



AMERICAN NATIONAL STANDARDS INSTITUTE/ STEEL DECK INSTITUTE

NC - 2010 Standard for

Non-Composite Steel Floor Deck



Documents

Document Skinning Hub

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 reinforced concrete slabs in floor and roof applications in buildings and similar structures.
- B. The appendices shall be part of the Standard.
- C. The user notes and user note attachments shall not be part of the Standard.

User Note: User notes and user note attachments 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. This is usually the Structural Engineer of Record.
- E. Equations that appear in this Standard are compatible with the inch-pounds system of units. However, any consistent system of units may be used. SI units or equations are shown in parenthesis in this Standard are for information only and are not part of this Standard.
- 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.

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
 - 1. American Iron and Steel Institute (AISI)
 - a. AISI S100-07 w/S2-10, North American Specification for the Design of Cold-Formed Steel Structural Members, Including Supplement 2 (February 2010)
 - b. AISI S905-08, Test Methods for Mechanically Fastened Cold-Formed Steel Connections
 - c. AISI S907-08, Test Standard for Cantilever Test Method for Cold-Formed Steel Diaphragms
 - d. AISI/AISC, Standard Definitions for Use in the Design of Steel Structures, 2007 edition
 - 2. American Welding Society (AWS)
 - a. AWS D1.1:2010, Structural Welding Code-Steel
 - b. AWS D1.3:2008, Structural Welding Code-Sheet Steel
 - 3. American Society for Testing and Materials (ASTM)
 - a. ASTM A653 / A653M - 08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

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- b. ASTM A1008 / A1008M - 08a, 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
 - 4. American Concrete Institute (ACI)
 - a. ACI 318-08, Building Code Requirements for Structural Concrete
 - 5. American Institute of Steel Construction (AISC)
 - a. ANSI/AISC 360-10, Specification for Structural Steel Buildings
- B. Reference Documents: 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 more stringent shall control.
 - 1. Steel Deck Institute (SDI)
 - a. SDI-DDM, Diaphragm Design Manual, 3rd Edition, including Appendices I through VI

User Note: The following documents are referenced within the user notes:

- 1. American Iron and Steel Institute (AISI)
 - a. AISI S100-07 w/S2-10, North American Specification for the Design of Cold-Formed Steel Structural Members, Including Supplement 2 (February 2010)
 - b. AISI S907-08, Test Standard for Cantilever Test Method for Cold-Formed Steel Diaphragms
- 2. American Society for Testing and Materials (ASTM)
 - a. ASTM A653 / A653M - 08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - b. ASTM A1008 / A1008M - 08a, 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 - 08a, 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-DDM, Diaphragm Design Manual, 3rd Edition, including Appendices I through VI
 - b. SDI-MOC, Manual of Construction with Steel Deck, 2nd Edition

2 Products

2.1 Material:

- A. All sheet steel used for deck or accessories shall have a minimum specified yield stress which meets or exceeds 33 ksi (230 Mpa) and a maximum specified yield stress which shall not exceed 80 ksi (550 Mpa).

User Note: The 80 ksi upper limit on specified yield stress applies only to the specified limit for a particular steel grade. Steel supplied under that specified grade may have mill certificates that report yield strengths of greater than 80 ksi.

accordance with AISI S100, this is acceptable and should not be considered to be grounds for rejection.

- B. Sheet steel for galvanized deck shall conform to ASTM A653 / A653M, Structural Steel. Other galvanized structural sheet steels or high strength low alloy steels shall be permitted in accordance with AISI S100, Section A2.
- C. Sheet steel for uncoated deck shall conform to ASTM A1008 / A1008M. Other structural sheet steels or high strength low alloy steels shall be permitted in accordance with AISI S100, Section A2.

User Note: Materials are offered in A653 (A653M) grade 80 steel (galvanized) or ASTM A1008 (A1008M) grade 80 steel (uncoated). This steel has a minimum yield strength of 80 ksi (550 MPa) and is generally over 90 ksi (620 MPa). Depending on the deck geometry, AISI S100 limits the maximum design yield stress to 60 ksi (415 MPa) for this material.

User Note: Most steel deck is manufactured from steel conforming to ASTM A1008 / A1008M, or from ASTM A653 / A653M, Structural Sheet Steel. When specifying alternative steels, certain restrictions apply, particularly as noted in AISI S100-07, Paragraph A2.3.2. Section 2.1B of this standard refers to the use of galvanized deck while Section 2.1C refers to the use of uncoated or uncoated top/painted underside 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). Specification of painted deck in areas that require spray-on fireproofing should be avoided unless specifically permitted by the applicable fire rated assembly. This must be clearly called out in the contract documents. In general, there are three types of fire resistive assemblies; those achieving the fire resistance by membrane protection, direct applied protection, or with an unprotected assembly. Of these three, only the systems that utilize direct applied protection are concerned with the finish of the steel deck. In these systems, the finish of the steel deck can be the factor that governs the fire resistance rating that is achieved. In assemblies with direct applied fire protection the finish (paint) is critical. In the Underwriters Laboratories Fire Resistance Directory, some of the individual deck manufacturing companies have steel deck units that are classified in some of the D700, D800, and D900-series roof-ceiling designs. These classified deck units (Classified Steel Floor and Form Units) are shown as having a galvanized finish or a phosphatized/painted finish. These classified deck units have been evaluated for use in these specific designs and found acceptable.

- D. Sheet steel for accessories shall conform to ASTM A653 / A653M, Structural Steel for structural accessories, ASTM A653 / A653M, Commercial Steel for non-structural accessories, or ASTM A1008 / A1008M for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels shall be permitted in accordance with AISI S100, Section A2.
- E. The deck type (profile) and thickness (gage) shall be as shown on the plans.
- F. Concrete:
 - 1. The specified concrete compression strength shall not be less than 3 ksi (21 MPa).
 - 2. Concrete and reinforcing steel placed on steel deck shall conform to ACI 318, Chapters 3, 4, and 5, except as modified in this standard.

3. Admixtures containing chloride salts or other substances that are deleterious to the steel deck shall not be permitted.

User Note: The use of admixtures containing chloride salts is not allowed because the salts will corrode the steel deck. Other admixtures may also have corrosive effects.

2.2 Tolerance:

- 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 as permitted by 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. Galvanizing shall conform to ASTM A653 / A653M.
- B. A shop coat of primer paint (one or both sides) shall be applied to steel sheet if specified by the designer.

User Note: Although deck painted on the top may be used as a form, uncoated steel or a galvanized surface is typically used in contact with concrete to achieve better chemical bond.

- C. The finish on the steel deck shall be compatible for the environment to which the deck is exposed within the finished structure, and shall be specified by the designer.

User Note: When galvanized material is used to support a reinforced concrete slab, the slab dead load is considered to be permanently carried by the deck. For any permanent load carrying function, a minimum galvanized coating conforming to ASTM A924 (A924M), G30 (Z090) is recommended.

User Note: The finish on the steel deck should be as specified by the designer and be suitable for the environment to which the deck is exposed within the finished structure. When non-composite deck with a painted bottom is used, the primer coat is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions and shall be considered an impermanent and provisional