SECTION 03 51 16
GYPSUM CONCRETE ROOF DECKS

SPEC WRITER NOTES:
1. Delete between // // if not applicable to project. Also delete any other item or paragraph in the section and renumber the paragraphs.
2. This is a sole source system. Prior approval for its use is required.
3. Insure details show system.

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section specifies gypsum plank systems for fire rated roof decks //.

B. Optional system for and roof decks. //

1.2 RELATED WORK

A. Section 05 12 00, STRUCTURAL STEEL FRAMING: Steel Framing.

B. //Section 07 51 00, BUILT-UP BITUMINOUS ROOFING: Membrane Roofing. //

C. //Section 07 53 23, ETHYLENE-PROPYLENE-DIENE-MONOMER ROOFING: Membrane Roofing. //

D. //Section 07 54 19, POLYVINYL-CHLORIDE ROOFING: Membrane Roofing. //

1.3 QUALITY CONTROL

A. Work performed by experienced, qualified installers approved by manufacturer of gypsum plank.

B. Gypsum materials products of one manufacturer.

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES. All items indicated below are required submittals requiring Contracting Officer’s Representative (COR) review and approval.

B. Fire Tests: Fire tests, data and certifications substantiating that Gypsum Plank Decking complies with fire rating requirements.

C. Shop Drawings: Show typical plank layouts, perimeter and framed opening supports and details of construction, installation, fastenings and grouting.

D. Manufacturer's Literature and Data: Each item specified.

E. Load tables for sub-purlins.

F. Sustainable Construction Submittals:

SPEC WRITER NOTE: Retain sustainable construction submittals appropriate to product.

G. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight

1.5 DELIVERY AND STORAGE

A. Deliver materials in original packages, containers, or bundles bearing brand name and name of manufacturer.

B. Store materials in a manner that prevents damage before use. When stored under tarpaulins, provide ventilation to prevent moisture accumulation under tarpaulin.

C. Store gypsum planks flat and off ground. Handle and stack in a manner to prevent damage to face, ends, and edges and keep dry until used.

D. Store gypsum concrete off ground and keep dry until used.

1.6 APPLICABLE PUBLICATIONS

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

B. ASTM International (ASTM):

A36/A36M-19.....Standard Specification for Carbon Structural Steel

A499-15(2020).....Standard Specification for Steel Bars and Shapes, Carbon Rolled from "T" Rails

A568/A568M-19a.....Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements

A653/A653M-20.....Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot Dip Process

A1064/A1064M-18a.....Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

C317/C317M-00(2019).....Standard Specification for Gypsum Concrete

C1396/C1396M-17.....Standard Specification for Gypsum Board

E119-20.....Standard Test Methods for Fire Tests of Building Construction and Materials

C. American Welding Society Publication (AWS):

D1.1/D1.1M-20.....Structural Welding Code - Steel

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sub-purlins:

1. Open web truss-tees, hot-rolled bulb-tees or folded sheet metal tees as required by design loads, spans and fire ratings.
2. Flanges: Provide 16 mm (5/8-inch) minimum bearing for gypsum planks.
3. Galvanize or factory coat sub-purlins with manufacturer's standard primer.
4. Open web truss-tees: Fabricate from cold-formed steel wire conforming to ASTM A1064.
5. Hot-rolled bulb-tees: Rail-shaped, fabricated from hot-rolled steel conforming to ASTM A36 or ASTM A499.
6. Folded sheet metal tees: Fabricate from sheet steel conforming to ASTM A653 and ASTM A568.

B. Cross-Tees:

1. Cold-Formed, Fabrication from sheet steel conforming to ASTM A525 or ASTM A568.
2. Size: 30 mm (1-1/4-inches) by 13 mm (1/2-inch) by 0.6 mm (0.023-inch) thick by 600 mm (24-inches) long.

C. Gypsum Deck Plank:

1. Fabricated of gypsum board: ASTM C1396.
2. Nominal Size: 50 mm (2-inches) thick by 600 mm (24-inches) wide by main purlin span. Where possible, length should span two main purlin spans.
3. Factory laminate from two 25 mm (1-inch) thick gypsum panels with top panel edge set back along sub-purlin edge not more than 13 mm (1/2-inch).
4. Edge encased in water-resistant paper.

D. Gypsum Deck Panels: ASTM C1396, Type "X", 16 mm (5/8-inch) thick by 600 mm (24-inches) wide by main purlin span.

E. Grout: Gypsum Concrete: ASTM C317, Class A, 3.5 MPa (500 psi) minimum compressive strength.

2.2 DECK SYSTEM

A. Roof Deck: Provide // one // 1-1/2 // hour fire rating per tested assembly by Underwriter's Laboratory Inc. or other testing.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine substrates, framing and conditions under which gypsum plank is to be installed and notify COR in writing of conditions detrimental to proper and timely completion.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Weld per AWS D1.1.

B. Sub-purlins:

1. Space at approximately 650 mm (24-5/8-inches) on center to provide minimum 16 mm (5/8-inch) continuous bearing for gypsum plank or deck.
2. Install framing of openings.
3. Touch up welds with same type of rust-inhibitive paint used for primer.

SPEC WRITER NOTES:
1. When sub-purlins are used to carry superimposed loads, such as ceilings, lighting fixtures or other building components, consult load tables for sub-purlin size selection.
2. Select and detail appropriate attachment methods.

4. Roof Decks: Use minimum 13 mm (1/2-inch) fillet welds on alternate sides of sub-purlins, both sides at end joints to main purlins.
5. For fire rated roof decks weld per fire test assembly.

C. Gypsum Deck Plank for Roof Decks:

1. Place plank on lower flanges of sub-purlins or other framing with ends and edges supported.
2. Stagger joints in adjacent courses.
3. Support end joints with cross-tees not supported by framing.
4. Cut plank to fit at ends and framed openings.

D. Provide continuous 16 mm (5/8-inch) minimum bearing for plank support at deck perimeter, plank ends and openings exceeding 200 mm (8-inches).

E. Grout:

1. Mix gypsum concrete thoroughly using a minimum amount of water to form a thick, pourable consistency.
2. Fill edge joints to slight excess with single pour at sub-purlins.
   a. Grout end joints on single span system against steel framing.
   b. After initial set, strike of excess to form smooth, flush joint.

c. // Form cant strips and curbs where shown. //

3. // Fill joints at roof ridges, hips and valleys. //

F. Patching:

1. Fill with grout and smooth any surface damage to gypsum plank.
2. Remove and replace cracked, broken, and plank damaged beyond repair.

G. Cleaning and Protection:

1. Upon completion of gypsum plank decking, remove, debris and sweep surface clean. Leave ready for subsequent work.
2. Protect finished deck from weather and subsequent construction operations.
3. Provide hardboard or plywood temporary protection over decking subject to repetitive impact or wheeled loads.

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