



PART I: GENERAL

1.1 Summary

- A.** This section includes underlayment for interior finish flooring.
- B.** Specify to meet project requirements. The conditions of the Contract (General, Supplementary, and other conditions) and the General Requirements (sections of Division 1) govern the provisions of this section.
- C. Related Sections:**
 - 1. Section 09 21 16 – Gypsum Board Assemblies

1.2 Referenced Standards

- A. The following standards and publications are applicable:**
 - 1. ASTM C472 Modified Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters, and Gypsum Cement (compressive strength)
 - 2. ASTM C33 Standard Specification for Concrete Aggregates (sand aggregate)
 - 3. ASTM D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
 - 4. ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
 - 5. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials
 - 6. ASTM E413 Rating Classification for Rating Sound Insulation
 - 7. ASTM E492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
 - 8. ASTM F2419 Standard Practice for Installation of Thick Poured Gypsum Concrete and Preparation of the Surface to Receive Resilient Flooring
 - 9. ASTM F2678 Standard Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Poured Lightweight Cellular Concrete Underlayments with Underlayment Patching Compounds to Receive Resilient Flooring
 - 10. TCNA F180 Tile Council of North America Installation Handbook
 - 11. NWFA National Wood Flooring Association Instructions
 - 12. Hacker Industries, Inc. Installation Guide
 - 13. Hacker Industries, Inc. Drying Conditions Flyer
 - 14. Hacker Industries, Inc. Guidelines for Installing Finished Floor Coverings
 - 15. UL Fire Resistance Directory



1.3 Submittals

- A. **Product Data:** Submit manufacturer's specifications and installation instructions with project conditions and materials clearly identified or detailed for each required product or system.
- B. **Environmental Information:** Submit product data for LEED® Credits MR 4 and MR 5, Recycled Content and Regional Materials. Provide documentation indicating percentages, by weight, of post-consumer and pre-consumer recycled content. Also provide documentation substantiating Regional Materials.

1.4 Quality Assurance

- A. **Fire Resistance:** Provide materials and construction identical to those tested according to ASTM E119 by an independent testing agency.
- B. **Acoustical Performance:** For STC: Provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency. For IIC: Provide materials and construction identical to those tested in assembly according to ASTM E492.
- C. **Manufacturer:** All materials, unless otherwise indicated, shall be manufactured by Hacker Industries, Inc., Newport Beach, California.
- D. **Installer:** Installation of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment shall be by a Licensed Applicator of Hacker Industries, Inc., using mixing and pumping equipment with a water meter approved by Hacker Industries, Inc.
- E. Hacker Industries, Inc., Newport Beach, CA, shall approve all materials specified herein. All others must receive prior approval.

1.5 Performance Requirements

- A. Compressive strength of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment shall be from 2000 to 3300 psi (approx. 13.8 to 22.8 MPa)

1.6 Delivery, Storage And Handling

- A. Materials shall be delivered in their original, unopened packages, and protected from exposure to the elements after delivery. Do not allow the bags to get wet.

1.7 Project Conditions

- A. Before, during, and after installation of product, building interior shall be enclosed, with adequate ventilation and heat maintained at a temperature above 50°F (10°C) to allow for drying of product.



1.8 Warranty

- A. **Certification:** Upon completion of this portion of the work, and as a condition of its acceptance, deliver to the architect a certificate from Hacker Industries, Inc., and signed by the Licensed Applicator, stating that the material used in this work complies with the specified requirements.
- B. Subject to express warranty as stated on Hacker Industries, Inc.'s website.

PART II: PRODUCTS

2.1 Manufacturers

- A. **Acceptable Manufacturers**, subject to all the requirements contained herein:
 - 1. Hacker Industries, Inc., Newport Beach, California

2.2 Material Description

- A. **Gypsum Concrete:** FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment, supplied by Hacker Industries, Inc.
- B. **Subfloor Primer:** Hacker Floor Primer or approved equal
- C. **Sand:** Washed plaster or masonry sand meeting the requirements of Hacker Industries, Inc. Sand Guidelines
- D. **Water:** Potable and free from impurities
- E. **Sealer:** Hacker TopCoat™ SP Surface Preparation Agent, if specified

PART III: EXECUTION

3.1 Examination

- A. **Condition of Subfloor**
 - 1. Subfloor shall be structurally sound, broom cleaned, dry and free from oil, grease, paraffin, laitance or other contaminants before the arrival of the Hacker Licensed Applicator.
 - 2. Wood Substrate:
 - a. Subfloor and framing must be designed to a maximum deflection of L/360.
 - b. Wood should be APA rated 23/32" (1.8 cm) T&G.
 - 3. Concrete Substrate: shall be in place a minimum of 28 days.
 - 4. Before installation, the General Contractor (GC) shall inspect and approve the condition of the subfloor and test for dryness.



3.2 Preparation

- A. **Leak Prevention:** All cracks and voids should be filled with a quick-setting patching or taping compound, or equal, where leakage may occur. Prime wood subfloors with one coat of Hacker Floor Primer (diluted 4:1 with water) using one gallon of primer solution (approx. 3.79 L) per 500 ft² (approx. 47 m²).
- B. Hacker Floor Primer is not always required over concrete substrates. Multiple coats may be required over porous concrete or plank. (Note: For rehabilitation work or pours over old and/or porous concrete or wood, consult a Licensed Applicator or Hacker Industries, Inc. for recommended floor preparation.)
- C. Installation of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment shall not begin until the building is enclosed, including roof, windows, doors, and other openings.
- D. FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment shall be installed before or after the installation of drywall, as specified.

3.3 Installation

- A. **Mixing Requirements:** 4 to 5.5 gallons (15.1 to 20.8 L) of water as specified per 80-pound (36.3-kg) bag of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment. Do not overwater. Water amount will change with wetness of sand. Amount of sand to vary with mix.
 - 1. FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment mix proportions, mix designs and methods shall be in strict accordance with Hacker Industries, Inc.'s recommendations.
- B. **Application:** The minimum thickness of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment varies with the type of subfloor. Over wood subfloors, a minimum of 3/4" (approx. 19 mm) is required. Over precast or poured-in-place concrete, a minimum of 1/2" (approx. 13 mm) is required.
- C. FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment is suitable for interior applications only and must be covered by a finished floor material.
- D. **Protection:** After installation, the GC shall place temporary wood planking wherever the floor underlayment will be subject to wheeled or concentrated loads.
- E. **Drying:** Before, during and after installation of FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment, building interior must be ventilated and heated to a minimum 50°F (10°C) to ensure completion of the drying process. The GC shall provide continuous ventilation and adequate heat to rapidly remove moisture from the area until the FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment is dry. Do not install finished floor coverings until the FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment is tested for dryness. Consult flooring contractor for recommended procedures to test for dryness. Reference Hacker Industries, Inc.'s Drying Conditions Flyer.



F. Field Quality Control:

1. Slump Test: FIRM-FILL® 3310 Gypsum Concrete Floor Underlayment shall be tested for slump at the beginning of each installation in order to establish the required slump. Slump tests shall then be taken periodically during installation to verify that the required slump is maintained. Slump tests shall be conducted using a 2" by 4" (approx. 51 mm by 102 mm) cylinder. The acceptable patty size should be 8.5" (approx. 216 mm) plus or minus 1/2" (approx. 13 mm) in diameter.
2. Field Samples: Testing shall be done in accordance with ASTM C472 modified testing procedures, using 2" (approx. 51 mm) split brass molds. Prior to independent sampling, contact Hacker Industries, Inc., to ensure that proper ASTM procedures are followed. If requested prior to installation, test results shall be available to the architect and/or contractor from the Licensed Applicator.

3.4 Preparation For Finished Floor

- A. Repair any damaged areas of underlayment prior to application of any sealers.
- B. Underlayment must be dry prior to installation of finished floor. Follow ASTM D4263 to determine dryness of underlayment.
- C. **Resilient Floor Applications:** Follow floor covering manufacturer's guidelines for proper applications and procedures (ASTM F2419).
- D. Install wood flooring according to NWFA Instructions.
- E. Install ceramic, porcelain, granite or natural stone tiles according to TCNA recommendations.