
USACE / NAVFAC / AFCEA / NASA UFGS-05310 (October 2003)

Preparing Activity: NAVFAC MasterFormat™ 2004 - 05 30 00
 Superceding
 UFGS-05310 (September 1999)
 UFGS-05300A (January 2002)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 23 June 2005

SECTION TABLE OF CONTENTS

DIVISION 05 - METALS

SECTION 05310

STEEL DECKS

10/03

PART 1 GENERAL

- 1.1 REFERENCES
- 1.2 SUBMITTALS
- 1.3 QUALITY ASSURANCE
 - 1.3.1 Deck Units
 - 1.3.2 Certification of Piston Tool Operator
 - 1.3.3 Qualification of Welders
 - 1.3.4 Regulatory Requirements
 - 1.3.4.1 Fire Safety
 - 1.3.4.2 Wind Storm Resistance
 - 1.3.5 Fabrication Drawings
- 1.4 DELIVERY, STORAGE, AND HANDLING

PART 2 PRODUCTS

- 2.1 MATERIALS
 - 2.1.1 Steel Sheet
 - 2.1.2 Steel Coating
 - 2.1.3 Sound Absorbing Material
- 2.2 ACCESSORIES
 - 2.2.1 Adjusting Plates
 - 2.2.2 End Closures
 - 2.2.3 Partition Closures
 - 2.2.4 Closure Plates for Composite Deck
 - 2.2.5 Sheet Metal Collar
 - 2.2.6 Cover Plates
 - 2.2.7 Sump Pans
 - 2.2.8 Column Closures
 - 2.2.9 Access Hole Covers
 - 2.2.10 Hanger
 - 2.2.11 Shear Connectors
 - 2.2.12 Mechanical Fasteners
 - 2.2.13 Miscellaneous Accessories

- 2.3 FABRICATION
 - 2.3.1 Deck Units
 - 2.3.2 Roof Deck
 - 2.3.3 Form Deck
 - 2.3.4 Composite Deck
 - 2.3.5 Cellular Decking
 - 2.3.6 Acoustical Steel Deck
 - 2.3.7 Venting
 - 2.3.8 Shop Priming
 - 2.3.9 Touch-Up Paint

PART 3 EXECUTION

- 3.1 EXAMINATION
- 3.2 INSTALLATION
 - 3.2.1 Attachment
 - 3.2.1.1 Welding
 - 3.2.1.2 Fastening
 - 3.2.2 Openings
 - 3.2.3 Deck Damage
 - 3.2.4 Accessory Installation
 - 3.2.4.1 Adjusting Plates
 - 3.2.4.2 End Closures
 - 3.2.4.3 Closures Above Partitions
 - 3.2.4.4 Cover Plates
 - 3.2.4.5 Column Closures
 - 3.2.4.6 Access Hole Covers
 - 3.2.4.7 Hangers
 - 3.2.5 Sound Absorbing Material
 - 3.2.6 Concrete Work
 - 3.2.7 Preparation of Fire-Proofed Surfaces
- 3.3 FIELD QUALITY CONTROL
 - 3.3.1 Decks Not Receiving Concrete

-- End of Section Table of Contents --

USACE / NAVFAC / AFCEA / NASA UFGS-05310 (October 2003)

Preparing Activity: NAVFAC MasterFormat™ 2004 - 05 30 00
 Superceding
 UFGS-05310 (September 1999)
 UFGS-05300A (January 2002)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 23 June 2005

SECTION 05310

STEEL DECKS 10/03

NOTE: This guide specification covers the requirements for steel floor and roof decks, including accessories.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

NOTE: Determine which roof areas on the structure are considered by the structural engineer as functioning as diaphragms for the lateral force resisting system.

Composite decks and diaphragm acting decks, including connections, should be designed by the structural engineer according to the Steel Deck Institute. Refer to the Uniform Building Code for diaphragm decks in seismic areas. All connections must be shown. Drawings must show wind uplift loads for roof joist design in addition to the items listed below.

For non-diaphragm acting, non-composite decks, the contractor may provide the deck design and connections. In this case, the drawings must show roof live loads, including snow loads, and wind

loads, including internal and external pressures and high intensity zones. Consider showing a roof uplift and snow load plan on the drawings.

In addition to the above, show the following information on the project drawings:

1. Structural properties (height, sheet thickness, and section moduli or moment of inertia).
2. Floor and roof deck penetrations.
3. Location, spacing, and size of hanger clips or loops.
4. Closure plates.
5. Location of cellular decking and whether it is to be used as electrical raceway.
6. Weld or fastener spacing.
7. Whether construction is based on shored construction.

Design steel deck to carry the concrete and steel deck dead loads, and the live loads during construction before the concrete sets. Additional concrete dead load due to deflection of the deck shall be considered when necessary to prevent excessive stresses or deflections in the deck.

PART 1 GENERAL

NOTE: The structural steel design must meet the requirements of OSHA Steel Erection Standard, 29 CFR Part 1926, Subpart R-Steel Erection, Effective Date January 18, 2002.

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically
be deleted from this section of the project
specification when you choose to reconcile
references in the publish print process.

The publications listed below form a part of this specification to the
extent referenced. The publications are referred to within the text by the
basic designation only.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 335 (1989) Structural Steel Buildings
Allowable Stress Design and Plastic Design

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI SG-973 (1996) Cold-Formed Steel Design Manual

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2004) Structural Welding Code - Steel

AWS D1.3 (1998) Structural Welding Code - Sheet
Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 1008/A 1008M (2004b) Steel Sheet, Cold-Rolled, Carbon,
Structural, High-Strength Low-Alloy and
High-Strength Low-Alloy with Improved
Formability

ASTM A 108 (2003) Steel Bars, Carbon, Cold-Finished

ASTM A 570/A 570M (1998) Steel, Sheet and Strip, Carbon,
Hot-Rolled

ASTM A 653/A 653M (2004a) Steel Sheet, Zinc-Coated
(Galvanized) or Zinc-Iron Alloy-Coated
(Galvannealed) by the Hot-Dip Process

ASTM A 780 (2001) Repair of Damaged and Uncoated
Areas of Hot-Dipped Galvanized Coatings

ASTM A 792/A 792M (2003) Steel Sheet, 55% Aluminum-Zinc
Alloy-Coated by the Hot-Dip Process

ASTM C 423 (2002a) Sound Absorption and Sound
Absorption Coefficients by the
Reverberation Room Method

FM GLOBAL (FM)

FM DS 1-28 (2002) Design Wind Loads

FM P7825 (2003) Approval Guide

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2005) National Electrical Code

STEEL DECK INSTITUTE (SDI)

SDI 30 (2001) Design Manual for Composite Decks, Form Decks, and Roof Decks

SDI DDM02 (1987) Diaphragm Design Manual

SDI DDP (1987; R 2000) Deck Damage and Penetrations

SDI MOC1 (1991) Manual of Construction with Steel Deck

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 20 (2002) Zinc-Rich Primers, (Type I - "Inorganic" and Type II - "Organic")

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-310-01 (2000) Load Assumptions for Buildings

UNDERWRITERS LABORATORIES (UL)

UL 209 (1998; Rev thru Mar 2004) Cellular Metal Floor Raceways and Fittings

UL 580 (1994; Rev thru Feb 1998) Tests for Uplift Resistance of Roof Assemblies

UL Bld Mat Dir (2004) Building Materials Directory

1.2 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for

Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings

SD-03 Product Data

Deck Units

Sound Absorbing Material

Accessories

[Mechanical Fasteners]

SD-04 Samples

[Deck Units]

[Accessories]

SD-05 Design Data

Deck Units

Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

SD-07 Certificates

Deck Units

Accessories

Qualification of Welders

Fire Safety

Wind Storm Resistance

1.3 QUALITY ASSURANCE

1.3.1 Deck Units

Deck units and accessories shall be products of a manufacturer regularly engaged in manufacture of steel decking. [Provide a 0.19 sq meter 2 sq ft. sample of decking material and each accessory to be used.] [Provide a sample of acoustical material to be used.] Provide manufacturer's certificates attesting that the decking material meets the specified requirements.

1.3.2 Certification of Piston Tool Operator

Manufacturer's certificate attesting that the operators are authorized to use the low velocity piston tool.

1.3.3 Qualification of Welders

Provide welder qualification procedures, welder qualifications, and duration of qualification period in accordance with AWS D1.1/D1.1M and AWS D1.3.

1.3.4 Regulatory Requirements

NOTE: For roofing systems with insulation/
underlayment applied directly to deck, include
applicable paragraph/sentence for fire rated and/or
windstorm resistance. Specify roof assemblies that
are in consonance with other roof components
(Supports, deck, adhesives, bitumen, fasteners and
attachments, vapor retarders, insulation, membrane,
and surfacing) so that the roof construction
assembly results in UL or FM fire-resistance and
windstorm resistance classification required by
project criteria.

1.3.4.1 Fire Safety

Roof deck shall have been tested as a part of a roof deck construction assembly of the type used for this project, shall be listed as fire classified in the UL Bld Mat Dir, or listed as Class I construction in the FM P7825, and so labeled.

1.3.4.2 Wind Storm Resistance

NOTE: Select the appropriate wind uplift pressure
based on wind speeds used by the structural designer
in accordance with UFC 3-310-01, "Load Assumptions
for Buildings".

The roof construction assembly shall be capable of withstanding an uplift pressure of [3] [5] [_____] kPa [60] [90] [_____] pounds per square foot when tested in accordance with the uplift pressure test described in the FM DS 1-28 or as described in UL 580 and in general compliance with UFC 3-310-01.

1.3.5 Fabrication Drawings

Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during construction. The maximum uniform distributed storage load shall not exceed the design live load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel Sheet

NOTE: Minimum metal thickness should be 0.35 mm
0.014 inches for form decks and 0.75 mm 0.028 inches
for roof and composite decks. However, for
corrosive exposures, consider 0.92 mm 0.034 inch
minimum thickness.

NOTE: Include requirements for acoustical steel
deck when required by the design, otherwise delete.
Acoustical steel deck is designed to serve as a
sound absorbing ceiling as well as a structural
deck. Acoustical noncellular steel roof deck is
identical in appearance to standard steel roof deck
(noncellular) except that the webs of the ribs are
perforated to receive fiber glass sound absorbing
material, in roll form, placed between the
perforated ribs. Acoustical noncellular roof deck
should not be used without modifying FM or UL
requirements for roof decks in Division 07.
Acoustical cellular steel deck is identical in
appearance to cellular steel deck, except that the
steel bottom plate (ceiling) is perforated. In
addition, acoustical deck serves as both a deck and
acoustical ceiling (in lieu of a separate finished
acoustical ceiling) where noise levels are to be
controlled. Include cover plates when cellular deck
is specified. Include 50 mm 2 inch end laps for
non-cellular deck.

Flat rolled carbon steel sheets of structural quality, [thickness not less than [indicated] [0.75] [_____] mm [0.028] [_____] inch before coating,] meeting the requirements of AISI SG-973, except as modified herein. [For acoustical steel deck units, provide perforated sheets with 4 mm 5/32 inch diameter holes staggered 10 mm 3/8 inch on-centers.]

2.1.2 Steel Coating

NOTE: Specify coated steel for most floor decks and all roof decks. Use Z275 G90 galvanized coating or galvalume ASTM A 792/A 792M for severe corrosive conditions. Galvanize Z275 G90 deck used with concrete or spray applied fire protection. Use Z180 G60 when severe conditions do not exist. Prime painted, not coated, should be specified only for low-budget jobs where deck is not critical. Include sentence in brackets when applicable. Coordinate cellular deck wire raceways with appropriate sections in Division 16 and add information where needed.

ASTM A 653/A 653M designation [Z275] [_____] [G90] [_____] galvanized, or ASTM A 792/A 792M designation AZ165 AZ55, aluminum-zinc alloy. Apply coating to both sides of sheet. [Coating for decking provided as wire raceways shall conform to UL 209.]

[2.1.3 Sound Absorbing Material

NOTE: Include requirements for acoustical steel deck when required by the design, otherwise delete.

Acoustical steel deck is designed to serve as a sound absorbing ceiling as well as a structural deck. Acoustical noncellular steel roof deck is identical in appearance to standard steel roof deck (noncellular) except that the webs of the ribs are perforated to receive fiber glass sound absorbing material, in roll form, placed between the perforated ribs. Acoustical noncellular roof deck should not be used without modifying FM or UL requirements for roof decks in Division 07. Acoustical cellular steel deck is identical in appearance to cellular steel deck, except that the steel bottom plate (ceiling) is perforated. In addition, acoustical deck serves as both a deck and acoustical ceiling (in lieu of a separate finished acoustical ceiling) where noise levels are to be controlled. Include cover plates when cellular deck is specified. Include 50 mm 2 inch end laps for non-cellular deck.

Provide [glass fiber in roll or premolded form for acoustical noncellular steel roof deck] [and] [glass fiber rigid strip for acoustical cellular steel deck] in accordance with the manufacturer's standards.

]2.2 ACCESSORIES

Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

2.2.1 Adjusting Plates

Provide adjusting plates, or segments of deck units, of same thickness and configuration as deck units in locations too narrow to accommodate full size units. Provide factory cut plates of predetermined size where possible.

2.2.2 End Closures

Fabricated of sheet metal by the deck manufacturer. Provide end closures minimum 0.75 mm 0.028 inch thick to close open ends at [exposed edges of floors,] [parapets,] [end walls,] [eaves,] [and] openings through deck.

2.2.3 Partition Closures

NOTE: Coordinate options in paragraphs entitled "Partition Closures" and "Closures Above Partitions." When a suspended acoustical ceiling is provided below the metal deck, the closures above partitions may be eliminated for acoustical purposes provided the acoustical properties of the ceiling are adequate to restrict sound transmission to a level consistent with the facility design criteria.

Provide closures for closing voids above interior walls and partitions that are perpendicular to the direction of the configurations. [Provide rubber, plastic, or sheet steel closures above typical partitions.] [Provide minimum one inch thick soft composition rubber closures above walls and partitions contiguous to acoustical steel deck.] [Provide sheet steel closures above fire-resistant interior walls and partitions located on both sides of wall or partition.] [Provide glass fiber blanket insulation in the space between pairs of closures at acoustical partitions.]

NOTE: Drawings shall show closures above interior partitions where required. On fire partitions, metal closures will be shown on both sides of the wall.

2.2.4 Closure Plates for Composite Deck

The concrete shall be supported and retained at each floor level. Provide edge closures at all edges of the slab of sufficient strength and stiffness to support the wet concrete. Metal closures shall be provided for all openings in composite steel deck 6 mm 1/4 inch and over.

2.2.5 Sheet Metal Collar

Where deck is cut for passage of pipes, ducts, columns, etc., and deck is to remain exposed, provide a neatly cut sheet metal collar to cover edges of deck. Do not cut deck until after installation of supplemental supports.

2.2.6 Cover Plates

Sheet metal to close panel edge and end conditions, and where panels change direction or butt. Polyethylene-coated, self-adhesive, 50 mm 2 inch wide joint tape may be provided in lieu of cover plates on flat-surfaced decking butt joints.

2.2.7 Sump Pans

NOTE: Coordinate sump pans with type of roof drain specified.

Sump pans shall be provided for roof drains and shall be minimum 2 mm 0.075 inch thick steel, [flat] [recessed] type. Sump pans shall be shaped to meet roof slope by the supplier or by a sheet metal specialist. Bearing flanges of sump pans shall overlap steel deck a minimum of 75 mm 3 inches. Opening in bottom of pan shall be shaped, sized, and reinforced to receive roof drain.

2.2.8 Column Closures

Sheet metal, minimum 0.85 mm 0.0358 inch thick or metal rib lath.

2.2.9 Access Hole Covers

Sheet metal, minimum 1.2 mm 0.0474 inch thick.

2.2.10 Hanger

NOTE: Location, spacing, and size of hangar clips or loops must be indicated or specified, as applicable to the project.

Provide clips or loops for [utility systems] [and] [suspended ceilings] of one or more of the following types:

- a. Lip tabs or integral tabs where noncellular decking or flat plate of cellular section is 1.2 mm 0.0474 inch thick or more, and a structural concrete fill is used over deck.
- b. Slots or holes punched in decking for installation of pigtails.
- c. Tabs driven from top side of decking and arranged so as not to pierce electrical cells.
- d. Decking manufacturer's standard as approved by the Contracting Officer.

2.2.11 Shear Connectors

NOTE: Designer shall determine the necessity for shear connectors as per AISC ASD Spec S335. Designer shall show the size, spacing, and location

of the shear connectors.

Shear connectors shall be [headed stud type, ASTM A 108, Grade 1015 or 1020, cold finished carbon steel with dimensions complying with AISC 335] [and] [or] [strap type, ASTM A 570/A 570M, Grade D, hot-rolled carbon steel].

[2.2.12 Mechanical Fasteners

NOTE: Delete this paragraph when only welding is allowed.

Provide mechanical fasteners, such as powder actuated or pneumatically driven fasteners, for anchoring the deck to structural supports and adjoining units that are designed to meet the loads indicated. Provide positive locking-type fasteners standard with the Steel Deck Institute and the steel deck manufacturer, as approved by the Contracting Officer.

]2.2.13 Miscellaneous Accessories

NOTE: Ensure that items listed in this paragraph are indicated on the project drawings.

The manufacturer's standard accessories shall be furnished as necessary to complete the deck installation. Metal accessories shall be of the same material as the deck and have minimum design thickness as follows: saddles, 1.204 mm (0.0474 inch); 0.0474 inch; welding washers, 1.519 mm (0.0598 inch); 0.0598 inch; cant strip, 0.749 mm (0.0295 inch); 0.0295 inch; other metal accessories, 0.909 mm (0.0358 inch); 0.0358 inch; unless otherwise indicated. Accessories shall include but not be limited to saddles, welding washers, fasteners, cant strips, butt cover plates, underlapping sleeves, and ridge and valley plates.

2.3 FABRICATION

2.3.1 Deck Units

NOTE: Cellular and noncellular decking may or may not be combined into one deck system. If only one type is used, delete the other type. Where deck design is based on shored construction, edit and include requirements in the last bracketed sentence and indicate on structural drawings that decking must be shored during placement and curing of concrete.

NOTE: The steel deck shall be designed according to SDI Pub No. 30 Verify grades of steel are appropriate for design. SDI allows ASTM A 653/A 653M, Grade 230 Grade 33; ASTM A 1008, Grades C and D; or ASTM A 792/A 792M. Phosphatized and painted coating is not recommended for the majority of

applications. The steel deck specified in this guide specification will be used in conjunction with insulation and built-up roofing in accordance with TM 5-805-14, Roofing and Waterproofing, or will be used as a permanent form for concrete or as part of a composite deck assembly. Steel deck for lightweight concrete roofs is specified in Section 03340 ROOF DECKING, CAST-IN-PLACE LOW DENSITY CONCRETE. Drawings should show location and extent of steel deck, complete structural support including openings greater than 300 mm (12 inches), type and location of accessories, uniformly distributed live loads (positive and negative) in kPa (psf), thickness, and required values for section modulus and moment of inertia per mm (foot) of width. Moments of inertia and section modulus values will be designed based on procedures set forth in SDI Pub No. 30. Steel decks used as diaphragms must meet the requirements of TM 5-809-10, Chapter 5. Subsystems for fire-rated construction, including roof deck, joists, insulation, built-in roofing, and ceiling material will be indicated. When the finished installations will be exposed to high humidity, seacoast atmosphere or corrosive chemical fumes special care in specifying the finish should be used and individual manufacturers should be consulted for the specific application. Where sprayed-on fireproofing is used only galvanized decking with a G90 coating will be allowed. ASTM A 653/A 653M, G90 coating should be specified in paragraphs Roof Deck, Composite Deck, and Form Deck. Notes on the drawings should indicate the attachment method to be used, and should give the size and spacing for perimeter, side lap, intermediate supports, and end lap attachments.

Deck units shall conform to SDI 30. Form [cellular] [and] [non-cellular] decking and accessories shall conform to ASTM A 653/A 653M, SQ, Grade 230, Grade 33; ASTM A 1008/A 1008M Coated Carbon Steel Sheets, Grade C, 228 mPa, 33, 000 psi minimum yield strength; or ASTM A 792/A 792M Coated Steel Sheets, Grade 33. Panels of maximum possible lengths shall be used to minimize end laps. Deck units shall be fabricated in lengths to span 3 or more supports with flush, telescoped, or nested 50 mm 2 inchlaps at ends, and interlocking, or nested side laps, unless otherwise indicated. Deck with cross-sectional configuration differing from the units indicated may be used, provided that the properties of the proposed units, determined in accordance with AISI SG-973, are equal to or greater than the properties of the units indicated and that the material will fit the space provided without requiring revisions to adjacent materials or systems. [Factory apply a standard, phosphatized and painted, baked-on enamel finish to underside of steel decking.] [[Floor] [and] [Road] deck system design is based on shared construction.]

2.3.2 Roof Deck

NOTE: The epoxy coating is expensive and should only be considered for corrosive environments where

justified by a cost analysis.

Deck used in conjunction with insulation and built-up roofing shall conform to ASTM A 792/A 792M or ASTM A 1008/A 1008M. Roof deck units shall be fabricated of [[0.75] [_____] mm [0.0295] [_____] inch design thickness or thicker steel] [the steel design thickness required by the design drawings] and shall be [shop painted] [galvanized] [painted with an epoxy coating or equivalent applied to prime-coating in accordance with manufacturer's standard] [zinc-coated in conformance with ASTM A 653/A 653M, G90 coating class or aluminum-zinc coated in accordance with ASTM A 792/A 792M Coating Designation AZ55].

2.3.3 Form Deck

Deck used as formwork for concrete shall conform to ASTM A 653/A 653M or ASTM A 1008. Form deck shall be fabricated of [[0.38] [_____] mm [0.015] [_____] inch design thickness or thicker steel.] [the steel design thickness required by the design drawings.] [Paint with one coat of manufacture's standard paint.] [Zinc-coat in conformance with ASTM A 653/A 653M, [G60] [G90] coating class.]

2.3.4 Composite Deck

[Composite deck assembly shall conform to ASTM A 653/A 653M or ASTM A 1008/A 1008M. Deck used as the tension reinforcing in composite deck shall be fabricated if [0.75][_____] mm[0.0295] [_____] inch design thickness or thicker steel.] [The steel design thickness required by the design drawings. Zinc-coat in conformance with ASTM A 653/A 653M, [G60] [G90] coating class.

In addition to resisting shear, devices shall provide resistance to vertical separation between the steel deck and the concrete. Provide one of the following types of shear devices:

- a. Mechanically fixed shear devices such as embossments, holes, or welded buttons.
- b. Mechanically fixed shear devices such as inverted, triangular-shaped ribs.

] [2.3.5 Cellular Decking

Cellular decking provided as wire raceways, shall conform to NFPA 70.

] [2.3.6 Acoustical Steel Deck

NOTE: A noise reduction coefficient of 0.70 is a commonly used coefficient. The coefficient can also be obtained from manufacturer's literature. However, specific design requirements must be considered and the appropriate value inserted. The manufacturer's standard acoustical steel deck shall be provided where indicated.

Provide a Noise Reduction Coefficient (NRC) rating of not less than [0.70]

[____], when tested in accordance with ASTM C 423, Standard Mounting No. 6. Sound absorbing materials shall be either [glass fiber in roll or premolded form for acoustical steel deck (noncellular)] [and] [or] [glass fiber rigid strip for acoustical steel deck (cellular)] in accordance with manufacturer's standards. The Contractor shall comply with EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

] 2.3.7 Venting

NOTE: Include this paragraph on projects where
lightweight insulating concrete roof systems are
used. Verify that deck size specified is available
as vented.

To ensure positive venting from the underside, provide slotted or perforated steel deck to receive concrete fill, overlay, or a poured concrete deck.

] 2.3.8 Shop Priming

NOTE: Specify shop priming when decking will
receive field applied finish painted. Paint will
not adhere to passivating or stabilizing treatment
commonly used on galvanized steel surfaces to
prevent "white rust." Coordinate requirements for
finishes with requirements for fireproofing and
field finish painting.

Shop prime accessories and [underside of] deck at the factory after coating. Clean surfaces in accordance with the manufacturer's standard procedure followed by a spray, dip or roller coat of rust-inhibitive primer, oven cured. Provide shop primer compatible with [field applied sprayed-on fireproofing as specified in Section 07810 SPRAY-APPLIED FIREPROOFING] [and with] [field applied finish painting, as specified in Section 09900 PAINTS AND COATINGS.]

] 2.3.9 Touch-Up Paint

Touch-up paint for shop-painted units shall be [of the same type used for the shop painting] [____], and touch-up paint for zinc-coated units shall be [an approved galvanizing repair paint with a high-zinc dust content] [____]. Welds shall be touched-up with paint conforming to SSPC Paint 20 in accordance with ASTM A 780. Finish of deck units and accessories shall be maintained by using touch-up paint whenever necessary to prevent the formation of rust.

PART 3 EXECUTION

3.1 EXAMINATION

Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

3.2 INSTALLATION

NOTE: Use SDI Pub No. 30 for all decks except those designed for diaphragm action. Use SDI DDM 02 for diaphragm-action decks. Indicate cellular deck to be used as wiring raceways on the project drawings if included below.

NOTE: The designer must determine if there are shoring requirements for composite decks. For most applications the design is selected so that shoring is not required. Shoring requirements shall be detailed on the design drawings.

Install steel deck units in accordance with [SDI 30] [SDI DDM02 and] approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports before permanently securing in place. Damaged deck and accessories including material which is permanently stained or contaminated, deformed, or with burned holes shall not be installed. Extend deck units over three or more supports unless absolutely impractical. Report inaccuracies in alignment or leveling to the Contracting Officer and make necessary corrections before permanently anchoring deck units. Locate deck ends over supports only. [Ends of floor deck may be lapped or butted.] Do not use unanchored deck units as a work or storage platform. [Do not fill unanchored deck with concrete.] Permanently anchor units placed by the end of each working day. Do not support suspended ceilings, light fixtures, ducts, utilities, or other loads by steel deck unless indicated. Loads shall be distributed by appropriate means to prevent damage. [Shoring shall be in position before concrete placement begins in composite or form deck.] [Size cellular decking provided as electrical raceways to accommodate indicated wiring systems. Chip off burrs and eliminate sharp edges which may damage wiring. Mesh decking panels accurately and place in accordance with UL 209.] [Acoustical material shall be neatly fitted into the rib voids.]

3.2.1 Attachment

NOTE: Use of powder actuated or pneumatically driven fasteners is limited to Seismic Zone 1 and areas with wind design velocity of less than 160 km/h 100 mph. However, based upon the submittal of supporting calculations and data to substantiate that such fasteners can resist the design loads, and approval of the Contracting Officer, fasteners may be used in all seismic areas and in areas with the wind velocity to 160 km/hr (100 mph) or more. Refer to COE Technical Instruction (TI) 809-04, "Seismic Design for Buildings".

NOTE: Refer to UFC 1-200-01 for shear capacity, flexibility, connection details, size and spacing of welds and attachments, and concrete fill requirements.

For diaphragm acting decks, refer to Steel Deck Institute's "Diaphragm Design Manual" (First and Second Editions).

Where welding only is allowed, delete the first two bracketed phrases and include the last bracketed phrase.

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding with normal 16mm 5/8 inch diameter puddle welds [or fastened with screws, powder-actuated fasteners, or pneumatically driven fasteners] as indicated on the design drawings and in accordance with manufacturer's recommended procedure[and SDI 30]. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing welding [or fastening]. [Anchoring the deck to structural supports with powder-actuated fasteners or pneumatically driven fasteners is prohibited.] Attachment of adjacent deck units by button-punching is prohibited.

The fasteners shall provide minimum required pull-out, pull-over and shear resistance based upon test results of the specific steel deck and fastener as listed in the current edition of the Factory Mutual Approval Guide and Factory Mutual Data Sheet 1-28 or manufacturer's data sheets. If studs are being welded to the top flanges of beams, the deck ends should be butted. If not, deck ends should be lapped. Welding washers shall be used at welded connections when deck thickness is less than 0.711 mm (0.028 inch). Fasteners for roof insulations are specified in Section 07220, ROOF INSULATION.

3.2.1.1 Welding

NOTE: Show location, size, and spacing of attachments on the drawings for composite and diaphragm-acting decks. If they are not shown, delete the first phrase and include the second. Coordinate finish repair with finish requirements.

Perform welding in accordance with AWS D1.3 using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in AWS D1.1/D1.1M and AWS D1.3 make welds. Immediately recertify, or replace with qualified welders, welders that have passed qualification tests but are producing unsatisfactory welding. Location, size, and spacing of fastening shall [be as indicated] [conform to the recommendations of the Steel Deck Institute and the steel deck manufacturer]. Welding washers [shall] [shall not] be used at the connections of the deck to supports. Welding washers shall not be used at sidelaps. Holes and similar defects will not be acceptable. Deck ends shall be [lapped 50 mm 2 inches] [butted]. All partial or segments of deck units shall be attached to structural supports in accordance with Section 2.5 of SDI DDM02. [Shear connectors shall be

attached as shown and shall be welded as per AWS D1.1/D1.1M [through the steel deck to the steel member] [directly to the steel member]]. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of [coated finish with zinc-dust paint conforming to ASTM A 780] [shop [primed] [painted] finish with the manufacturer's standard touch-up paint].

[3.2.1.2 Fastening

NOTE: Delete this paragraph when only welding is allowed.

Anchor deck to structural supports and adjoining units with mechanical deck fasteners as recommended by the Steel Deck Institute and the steel deck manufacturer, as approved by the Contracting Officer. [Powder-actuated fasteners shall be driven with a low-velocity piston tool by an operator authorized by the manufacturer of the piston tool. Pneumatically driven fasteners shall be driven with a low-velocity fastening tool and shall comply with the manufacturer's recommendations.]

]3.2.2 Openings

NOTE: Include bracketed phrases when design is based on seismic requirements. When cells of cellular steel floor decking will be used for air ducts, the cutting of decking units for connections to air distribution ductwork, outlets, and system accessories must be coordinated with and specified in applicable sections of the mechanical specifications.

When cells of cellular metal floor decking will be used for electrical raceways, the inspection of these cells, cutting for inserts, and installation of electrical outlets, fittings, or grounding of the metal floor decking, be coordinated with and specified in applicable sections of the electrical specifications.

All holes and openings required shall be cut or drilled holes and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. [Holes and openings 150 to 300 mm 6 to 12 inches across shall be reinforced by 1.204 mm (0.0474 inch) 0.0474 inch thick steel sheet at least 300 mm 12 inches wider and longer than the opening and be fastened to the steel deck at each corner of the sheet and at a maximum of 150 mm 6 inches on center. Holes and openings larger than 300 mm 12 inches shall be reinforced by steel channels or angles installed perpendicular to the steel joists and supported by the adjacent steel joists. Steel channels or angles shall be installed perpendicular to the deck ribs and shall be fastened to the channels or angles perpendicular to the steel joists.] [Deck manufacturer shall approve holes or openings larger than 150 mm 6 inches in diameter prior to drilling or cutting.] [Openings shall not interfere with seismic members such as chords and drag struts.]

3.2.3 Deck Damage

SDI MOC1, for repair of deck damage.

3.2.4 Accessory Installation

3.2.4.1 Adjusting Plates

Install as shown on shop drawings.

3.2.4.2 End Closures

Provide end closure to close open ends of cells at columns, walls, and openings in deck.

3.2.4.3 Closures Above Partitions

NOTE: Coordinate options in paragraphs entitled
"Partition Enclosures" and "Closures Above
Partitions." When a suspended acoustical ceiling is
provided below the metal deck, the closures above
partitions may be eliminated for acoustical purposes
provided the acoustical properties of the ceiling
are adequate to restrict sound transmission to a
level consistent with the facility design criteria.

Provide for closing voids between cells over partitions that are perpendicular to direction of cells. Provide a one-piece closure strip for partitions 100 mm 4 inches nominal or less in thickness and two-piece closure strips for wider partitions. [Provide sheet metal closures above fire-rated partitions at both sides of partition with space between filled with fiberglass insulation.] [Provide flexible rubber closures above acoustic-rated partitions at both sides of partition with space between filled with blanket insulation.]

3.2.4.4 Cover Plates

[Provide metal cover plates, or joint tape, at joints between cellular decking sheets to be used as electrical raceways.] [Where concrete leakage would be a problem, provide metal cover plates, or joint tape, at joints between decking sheets, cellular or noncellular, to be covered with concrete fill.]

[3.2.4.5 Column Closures

NOTE: Delete this paragraph if steel floor decks
are not included.

Provide for spaces between floor decking and columns which penetrate the deck. Field cut closure plate to fit column in the field and tack weld to decking and columns.

]3.2.4.6 Access Hole Covers

Provide to seal holes cut in decking to facilitate welding of decking to

structural supports.

3.2.4.7 Hangers

NOTE: Location, spacing, and size of hanger clips
or loops must be indicated or specified, as
applicable to the project.

Provide as indicated to support [utility system] [and] [suspended
ceilings]. Space devices [as indicated] [so as to provide one device per
0.60 square meters 6.25 square feet].

[3.2.5 Sound Absorbing Material

NOTE: Include this paragraph when required by the
design for acoustical deck.

Install sound absorbing [glass fiber roll or premolded form, neatly in
voids between perforated webs of acoustical noncellular steel deck] [and]
[glass fiber rigid strip, in cells of acoustical cellular steel deck].
Keep sound absorbing material dry before, during and after installation.

] 3.2.6 Concrete Work

NOTE: Ensure that admixtures containing chloride
salts are not used in concrete placed on steel deck.
Coordinate with Section 03300, "Cast-In-Place
Concrete." Delete this paragraph if concrete is not
cast on metal decking.

Prior to placement of concrete, inspect installed decking to ensure that
there has been no permanent deflection or other damage to decking. Replace
decking which has been damaged or permanently deflected as approved by the
Contracting Officer. Place concrete on metal deck in accordance with
Construction Practice of SDI 30. Concrete fill over metal deck is
specified in Section 03300N CAST-IN-PLACE CONCRETE.

] 3.2.7 Preparation of Fire-Proofed Surfaces

Deck surfaces, both composite and noncomposite, which are to receive
sprayed-on fireproofing, shall be galvanized and shall be free of all
grease, mill oil, paraffin, dirt, salt, and other contaminants which impair
adhesion of the fireproofing. Any required cleaning shall be done prior to
steel deck installation using a cleaning method that is compatible with the
sprayed-on fireproofing.

[3.3 FIELD QUALITY CONTROL

NOTE: Include this paragraph when roof decks that
are not receiving concrete are in the project.
Coordinate paragraph with requirements for roofing
membrane.

3.3.1 Decks Not Receiving Concrete

Inspect the decking top surface for distortion after installation. For roof decks not receiving concrete, verify distortion by placing a straight edge across three adjacent top flanges. The maximum allowable gap between the straight edge and the top flanges is 2 mm 1/16 inch; when gap is more than 2 mm 1/16 inch, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

]

-- End of Section --