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ICC-ES Evaluation Report

ESR-3386

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Issued 11/2017
This report is subject to renewal 11/2018.

DIVISION: 03 00 00—CONCRETE

SECTION: 03 54 00—CEMENTITIOUS UNDERLAYMENT

REPORT HOLDER:

HACKER INDUSTRIES, INC.

**1600 NEWPORT CENTER DRIVE, SUITE 250
NEWPORT BEACH, CALIFORNIA 92660**

EVALUATION SUBJECT:

**GYPSUM CONCRETE: FIRM-FILL® GYPSUM CONCRETE, FIRM-FILL® 2010+, FIRM-FILL® 3310+,
FIRM-FILL® 4010, GYP-SPAN® RADIANT.**

MATS: FIRM-FILL SCM-125, FIRM-FILL SCM-250, FIRM-FILL SCM-400, FIRM-FILL SCM-750.



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A Subsidiary of the International Code Council®

DIVISION: 03 00 00—CONCRETE

Section: 03 54 00—Cementitious Underlayment

REPORT HOLDER:

HACKER INDUSTRIES, INC.
1600 NEWPORT CENTER DRIVE, SUITE 250
NEWPORT BEACH, CALIFORNIA 92660
(949) 729-3101
www.hackerindustries.com

EVALUATION SUBJECT:

GYPSUM CONCRETE;
FIRM-FILL® Gypsum Concrete,
FIRM-FILL® 2010+,
FIRM-FILL® 3310+,
FIRM-FILL® 4010,
GYP-SPAN® RADIANT.

MATS;
FIRM-FILL SCM-125,
FIRM-FILL SCM-250,
FIRM-FILL SCM-400,
FIRM-FILL SCM-750.

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2015 and 2012 *International Building Code*® (IBC)
- 2015 and 2012 *International Residential Code*® (IRC)

Properties evaluated:

- Fire-resistance-rated construction
- Compressive Strength

2.0 USES

The gypsum concrete and mats may be used in fire-resistance-rated floor/ceiling assemblies in accordance with IBC Sections 703 and 711 and IRC Section R302.3 when installed in accordance with Sections 4.0 and 4.1 and Figure 1.

3.0 DESCRIPTION

3.1 Gypsum Concrete:

The FIRM-FILL® Gypsum Concrete, FIRM-FILL® 2010+, FIRM-FILL® 3310+, FIRM-FILL® 4010, and GYP-SPAN® RADIANT are dry mixes consisting of gypsum and Portland cement provided in bags or containers of various sizes. The shelf-life of the dry mixes is specified in the report holder's published installation instructions.

Each of the gypsum concretes, when mixed in accordance with the manufacturer's specifications at various densities between 110 pcf and 130 pcf (1760-2.080 kg/m³), have the following minimum compressive strengths when based on testing in accordance with ASTM C472:

- FIRM-FILL® Gypsum Concrete, 1500 psi
- FIRM-FILL® 2010+, 2000 psi
- FIRM-FILL® 3310+, 3000 psi
- FIRM-FILL® 4010, 4000 psi
- GYP-SPAN® RADIANT, 2500 psi

3.2 Mats:

The Firm-Fill mat products have an entangled plastic net core with a non-woven fabric backing. Firm-Fill SCM-125, SCM-250, SCM-400, and SCM-750 have an overall nominal thickness of 0.125-inch, 0.250-inch, 0.375-inch, and 0.750-inch (3.2 mm, 6.4 mm, 9.5 mm and 19.1 mm), respectively.

4.0 INSTALLATION

Hacker Industries, Inc.'s gypsum concrete products are mixed with sand and water on the jobsite and pumped into place by Hacker Industries, Inc. approved installers. Mixing and installation must be in accordance with the report holder's published installation instructions.

4.1 Fire-resistance-rated Floor/Ceiling Assembly:

The 1-hour fire-resistance-rated floor/ceiling assembly shown in Figure 1 is based on a UL design. When using this assembly, all details must be in accordance with the specifications contained in the UL *BXUV GuideInfo*.

5.0 CONDITIONS OF USE

The products described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Installation must comply with this report, the report holder's published instructions and the applicable code. In the event of a conflict between the report holder's published installation instructions and this report, this report governs.
- 5.2** Application must be by installers approved by Hacker Industries, Inc.
- 5.3** Use of the products as components of fire-classified roof coverings or roof/ceiling assemblies is outside the scope of this report.

5.4 The gypsum concrete products are produced under a quality control program with inspections by ICC-ES at the following locations: Blue Rapids, Kansas; Camden, New Jersey; and North Las Vegas, Nevada.

5.5 The mats are produced under a quality control program with inspections by ICC-ES at Burlington, Washington.

6.0 EVIDENCE SUBMITTED

6.1 Report of fire-resistance testing and analysis.

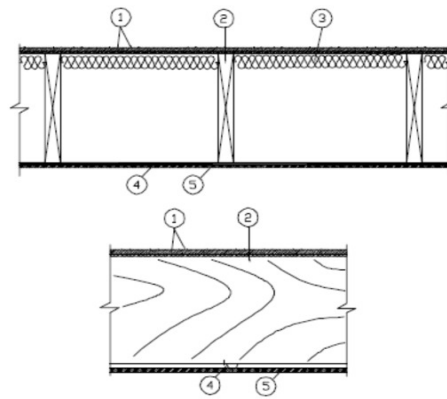
6.2 Reports of density and compressive strength testing.

6.3 Product literature and quality documentation.

7.0 IDENTIFICATION

The bags of gypsum concrete dry mix are identified with the Hacker Industries, Inc. name, product name, the date of manufacture, and the evaluation report number (ESR-3386).

The rolls of mats are identified with the Hacker Industries, Inc. name, product name, the date of manufacture, and the evaluation report number (ESR-3386).



Where noted with an “*” in the description below, the product must bear the UL Classification Mark.

For SI Units: 1 inch = 25.4 mm, 1 foot = 0.3048 m, 1 pound = 4.45 N

1. Flooring System — The flooring system shall consist of the following:

- Subflooring — Nominal $\frac{5}{8}$ in. thick wood structural panels installed perpendicular to the joists with end joints staggered. Panels secured to joists with construction adhesive and No. 10d ringed shank nails, spaced 10 in. OC along each joist and 6 in. OC at the end joints.
- Vapor Barrier — (Optional) - Nominal 0.030 in. thick commercial asphalt saturated felt.
- Alternate Floor Mat Materials* — Floor mat material nom $\frac{1}{8}$ in. (3mm) thick loose laid over the subfloor. Floor topping thickness shall be a minimum of $\frac{3}{4}$ in.

HACKER INDUSTRIES INC.:

- FIRM-FILL SCM 125

- Alternate Floor Mat Materials* — Floor mat material nom $\frac{1}{4}$ in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of 1 in.

HACKER INDUSTRIES INC.:

- Type FIRM-FILL SCM 250

- Alternate Floor Mat Materials* — Floor mat material nominal $\frac{3}{8}$ -in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of $1\frac{1}{4}$ in.

HACKER INDUSTRIES INC.:

- FIRM-FILL SCM 400

- Alternate Floor Mat Materials* — Floor mat material nominal $\frac{3}{4}$ in. thick loose laid over the subfloor. Floor topping thickness shall be a minimum of $1\frac{1}{2}$ in.

HACKER INDUSTRIES INC.:

- FIRM-FILL SCM 750

- Metal Lath (Optional) — For use with $\frac{3}{8}$ in. floor mat materials, $\frac{3}{8}$ in. expanded steel diamond mesh, 3.4 lbs/sq yd placed over the floor mat material. Hacker Floor Primer to be applied prior to the placement of the metal lath. When metal lath is used, floor topping thickness a nominal 1 in. over the floor mat.

- Finish Flooring - Floor Topping Mixture* — Minimum $\frac{3}{4}$ in. thickness of floor topping mixture having a minimum

compressive strength of 1100 psi. Mixture shall consist of 6.8 gal of water to 80 lbs of floor topping mixture to 1.9 cu ft of sand.

HACKER INDUSTRIES INC.:

- Firm-Fill Gypsum Concrete.
- Firm-Fill 2010+.
- Firm-Fill 3310+.
- Firm-Fill 4010. or
- Gyp-Span Radiant

2. Wood Joists — 2 by 10 in., spaced 16 in. OC.

3. Batts and Blankets* — Glass fiber or mineral wool insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance. Insulation shall be a maximum of $3\frac{1}{2}$ in. thick and shall be secured against the underside of the subflooring with staples at 12 in. OC.

4. Resilient Channels — Nominal $\frac{1}{2}$ in. deep by $2\frac{3}{8}$ in. wide at the base and $1\frac{3}{8}$ in. wide at the face, formed from 0.020 in. thick galv steel. Installed perpendicular to the wood joists, spaced a max of 16 in. OC. Channel splices overlapped 4 in. Channels secured to each truss with $\frac{1}{4}$ in. long Type S screws.

5. Gypsum Board* — Nominal $\frac{5}{8}$ in. thick, 48 in. wide gypsum panels installed with long dimension perpendicular to resilient channels. Gypsum panels secured with 1 in. long Type S bugle head steel screws spaced 12 in. OC in the field and 6 in. OC along the butt joints. Screws located a minimum of $\frac{1}{2}$ in. from side and end joints. Butted end joints shall be staggered minimum 9 ft 4 in. within the assembly.

CERTAINTEED GYPSUM INC.:

- Type C

PABCO BUILDING PRODUCTS LLC DBA PABCO GYPSUM

- Type C

6. Finishing System — (Not shown) - Vinyl, dry or premixed joint compound, applied in two coats to joints and screw-heads. Nom 2 in. wide paper tape embedded in first layer of compound over all joints.

FIGURE 1—FIRE-RESISTANCE-RATED FLOOR/CEILING ASSEMBLY – 1 HOUR
Fire Resistance Ratings - ANSI/UL 263
Unrestrained Assembly Rating — 1 Hr
FLOOR/CEILING Assembly Incorporating Wood Joints