

**Division 03 54 13:
Gypsum Cement Underlayment**



Hacker Industries, Inc.
Architect Binder



FIRM-FILL® 3310

FIRM-FILL® 3310

FLOOR UNDERLAYMENT

Technical Data	Properties	ASTM
Weight	7.6 lbs/ft ² (37.1 kg/m ²) at 3/4" (19mm)	C472 M
Thickness	3/4" (19mm) (minimum over wood) to 3 1/2" (89mm)	F2419
Compressive Strength	2000 - 3300 psi (13.8-22.7 MPa)	C472 M
Thermal Performance	K-value of 2.8 Btu; R-value of 0.36 ft ² .h.°F/Btu	C177
Fire Hazard Classification	Flamespread index 0; Fuel Contribution 0; Smoke Density 0	E84
Sand	1/8" (3mm) or less washed plaster or masonry sand	E11



- High-strength underlayment for use over wood or concrete subfloors
- Install over a Hacker Sound Mat for additional sound isolation
- Essential for excellent STC and IIC ratings
- Integral part of over 90 UL design listings
- Lightweight and crack-resistant
- Reduced amount of water for accelerated set time
- Helps contribute points to LEED® project certification
- Creates a flat, durable surface for finished floor coverings
- Installed only by Licensed Applicators across North America

Product Description

FIRM-FILL® 3310 offers an innovative formulation that decreases the amount of water used while enhancing the rock-solid floor strength. The product's rapid set time allows light foot traffic in 90 minutes. This versatile, high quality floor underlayment is widely used as an alternate to lightweight concrete in multi-family, light-commercial and hospitality projects. FIRM-FILL® 3310 provides compressive strengths from 2000-3300 psi (13.8 to 22.8 MPa). Depending on compressive strength, it can be installed before or after drywall. To help keep projects on schedule and on budget, Licensed Applicators can install over 30,000 ft² of FIRM-FILL® 3310 in one day.

FIRM-FILL® 3310 is mixed on the job site with local sand (per ASTM E-11) and water to create a light weight slurry. Installed at a minimum of 3/4" thick, the underlayment weighs approximately 7.6 lbs/ft².

For new construction or renovation, FIRM-FILL® 3310 is a cost-efficient way to maximize sound control and create a smooth, flat, and high-strength surface for finished floor coverings. To achieve additional sound isolation, use FIRM-FILL® 3310 with a Hacker Industries, Inc. sound control mat.

Limitations

- Shall not be used in exterior locations, below grade, or where continuous exposure to moisture is likely.
- Shall not be used as a wear surface; must be covered by a finished floor covering.
- Structure shall be designed so that deflection does not exceed L/360 live or dead load. Certain floor coverings such as marble, limestone, travertine and wood may have more restrictive deflection limits. Consult the appropriate floor covering manufacturer for recommendations.
- If installed above a crawl space, subfloor must be protected by a vapor barrier.
- No single application of FIRM-FILL® 3310 shall exceed 3" in depth.
- FIRM-FILL® 3310 is but one component of an effective sound and fire control system. Care must be taken in the installation of all components to assure the ultimate design performance. Published acoustical and fire system tests were conducted under controlled laboratory or field conditions and reflect results applicable only to those specific assemblies.

Installation

Before, during, and after the installation of FIRM-FILL® 3310, the building must be enclosed and the temperature maintained at a minimum of 50°F (10°C). Prior to the installation of FIRM-FILL® 3310, the subfloor shall be structurally sound (L/360) and broom clean, dry and free from oil, grease, paraffin, laitance, wax or other contaminants. Concrete subfloors shall be 28 days or older. After installation, temporary wood planking shall be placed by the GC wherever the floor underlayment will be subject to wheeled or concentrated loads. For on-grade applications over concrete, measure the Moisture Vapor Emission Rate (MVER) per ASTM F1869. MVER shall not exceed 3lbs./1000 ft² per 24 hours. Prime wood subfloors per recommended specifications before installing underlayment. After installation, temporary wood planking shall be placed by the GC wherever the floor underlayment will be subject to wheeled or concentrated loads. Adequate ventilation shall be provided by the General Contractor (GC) to ensure proper drying of FIRM-FILL® 3310. If necessary, the GC shall provide mechanical ventilation and heat. Depending on thickness and drying conditions, the underlayment will dry within 10 to 14 days. To avoid potential problems during the drying process, the GC shall consult Hacker Industries, Inc.'s Drying Conditions Flyer and information contained on Hacker Industries, Inc.'s website for additional information concerning drying of this product.

Finished floor coverings can be installed when the FIRM-FILL® 3310 is completely dry. Consult flooring contractor for recommended procedures to test for dryness and acceptable levels of moisture. Reference Hacker Industries, Inc.'s Guidelines for Installing Finished Floor Coverings. This guideline is not a warranty and shall be used as a guideline only. See ASTM F2419.

Product Data

Approximate Compressive Strength (aggregated) ASTM C472 (modified): 2000 - 3300 psi
(13.8 to 22.8 MPa)

Approximate Dry Density (aggregated): 107 to 120 pcf

Note *Compressive strengths published herein were achieved under controlled laboratory conditions. Actual field results may differ due to environmental conditions, regional sand variations, inconsistent proportioning of field applied water, sand and Hacker Floor Underlayment, as well as differences in mixing/pumping equipment.

Compliance

- ICC-ES ER-4147 • City of Los Angeles Research Report No. 24540 • ASTM F2419
- FHA - HUD MR 1255 Tile Council of America (F180, F200, RH111, RH122)

UL Designs

G565	G568	J917	J919	J920	J924	J927	J931	J957	J966	J991	J994
K906	L001	L004	L005	L006	L201	L202	L206	L208	L209	L210	L211
L212	L501	L502	L503	L504	L505	L506	L507	L508	L509	L510	L511
L512	L513	L514	L515	L516	L517	L518	L519	L520	L521	L522	L523
L524	L525	L526	L527	L528	L529	L530	L531	L532	L533	L534	L535
L536	L537	L538	L539	L540	L541	L542	L543	L544	L545	L546	L547
L548	L549	L550	L551	L552	L553	L555	L556	L557	L558	L559	L570
L574	L560	L562	L563	L571	L585	L590	L592	L593	L598	M502	M506
M508											

Related Products

Hacker Floor Primer, Hacker TopCoat SP and Hacker Floor Sealer are available for use with FIRM-FILL® 3310. Contact Hacker Industries, Inc. at (800) 642-3455 for more information.

Warranty

Subject to express warranty stated on Hacker Industries, Inc.'s website.

Submittal Approvals

Project Name: _____
Contractor/Architect: _____
Date: _____

Product Information

See HackerIndustries.com and bags for current recommended product specifications, literature and warnings.

WARNING!

When mixed with water, this product hardens and becomes extremely hot. DO NOT attempt to make a cast enclosing any part of the body using this material. Failure to follow these instructions may cause severe burns that may require surgical removal of affected tissue or amputation of limb. Portland cement is strongly alkaline. Direct contact can be corrosive and cause severe damage or chemical

burns to eyes and wet, moist skin. Avoid contact with eyes and skin. Wear protective glasses and clothing. If eye contact occurs, immediately flush thoroughly with water for 30 minutes and seek medical advice. Inhalation of dust may be corrosive or cause chemical burns or irritation to nose, throat and respiratory tract.

Avoid breathing dust. Use a NIOSH/MSHA-approved dust respirator. Wash thoroughly with soap and water after use. Do not ingest. If ingested, call a physician. Product safety, call (800) 642-3455. **KEEP OUT OF REACH OF CHILDREN.**

TRADEMARKS

FIRM-FILL, GYP-SPAN, Let Our Products FLOOR You and the associated logos are trademarks of Hacker Industries, Inc. LEED is a registered trademark of the U.S. Green Building Council.

NOTICE

We shall not be liable for incidental or consequential damages, directly or indirectly, sustained, nor for any loss caused by application of these goods not in accordance with current printed instruction or for other than the intended use. Our liability is expressly limited to replacement of

defective goods. Any claim shall be deemed waived unless made in writing to us within 30 days from date it was or reasonably should have been discovered.

SAFETY FIRST

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read MSDS and literature prior to specification and installation.

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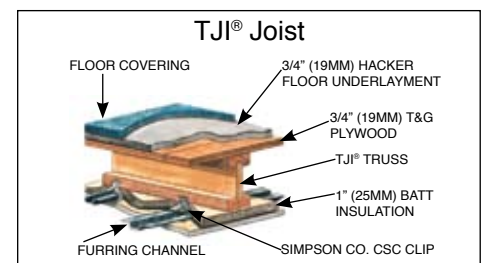
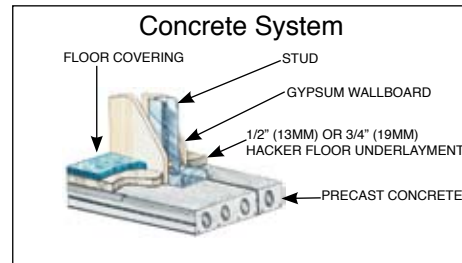
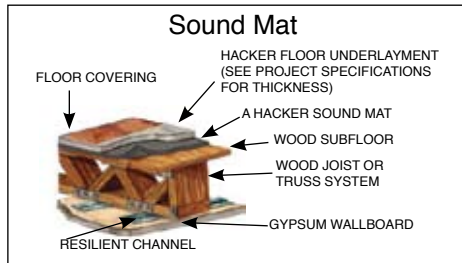
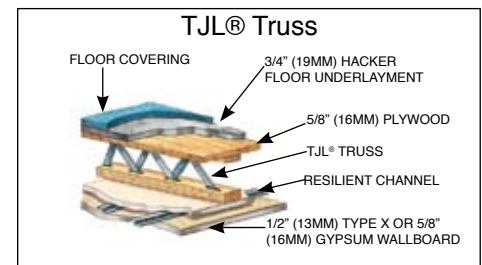
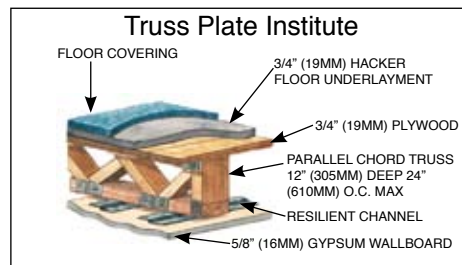
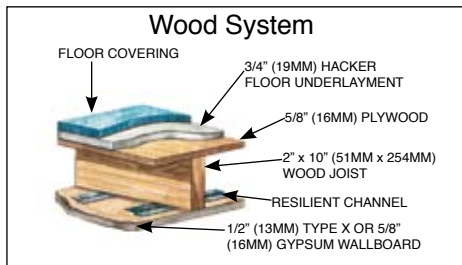
Firm-Fill®

3310

FIRM-FILL® 3310, a premium poured floor underlayment from Hacker Industries, Inc., delivers best in class performance with compressive strengths from 2000 - 3300 psi.

*Ideal over wood or concrete subfloors in multi-family, hospitality, and renovation projects, **FIRM-FILL® 3310** maximizes sound control and creates an enhanced surface for finished floor coverings.*

- Easy application, fast setting; light traffic can return within hours
- Over 89 UL listings; ICC-ES Legacy Report
- Can be poured before or after drywall, as specified
- Specify with a Hacker Sound Mat for additional sound control
- Meets ASTM F2419 and Tile Council of North America F180, F200
- Only available from trained, Licensed Applicators



These drawings shall not be used without a complete evaluation by the owner's design professional to verify the suitability of its use with the project's specific application.

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Recommended Specifications for FIRM-FILL® 3310

PART I GENERAL

- 1.1 Scope – Specify to meet project requirements
 - A. Work included:
 1. **FIRM-FILL® 3310**
 2. Division 3 Section - Gypsum Cement Underlayment
 3. Division 9 Section - Acoustical Treatment
- 1.2 Qualifications
 - A. **FIRM-FILL® 3310** shall be installed by Licensed Applicators of Hacker Industries, Inc., using approved mixing and pumping equipment with a water meter.
 - B. **FIRM-FILL® 3310** shall be delivered in original, unopened bags and protected from exposure to the elements. Product shall not be used beyond shelf life.
 - C. Install either before or after drywall.
 - D. Before, during, and after installation of **FIRM-FILL® 3310** (until dry), the building interior shall be continuously ventilated and heated to a minimum of 50°F (10°C).
 - E. All materials, unless otherwise specified, shall be supplied by Hacker Industries, Inc.

PART II PRODUCTS

- 2.1 Materials
 - A. Gypsum Concrete: **FIRM-FILL® 3310**; 2000 to 3300 psi (13.8 to 22.8 MPa).
- 2.2 Accessories
 - A. Sound Mat: Hacker Sound Mat II; FIRM-FILL® SCM; or as otherwise specified.
 - B. Hacker Floor Primer
 - C. Hacker Floor Sealer, if specified.
 - D. Hacker TopCoat™ SP, if specified.
 - E. Sand Aggregate: 1/8" (3mm) or less washed plaster or masonry sand meeting requirements of Hacker Industries, Inc. Sand Guidelines.
 - F. Mix Water: Potable and free from impurities.

PART III EXECUTION

- 3.1 Condition of Subfloor

- A. General Contractor (GC) is responsible for providing a structurally sound (L/360) sub-floor, broom cleaned, dry, and completely free of oil, grease, paraffin, wax, laitance or other contaminants.
 - B. Before installation, the GC shall inspect and approve the condition of the subfloor and test the existing subfloor for dryness.
- 3.2 Preparation of Subfloor
 - A. All cracks and voids shall be filled with a quick-setting compound or equal.
 - B. Plywood/OSB: Spray one coat Hacker Floor Primer using one diluted gallon (3.8L) per 500 square feet (47m²).
 - C. Other substrata: Conditions may vary. Consult Hacker Industries, Inc. for recommended preparation.
 - 3.3 Mixing Instructions
 - A. 4 to 5.5 gallons (15 to 21L) of water as specified per 80 lb. (36kg) bag of **FIRM-FILL® 3310**. Do not overwater. Water amount will change depending upon wetness of sand.
 - B. **FIRM-FILL® 3310** mix proportions and methods shall be in strict accordance with Hacker recommendations.
 - 3.4 Underlayment Application
 - A. Application: **FIRM-FILL® 3310** shall be installed at 3/4" (19mm) min. over wood, 1/2" (13mm) min. over concrete. Contact Hacker Industries, Inc. for recommended thickness over sound control mats. Place continuously until installation is complete.
 - B. Protection: After installation, temporary wood planking shall be placed by the GC wherever the underlayment will be subject to wheeled or concentrated loads.
 - C. Drying: The GC shall provide continuous ventilation and adequate heat to rapidly remove moisture from the area until the

underlayment is dry. If necessary, the GC shall provide mechanical ventilation. Do not install finished floor coverings until the **FIRM-FILL® 3310** has been tested for dryness. Consult flooring contractor for recommended procedures to test for dryness and acceptable levels of moisture. To avoid potential problems during the drying process, the GC shall consult Hacker Industries, Inc.'s Drying Conditions Flyer and information contained on Hacker Industries, Inc.'s website for additional information concerning drying of this product.

- D. **FIRM-FILL® 3310** is suitable for interior applications only and shall be covered by a finished floor covering.

3.5 Preparation for Installation of Floor Coverings

- A. Sealing: Any areas where the surface has been damaged shall be cleaned and sealed. Floor covering manufacturers' specifications and requirements supercede these recommendations.
- B. Floor Covering Procedures: Please see Hacker Industries, Inc.'s "Guidelines for Installing Finished Floor Coverings. The guideline is not a warranty and shall be used as a guideline only. See ASTM F2419.

3.6 Field Quality Control

- A. Slump Test: **FIRM-FILL® 3310** shall be tested as it is being installed using a 2" by 4" (51mm by 102mm) cylinder. The patty size shall be 8" (203mm) +/- 1/2" (13mm).
- B. Field Samples: Testing of molded cube samples shall be in accordance with ASTM C472 modified using split brass molds. Prior to independent testing, consult Hacker Industries, Inc.

SUBJECT TO EXPRESS WARRANTY STATED ON HACKER INDUSTRIES, INC.'S WEBSITE.



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For the Licensed Applicator in your area, please call our toll-free number, (800) 642-3455.



FIRM-FILL® 3310 Recommended Specifications

PART I. GENERAL

1.1 Scope

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.

1.2 Qualifications

- A. Supplier: Hacker Industries, Inc., Newport Beach, California.
- B. Installer: Installation of FIRM-FILL® 3310 shall be by a Licensed Applicator of Hacker Industries, Inc., using mixing and pumping equipment with a water meter approved by Hacker Industries, Inc.
- C. All materials specified herein shall be approved by Hacker Industries, Inc., Newport Beach, CA. All others must receive prior approval.
- D. Compressive strength can be specified from 2000 to 3300 psi (13.8 to 22.8 MPa).
- E. Materials shall be delivered in their original, unopened packages, and protected from exposure to the elements before and after delivery. Do not allow bags to get wet. Product shall not be used beyond shelf life.
- F. 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.

PART II. PRODUCTS

2.1 Materials

- A. Gypsum Concrete: FIRM-FILL® 3310, as supplied by Hacker Industries, Inc.
- B. Subfloor Primer: Hacker Floor Primer or approved equal
- C. Sand: 1/8" (3mm) or less washed plaster or masonry sand meeting the requirements of Hacker Industries, Inc.'s Sand Guidelines.
- D. Water: Potable and free from impurities
- E. Hacker TopCoat™ SP (if specified)

2.2 Mix Design: See section 3.3



FIRM-FILL® 3310 Recommended Specifications (Cont.)

PART III. PREPARATION

3.1 Condition of Subfloor

- A. Subfloor shall be structurally sound (minimum L/360 live or dead load), broom clean, dry and free from oil, grease, paraffin, laitance, wax or other contaminants before the arrival of the Hacker Licensed Applicator.
- B. Before installation, the GC shall inspect and approve the condition of the subfloor and test the existing subfloor for moisture.

3.2 Preparation of Subfloor

- A. Leak prevention: All cracks and voids shall be filled with a quick-setting patching or taping compound or equal where leakage may occur.
- B. Prime wood subfloors with one coat of Hacker Floor Primer (diluted 4:1 with water) using one gallon (3.79L) per 500 sq. ft. (47m²).
- C. Hacker Floor Primer is not always required over concrete substrates. Multiple coats may be required over porous concrete or plank. The Hacker Licensed Applicator can give specific recommendations. (Note: for rehabilitation work or pours over old and/or porous concrete, consult a Licensed Applicator or Hacker Industries, Inc., for recommended preparation.)

3.3 Mixing Instructions

- A. 4 to 5.5 gallons (15.1 to 20.8L) of water and sand as specified per 80-pound (36.3kg) bag of FIRM-FILL® 3310. Do not over-water. Water amount will change with wetness of sand.
- B. FIRM-FILL® 3310 mix proportions, mix designs and methods shall be in strict accordance with Hacker Industries, Inc.'s recommendations.

3.4 Underlayment Application

- A. Scheduling:
 - 1. Installation of FIRM-FILL® 3310 shall not begin until the building is enclosed including roof, windows, doors and other openings.
 - 2. FIRM-FILL® 3310 can be installed either before or after the installation of drywall, as specified.
- B. Application:
 - 1. The minimum thickness of FIRM-FILL® 3310 varies with the type of structural subfloor. Over wood subfloors, a minimum of 3/4" (19mm) is required. Over pre-cast or poured in place concrete, a minimum of 1/2" (13mm) is required.
 - 2. Install FIRM-FILL® 3310 by placing contents of bags, and water into a Hacker Floor Underlayment approved high-speed mixing device with a water meter and



FIRM-FILL® 3310 Recommended Specifications (Cont.)

blend for a minimum of one minute. FIRM-FILL® 3310 shall be pumped onto floor areas, spreading and screeding to a smooth surface at specified thickness. Place as continuously as possible until installation is complete so that no FIRM-FILL® 3310 slurry is placed against FIRM-FILL® 3310 that has already obtained its initial set, except at authorized joints.

3. FIRM-FILL® 3310 is suitable for interior applications only and must be covered by a finished floor covering.
- C. Protection: After installation, temporary wood planking shall be placed by the GC wherever the floor underlayment will be subjected to wheeled and/or concentrated loads. The GC shall not place concentrated loads such as pallets of material, drywall, taping compounds or any heavy item, which may cause deflection, in the middle of the floor or in hallways.
- D. Drying: Before, during and after installation of FIRM-FILL® 3310, building interior shall be ventilated and heated to a minimum 50°F (10°C) to assure 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 is dry. If necessary, the GC shall provide mechanical ventilation and heat. Do not install finished floor coverings until the FIRM-FILL® 3310 is tested for dryness. Consult flooring contractor for recommended procedures to test for dryness and acceptable levels of moisture. To avoid potential problems during the drying process, the GC shall consult Hacker Industries, Inc.'s Drying Conditions Flyer and information contained on Hacker Industries, Inc.'s website for additional information concerning drying of this product.

3.5 Preparation for Installation of Floor Coverings

- A. Sealing: Any areas where the underlayment surface has been damaged, shall be cleaned and sealed regardless of floor covering specified. Floor covering manufacturers' specifications and requirements supercede these recommendations.
- B. Floor Covering Procedures: Please see the Hacker Industries, Inc.'s "Guidelines for Installing Finished Floor Coverings." The document is not a warranty and shall be used as a guideline only. See also ASTM F2419 for recommended procedures.

3.6 Field Quality Control

- A. Slump Test: FIRM-FILL® 3310 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" (51mm by 102mm) cylinder. The acceptable patty size shall be 8 1/2" (215.9mm) plus or minus 1/2" (13mm) in diameter.
- B. Field Samples: Testing shall be done in accordance with ASTM C472 Modified testing procedures, using split brass molds. Prior to independent testing, consult Hacker Industries, Inc. for proper ASTM procedures.

Warranty: Subject to express warranty stated on Hacker Industries, Inc.'s website.



FIRM-FILL® 3310

Project References

Ideal over wood or concrete subfloors in multi-family, renovation projects and custom homes, FIRM-FILL® 3310 helps maximize sound control and creates a flat, durable surface for finished floor coverings. FIRM-FILL® 3310 offers an innovative formulation that decreases the amount of water used while enhancing the rock-solid floor strength, up to 3300 psi. Below is a small sample of projects that have utilized FIRM-FILL® 3310.

Contractor: Trammel Crow Residential
Project: The Enclave
Location: Atlanta, Georgia
Description: 149,644 sq. ft. of FIRM-FILL® 3310 over Hacker Sound Mat II

Contractor: LCG Pense
Project: Bozeman Village Assisted Living
Location: Bozeman, Montana
Description: 76,000 sq. ft. of FIRM-FILL® 3310

Contractor: Legacy
Project: Coggins Drive Apartments / Vineyards
Location: Pleasant Hill, California / Gilroy, California
Description: 200,000 sq. ft. of FIRM-FILL® 3310 over Quiet Qurl™

Contractor: Bozzuto Construction
Project: Jericho Senior Apartments
Location: Landover, Maryland
Description: 245,000 sq. ft. of FIRM-FILL® 3310

Contractor: D.R. Horton
Project: Grande @ Riverdale
Location: Riverdale, New Jersey
Description: 350,000 sq. ft. of FIRM-FILL® 3310 over Hacker Sound Mat II

Contractor: Fairfield Development
Project: Addison Residential
Location: Addison, Texas
Description: 354,351 sq. ft. of FIRM-FILL® 3310

Contractor: Metropolitan Homes
Project: Vallagio and Vallagio North
Location: Greenwood Village, Colorado
Description: 306,450 sq. ft. of FIRM-FILL® 3310 over Quiet Qurl 55/025 and
82,181 sq. ft. of FIRM-FILL® 3310 over Hacker Sound Mat II