057	1.44

¹ Minimum delivered thickness is 95% of the design thickness.

1.2 Reference Codes, Standards, and Documents:

- A. Codes and Standards: The following documents or portions thereof are referenced in this Standard and shall be considered part of the requirements of this Standard. Where these documents conflict with this Standard, the requirements of this Standard shall control:
1. American Iron and Steel Institute (AISI)
 - a. AISI S100-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
 - b. AISI S310-16, North American Standard for the Design of Profiled Steel Diaphragm Panels.
 - c. AISI S905-13, Test Methods for Mechanically Fastened Cold-Formed Steel Connections.
 - d. AISI/AISC, Standard Definitions for Use in the Design of Steel Structures, 2007 edition.
 2. American Welding Society (AWS)
 - a. AWS D1.1:2015, Structural Welding Code-Steel
 - b. AWS D1.3:2008, Structural Welding Code-Sheet Steel
 3. American Society of Civil Engineers (ASCE)
 - a. SEI/ASCE 7-16, Minimum Design Loads for Buildings and Other Structures
 4. American Concrete Institute (ACI)
 - a. ACI 318-14, Building Code Requirements for Structural Concrete
 5. American Institute of Steel Construction (AISC)
 - a. ANSI/AISC 360-16, Specification for Structural Steel Buildings

Commentary: The following documents are referenced within the Commentary and User Notes:

1. American Iron and Steel Institute (AISI)
 - a. AISI S100-16, North American Specification for the Design of Cold-Formed Steel Structural Members.
2. American Society for Testing and Materials (ASTM)
 - a. ASTM A653 / A653M - 15 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - b. ASTM A1008 / A1008M - 15, 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
 - c. ASTM E119 - 14, Standard Test Methods for Fire Tests of Building Construction and Materials
3. Underwriters Laboratories (UL)
 - a. Fire Resistance Directory
4. Steel Deck Institute (SDI)
 - a. SDI COSP-2017, Code of Standard Practice.
 - b. SDI-DDM, Diaphragm Design Manual, 4th Edition.
 - c. SDI-FDDM, Floor Deck Design Manual, 1st Edition
 - d. SDI-MOC, Manual of Construction with Steel Deck, 3rd Edition

- 1.3 Construction Documents:** The construction documents shall describe the non-composite steel floor deck and concrete slab that are to be constructed and shall include not less than the following information:
- A. Loads
 - 1. Floor loads as required by the applicable building code. Where applicable, load information shall include concentrated loads.
 - 2. Assumed construction phase loads.
 - B. Structural framing plans for all floor deck areas showing the size, location and type of all deck supports.
 - C. Deck and Deck Attachment
 - 1. Depth, type (profile), and design thickness.
 - 2. Deck material (including yield strength) and deck finish,
 - 3. Deck attachment type, spacing, and details.
 - D. Concrete and Reinforcing
 - 1. Specified concrete strength, f'_c
 - 2. Specified concrete density (and tolerance if required for fire rating assembly)
 - 3. Specified strength or grade of reinforcing steel or welded wire reinforcement
 - 4. Size, extent and location of all reinforcement
 - 5. Slab thicknesses (and tolerance if required for fire rating assembly)

User Note: The following is an example of a non-composite steel deck and slab as it could be specified on the contract drawings: "Steel floor shall consist of 1-1/2 inch deep G-60 galvanized non-composite steel deck, design thickness 0.0358 inch (20 gage), $F_y = 40$ ksi (Type XX by YY, Inc or approved equivalent) with 4 inch thick, 3000 psi, normal-weight concrete topping (total thickness = 5-1/2 inches) reinforced with XXX. Deck shall be attached to supporting framing using #12 screws in a 36/7 pattern. (4) #10 sidelap screws shall be installed per deck span."

2. Products

2.1 Material:

- A. Sheet steel for deck shall conform to AISI S100, Section A3.
- B. Sheet steel for accessories that carry defined loads shall conform to AISI S100, Section A3. Sheet steel for non-structural accessories that do not carry defined loads shall be permitted to be any steel that is adequate for the proposed application.
- C. All sheet steel used for deck or accessories that carry defined loads shall have a minimum specified yield stress that meets or exceeds 33 ksi (230 Mpa).

Commentary: Most steel deck is manufactured from steel conforming to ASTM A1008 /A1008M, Structural Sheet for uncoated or uncoated top/painted bottom deck or from ASTM A653 / A653M, Structural Sheet for galvanized deck. In most cases the designer will choose one finish or the other. However, both types of finish may be used on a project, in which case the designer must indicate on the plans and project specifications the areas in which each is used. (Refer to Section 2.3 of this Standard). Stainless steel is not recommended due to the lack of available performance data.

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- D. Concrete and Reinforcement:
1. Concrete placed on steel deck shall conform to ACI 318, Chapter 19, except as modified by Sections 2.1.D.2 and 2.1.D.3.
 2. The specified concrete compressive strength shall not be less than 3000 psi (21 MPa).

User Note: Load tables and labeled fire resistant rated assemblies may require concrete compressive strengths in excess of 3000 psi.

3. Admixtures containing chloride salts or other substances that are corrosive or otherwise deleterious to the steel deck and embedded items shall not be permitted.
4. Steel Reinforcing shall conform to ACI 318, Section 20.2.

2.2 Tolerance of Delivered Material:

- A. The minimum uncoated steel thickness as delivered to the job site shall not at any location be less than 95% of the design thickness, however lesser thicknesses shall be permitted at bends, such as corners, due to cold-forming effects.

User Note: The minimum delivered thickness is in accordance with AISI S100.

- B. Panel length shall be no less than ½ inch (13 mm) shorter than the specified length nor greater than ½ inch (13 mm) longer than the specified length for single span or butted end deck. Panel length shall be no less than ½ inch (13 mm) shorter than the specified length for lapped end deck.

User Note: No restriction is placed on over length panels in lapped applications because there is no adverse consequence in this application.

- C. Panel cover width shall be no less than 3/8 inch (10 mm) less than the specified panel width, nor more than 3/4 inch (19 mm) greater than the specified width.
- D. Panel camber and/or sweep shall not be greater than 1/4 inch in a 10 foot length (6 mm in 3 m).
- E. Panel end out of square shall not exceed 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

- A. The finish on the steel deck shall be specified by the designer.
- B. Galvanizing or other metallic coatings (if specified by the designer) shall conform to the requirements of the applicable steels in AISI S100, Section A3.

User Note: The most commonly specified galvanized sheet steel is ASTM A653 / A653M.

- C. A shop coat of primer paint (one or both sides) shall be applied to steel sheet if specified by the designer.