
NAVFAC IGS-05310 (SEPTEMBER 2002)

Preparing Activity: LANTNAVFACENGCOM Based on UFGS-05310N

ITALIAN GUIDE SPECIFICATIONS

Use for ITALIAN projects only

SECTION 05310

STEEL DECKS

09/02

NOTE: This guide specification is issued by the Atlantic Division, Naval Facilities Engineering Command for regional use in Italy.

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

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

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

1.1 REFERENCES

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

ITALIAN ELECTROTECHNICAL COMMITTEE STANDARDS (CEI)

NOTE: A CEI Norm is an Italian technical normative for electrical systems recognized by Italian Law, submitted by a private organization "Comitato Elettrotecnico Italiano" for the Italian territory, available in the Italian language and only in some cases in English.

CEI 64-8 (1998)Electrical installations of buildings
ITALIAN LAWS AND NORMS (D.M.)(LAW)(CIRC.)

NOTE: Italian laws and normatives are the legislative regulations and decrees issued by the Italian government in the form of laws, norms, decrees, circulars, and letters. These Laws and Decrees concur together with Norms and Standards in forming the governing directives for construction.

D.M. 9/1/96 (9 January 1996) Technical norms for construction of cast-in-place and pre-stressed reinforced concrete and for steel structures

D.M. 16/1/96 (16 January 1996) Technical norms relative to "General criteria for building safety verification and for loads and superimposed loads"

ITALIAN NATIONAL ASSOCIATION FOR UNIFICATION OF STANDARDS (UNI)

NOTE: A UNI Norm is a technical normative recognized as Italian Law, submitted by a private organization "Ente Nazionale Italiano di Unificazione" for Italy and is available only in the Italian language. It is the National Standard.

UNI 4634 (1960) Classification and qualification of electric welders - Welders of mild or low alloy steel sheet of medium or thick gage

UNI 7344 (1985) Cold formed steel sections - Requirements and tolerances

UNI 8627 (1984) Building - Roofing - Terminology and classification of functional schemes, conform solutions and technological solutions

CNR 10022-84 (1988) Cold formed steel profiles - Instructions for use in constructions

UNI 11001 (1962) Code of practice for edge preparation in fusion welding of steel structures

ITALIAN/EUROPEAN HARMONIZATION STANDARDS (UNI EN)(UNI ENV)(CEI EN)
(UNI EN ISO)(UNI ISO)

NOTE: A UNI EN, UNI ENV, CEI EN, UNI EN ISO or UNI ISO is a European Standard with a coincident Italian National Standard or International Standard. The two standards are identical, with most (but not all) EN's available in the English language and the UNI available only in the Italian language.

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|------------------|--|
| UNI EN ISO 1460 | (1997) Metallic coatings - Hot dip galvanized coatings on ferrous materials - Gravimetric determination of the mass per unit area. |
| UNI ENV 1991-2-4 | (1997) Eurocode 1 - Basis of design and actions on structures - Part 2-4: Actions on structures - Wind actions |
| UNI ENV 1993-1-2 | (1998) Eurocode 3 - Design of steel structures - Part 1-2: General rules - Structural fire design |
| UNI EN ISO 3746 | (1997) Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane |
| UNI EN 10142 | (2000) Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming - Technical delivery conditions |
| UNI EN 10147 | (2000) Continuously hot-dip zinc coated structural steels strip and sheet - Technical delivery conditions |
| UNI EN 10215 | (1996) Continuously hot-dip aluminium-zinc (AZ) coated steel strip and sheet. Technical delivery conditions. |

UNDERWRITERS LABORATORIES (UL)

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| UL 209 | (1995) Cellular Metal Floor Raceways and Fittings |
|--------|---|

1.2 SUBMITTALS

NOTE: Where a "G" in submittal tags follows a

submittal item, it indicates Government approval for that item. Add "G" in submittal tags following any added or existing submittal items deemed sufficiently critical, complex, or aesthetically significant to merit approval by the Government. Submittal items not designated with a "G" will be approved by the QC organization.

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

NOTE: If deck is composite design or if diaphragm action is required, indicate weld or fastener spacing on the drawings.

Layout; G

SD-03 Product Data

Sound absorbing material

Accessories

[Mechanical fasteners]

SD-05 Design Data

NOTE: Indicate deck loading on the contract drawings, including impact loads(s) and seismic load, if applicable.

Deck units

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

SD-07 Certificates

Qualification of welders

Fire safety

Wind storm resistance

1.3 QUALITY ASSURANCE

1.3.1 Steel Deck

Deck and accessories shall be products of a manufacturer regularly engaged in manufacture of steel decking.

1.3.2 Qualification of Welders

Provide welder qualification procedures, welder qualifications, and duration of qualification period in accordance with UNI 4634 and UNI 11001.

1.3.3 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.

1.3.3.1 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 in accordance with UNI ENV 1993-1-2 and UNI 8627.

1.3.3.2 Wind Storm Resistance

NOTE: Select the appropriate wind uplift pressure based on wind speeds used by the structural designer in accordance with MIL-HDBK-1002/2.

The roof construction assembly shall be capable of withstanding the wind load pressure as specified in D.M. 16/1/96 and UNI ENV 1991-2-4.

1.3.4 Layout Drawings

Show 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, and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver, 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. Replace damaged material.

PART 2 PRODUCTS

2.1 SOURCE MANUFACTURERS

2.1.1 Steel Deck

The following manufacturers provide steel roof and floor deck, composite decking, cellular decking, and acoustical decking that generally complies with these specifications:

METECNO INDUSTRIE S.p.A.
Via Terragneta, 90
80058 Torre Annunziata (NA)
Tel: 081-862-5301
Fax: 081-862-5328
www.metecnoindustrie.com

HEDAR EDILIZIA TIETALLICA S.r.l.
Strada Provinciale Es - SESIA, 2
28060 Vicolungo (NO)
Tel: 0321-835-511
Fax: 0321-835-420
www.hedar.it

2.2 MATERIALS

2.2.1 Steel Sheet

NOTE: Minimum metal thickness should be 0.35 mm for
form decks and 0.75 mm for roof and composite decks.
However, for corrosive exposures, consider 0.92 mm
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 end laps for non-cellular deck.

Flat rolled carbon steel sheets of structural quality, [thickness not less than [indicated] [0.75] [_____] mm before coating,] meeting the requirements of UNI 7344, except as modified herein. [For acoustical steel deck units, provide perforated sheets with 4 mm diameter holes staggered 10 mm on-centers.]

2.2.2 Steel Coating

NOTE: Specify coated steel for most floor decks and all roof decks. Use Z275 galvanized coating or galvalume ASTM A 792/A 792M for severe corrosive conditions. Galvanize Z275 deck used with concrete or spray applied fire protection. Use Z180 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.

UNI EN ISO 1460, UNI EN 10142, and UNI EN 10147, galvanized, or UNI EN 10215, aluminum-zinc alloy. Apply coating to both sides of sheet. [Coating for decking provided as wire raceways shall conform to UL 209.]

[2.2.3 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 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.

]2.3 ACCESSORIES

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

2.3.1 Adjusting Plates

Provide adjusting plates of same thickness and configuration as decking. Provide factory cut plates of predetermined size where possible.

2.3.2 End Closures

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

2.3.3 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.]

2.3.4 Cover Plates

Sheet metal. Polyethylene-coated, self-adhesive, 50 mm wide joint tape may be provided in lieu of cover plates on flat-surfaced decking.

2.3.5 Column Flashing

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

2.3.6 Access Hole Covers

Sheet metal, minimum 1.2 mm thick.

2.3.7 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 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.

[2.3.8 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 manufacturer.

]2.3.9 Miscellaneous Accessories

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

Provide [cant strips, fasteners, ridge and valley plates, and other types of] plates and closures as indicated or as necessary to complete the work. Provide accessories required for a finished installation.

2.4 FABRICATION

2.4.1 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: Verify grades of steel are appropriate for design. SDEI allows ASTM A 653/A 653M, Grade 230; ASTM A 611, Grades C and D; or ASTM A 792/A 792M. Phosphatized and painted coating is not recommended for the majority of applications.

D.M. 9/1/96. Form [cellular] [and] [non-cellular] decking and accessories from UNI EN ISO 1460, CNR 10022-84, UNI EN 10142, UNI EN 10147, and D.M. 16/1/96 coated carbon steel sheets, 228 MPa minimum yield strength; or UNI EN 10215 coated steel sheets. [Factory apply a standard, phosphatized and painted, baked-on enamel finish to underside of steel decking.] Provide deck units having the depth and the minimum structural properties indicated. [[Floor] [and] [Roof] deck system design is based on shored construction.]

[2.4.2 Composite Steel Decking

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.

]2.4.3 Cellular Decking

Cellular decking provided as wire raceways, shall conform to CEI 64-8.

]2.4.4 Acoustical Steel Deck

NOTE: A noise reduction coefficient of 0.70 is a commonly used coefficient. However, specific design requirements must be considered and the appropriate value inserted.

Provide a Noise Reduction Coefficient (NRC) rating of not less than [0.70] [____], when tested in accordance with UNI EN ISO 3746.

][2.4.5 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.

][2.4.6 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."]

]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: Indicate cellular deck to be used as wiring raceways on the project drawings if included below.

Install steel deck units in accordance with approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports. 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.] [Lap roof deck a minimum of 50 mm.] Do not use unanchored deck units as a work or storage platform. 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. [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.]

3.2.1 Attachment

NOTE: Delete first two and include last bracketed phrases when only welding is allowed. 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.

NOTE: Refer to COE Technical Instruction (TI) 809-04 "Seismic Designs for Buildings" (December 1998) for shear capacity, flexibility, connection details, size and spacing of welds and attachments, and concrete fill requirements. See <http://www.hnd.usace.army.mil/techinfo/ti/809-04/ti80904.htm>.

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

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding [or alternate fastening methods recommended by the steel deck manufacturer, subject to the Contracting Officer's approval]. 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.

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 UNI 11001 using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in UNI 11001. Location, size, and spacing of fastening shall [be as indicated] [conform to the recommendations of the steel deck manufacturer]. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of [coated finish with zinc-dust paint of type specified in Section 09900, "Paints and Coatings"] [shop [primed] [painted] finish with the manufacturer's standard touch-up paint]. Immediately recertify, or replace with qualified welders, welders that have passed qualification tests but are producing unsatisfactory welding.

3.2.2 Openings

NOTE: Include bracketed phrase when design is based on seismic requirements.

Reinforce and frame openings through the roof in conformance with D.M. 9/1/96. Cut or drill holes or other openings required for work of other trades. Deck manufacturer shall approve holes or openings larger than 150 mm 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

CNR 10022-84, 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 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 Flashing

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 flashing 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].

[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 D.M. 9/1/96. Concrete fill over metal deck is specified in Section 03300, "Cast-In-Place Concrete."

] [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; when gap is more than 2 mm, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

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-- End of Section --