Specifications Marcore-R and Marcore-RA

I. Engineering Tables

1. Scope

The engineering load tables were made for MARCORE roof deck made by Marlyn. A similar shaped deck if often called “dovetail.” The roof steel deck is the structural element, which is made with light gauge cold-formed steel deck. The deck is 2” deep. It can span one, two, three or more spans.

2. Materials

MARCORE steel deck is two inches deep.
This steel deck is fabricated from a steel sheet, zinc coated (galvanized G60 or G90) by a hot dip process in coils per ASTM A653.
Performance tables are given:

2.1. Steel decks made with 22 & 20 gauges, steel based on yield strength of 50 ksi (grade 50).

2.2. Steel decks made with 18 & 16 gauges, steel based on yield strength of 40 ksi (grade 40).

3. Design Assumptions

3.1. Gravity load tables.

3.1.0. General

Roof steel deck was designed for three main conditions: one-span, two-span, and three-span conditions.

- One-span condition: It is a roof steel deck that has two supports and was designed as a simple supported beam.
- Two-span condition: It is a roof steel deck that has three supports (two end supports and one intermediate) and was designed as a continuous beam with two equal spans.
- Three or more-span condition: It is a roof steel deck that has four or more supports (two end supports and the others are intermediate) and was designed as a continuous beam with equal spans.

3.1.1. Calculations assumptions:

- The calculations of the moments were based on the length of the span from center to center of the supports provided they do not differ in length more than 10%.

- The tables and design data in this publication are based on deck that is properly connected to the frame in accordance with SDI Specifications:

    a. Maximum side lap splices cannot be more than 12” between adjacent points.

    b. Deck has to be properly attached to prevent blow-off and slip-off from supporters.

    c. The maximum uniform loads determined in tables 3,5, and 7 are based on assumptions that end bearing of deck is not less than 2” and the deck bearing at the interior support is not less than 4”.

    d. The maximum uniform loads determined in tables 3, 5, and 7 are based on LRFD (load resistance factor design) and ASD (allowable stress design). Both calculations are combined of dead and live loads.

    e. Maximum deflection of the deck is designed not to exceed L/240 or 3/4” whichever is less under the uniformly distributed load.

    f. Construction and maintenance loads on one or more spans: The determined maximum span under concentrated construction load and maintenance load equal to 200 lb. at mid-span on 12” wide section of deck with deflection not to exceed L/240.

Commentary:

1. Suspended loads: If applied, additional calculations shall be made by the Engineer of Record to verify the deck deflections and stresses. Suspended loads may include ceilings, light fixtures, or other utilities. The designer must be informed of any loads applied after the roofing has been installed.
2. Openings: It is the responsibility of the Engineer of Record to verify openings in the deck. Additional framing between main supports has to be specified and detailed.
3. Installation: Deck ends are butted over supports. Gaps up to 1 inch shall be permitted.

3.2 Roof uplift load tables.

Roof net uplift calculations were made based on the information provided by Steel Deck Institute publication “Roof Deck Construction Handbook.”
The welding pattern is 24.5/4. The side lap spacing is 12”.
Fastener uplift (resistance) was calculated, based on formula:

$U=(k*P)/(C*L)$

Where:

P, lb – Simplified uplift values generally based on deck gauge and puddle weld diameter.
L, ft – Deck span.
Used safety factor is 2.5.
C & k – factors given in the mentioned above publication for the wide rib deck (see note below).

Note:

The following assumptions were made for the factors k & C:
The wide rib deck and the dovetail deck have the same C and k factors for the same fastener spacing. If later different additional information for the dovetail deck is provided, some modifications will be made.