



REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

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DEPARTMENT ORDER)
No. 10)
Series of 2006 02-16-06)
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SUBJECT: DPWH Standard Specifications
for Metal Deck, Item 1033

In line with the mandate of the Department in providing effective standard specifications to be used in the implementation of various infrastructure projects and in view of the need of setting standard specifications for metal deck, the attached **DPWH Standard Specifications for Metal Deck, Item 1033**, are hereby prescribed for the guidance and compliance of all concerned.

These specifications shall form part of the DPWH Standard Specifications (Volume III – Buildings, Ports and Harbors, Flood Control and Drainage Structure and Water Supply System).

This order shall take effect immediately.

HERMOGENES E. ERDANE, JR.
Acting Secretary



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DEPARTMENT ORDERNo. 10 Series of 2006

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DPWH STANDARD SPECIFICATIONS FOR**ITEM 1033 - METAL DECK****1033.1 DESCRIPTION**

This Item shall consist of furnishing and placing of metal deck panel, acting as support and formworks, constructed in conformity with the lines, grades and dimensions shown on the plans or established by the Engineer and in accordance with this specification.

1033.2 MATERIAL REQUIREMENTS**1033.2.1 Metal Deck Panel**

1033.2.1.1 Structural metal for metal deck panel shall conform to ASTM A611 or ASTM A446 with a minimum yield strength (fy) of 40,000 psi (275 MPa). The finished metal deck panel is galvanized coated, conforming to ASTM A525 G90 with base metal thickness of 0.80, 1.00, 1.20, 1.40 and 1.60 mm as shown in Table I.

TABLE 1. SECTION PROPERTIES PER METER OF WIDTH

Base Metal thickness (mm)	Weight Per Area (kg/m ²)	+ I x 10 ⁶ (mm ⁴)	- I x 10 ⁶ (mm ⁴)	+ S x 10 ³ (mm ³)	- S x 10 ³ (mm ³)	A (mm ²)
0.80	8.073	0.504	0.419	20.008	19.582	1033.7
1.00	10.093	0.631	0.613	24.938	24.568	1296.1
1.20	12.114	0.757	0.736	29.843	29.596	1560.9
1.40	14.1365	0.885	0.859	34.725	34.669	1828.6
1.60	16.1594	1.011	0.982	39.584	39.787	2099.6

+I – positive moment of inertia

- I = negative moment of inertia

+S – section modulus for positive region

- S = section modulus for negative region

1033.2.1.2 Metal deck shall have a unit width of 846 mm with triangular ribs formed to a depth of 50 mm and a 32 mm width on the top.

1033.3 CONSTRUCTION REQUIREMENTS**1033.3.1 Deck Placement**

Place each metal deck unit on supporting structural frame. Adjust to final position with accurately aligned side laps and ends bearing on supporting members by a minimum of 50 mm.

1033.3.2 Side Lap Joints

Metal deck panels shall be sidelapped with the female rib overlapping the male rib of the adjacent panel. Side lap joints should be fastened by a No. 12 x 20 mm self-drilling screw or its equivalent through the center of the side lap joint. Fastening should be as follows:

1033.3.2.1 For spans up to 1.80 m, fasten side lap joints at the ends and at midspan

1033.3.2.2 For spans greater than 1.80 m, fasten at third points of span or at 1.20 m spacing, whichever is less.

1033.3.3 Cutting

Metal deck panels shall be cut using a power saw with a suitable disc. During cutting, the panel should be turned over with the ribs downward. A hole saw or drill shall be used to cut holes for conduits, pipes and fittings. For cut-out of 200-700 mm diameter, adequate bar reinforcements around the perimeter of the opening must be provided prior to concrete pouring.

1033.3.4 Installation

1033.3.4.1 Structural Steel Framing

Metal deck panels shall be anchored to structural steel members by either welding or by mechanical fastening. A minimum of one fastener should be located adjacent to each female rib using 12 mm puddle welds, 4 mm diameter powder actuated drive nail, or 12 x 20 mm self-drilling screws.

1033.3.4.2 Concrete and Masonry Framing

Fastening of metal deck panels could be done by nailing directly to the beam formwork using 4mm diameter powder actuated drive nails or masonry nails.

1033.3.4.3 Shear Studs

In a composite beam assembly, a composite floor slab and a steel beam are joined by shear connectors to create one structural unit which has greater strength than a separate slab and beam. Several

types of shear connectors are available, but oftenly used are either studs, joists or channels. Most commonly used is the headed stud with its body resisting horizontal shear and with its head providing adequate restraint to connect the concrete slab to the beam. Headed studs are readily welded to the metal deck panel and top flange of the beam before concrete is poured.

1033.3.5 Uses

1033.3.5.1 Parking Garages

Composite floor decks have been successfully used in parking structures; however the following precautions should be observed:

1033.3.5.1.1

Slabs should be designed as continuous spans with negative bending reinforcement over the supports.

1033.3.5.1.2

Additional reinforcement should be included to deter cracking caused by large temperature differences and to provide load distribution.

1033.3.5.2 Cantilevers

When cantilevers are encountered, the deck acts only as a permanent form; top reinforcing steel must be designed by the structural engineer.

1033.3.5.3 Dynamic Loads

Dynamic loading e.g. forklifts, can, over along period of time, interfere with the mechanical bond between the concrete and deck which achieves its composite action via web shapes. Reinforcing steel running perpendicular to the span and placed on the top of the deck ribs is often used with this type of loading to distribute concentrated loads.

1033.3.5.4 Other Criteria

Composite steel floor deck may be used in a variety of ways, some of which do not lend themselves to a standard "metal deck" analysis for span and loading. In these cases, other criteria must be

considered. Make sure that this investigation starts with a review of the applicable codes and that any special conditions are included in the design.

1033.4 Method of Measurement

The quantity to be paid for shall be the number of linear meter measured center to center of the metal decking erected in place and accepted to the satisfaction of the Engineer.

1033.5 Basis of Payment

The quantity, as determined in subsection 1033.4 Method of Measurement, shall be paid for at the unit bid or contract unit price which price and payment shall be full compensation for furnishing and placing all materials and for all labor, equipment, tools and other incidentals necessary to complete this item.

1033.6 Payment will be made under:

Payment Item Number	Description	Unit of Measurement
1033	Metal Deck Panel	Linear Meter