



# Standard Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring<sup>1</sup>

This standard is issued under the fixed designation F2419; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This practice covers the installation and preparation of the thick poured gypsum concrete underlayments over wood structural panel subfloors in commercial structures or over concrete floors in commercial structures and the preparation of the thick poured gypsum concrete underlayment surface prior to the installation of resilient flooring in commercial buildings.

1.2 This practice covers the factors that are required to be controlled while installing thick poured gypsum concrete underlayment as a base for resilient flooring.

1.3 This practice does not cover the structural adequacy of the wood structural panel subfloor or concrete subfloor. The structural integrity of assemblies is governed by local building codes.

1.4 This practice does not supersede in any manner the thick poured gypsum concrete underlayment manufacturers, adhesive manufacturer's or resilient flooring manufacturer's written instructions. Consult the individual manufacturer for specific recommendations.

1.5 Thick poured gypsum concrete underlayments are not suitable for use on concrete slabs on ground due to potential moisture problems arising from moisture intrusion, unless an adequate vapor retarder or vapor barrier is present directly beneath the concrete subfloor.

1.6 The values stated in inch-pound units are to be regarded as standard. The values stated in parentheses are approximate mathematical conversions to SI units, which are provided for information only.

1.7 *This practice may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to*

*establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

**C472** Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete

**D4263** Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

**F141** Terminology Relating to Resilient Floor Coverings

**F1482** Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

## 3. Terminology

3.1 *Definitions*—Definitions used in this practice shall be in accordance with Terminology **F141**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *fully adhered flooring, n*—resilient flooring which has adhesive under the entire product, bonding it to the underlayment surface. **F1482**

3.2.2 *non-fully adhered flooring, n*—resilient flooring that may be loose laid, in which no adhesive is utilized, or partially bonded to the surface of the underlayment, typically at seams and the surrounding perimeter of the product. **F1482**

3.2.3 *subfloor, n*—that wood or concrete structural layer intended to provide support for design loads which may receive resilient floor coverings directly if the surface is appropriate or indirectly via an underlayment if its surface is not suitable or if underlayment is required by appropriate code authorities.

3.2.4 *gypsum concrete underlayment, n*—that layer of material, with binder content composed primarily of gypsum cement and Portland cement that is mixed with sand and water, then pumped and poured in a liquid state to be installed on or over a subfloor to provide a monolithic surface suitable to receive resilient floor coverings.

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee **F06** on Resilient Floor Coverings and is the direct responsibility of Subcommittee **F06.40** on Practices.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.2.5 *thick poured gypsum concrete underlayment, n*—products which are installed in a liquid state over a structurally sound concrete or precast subfloor at a minimum of ½ in. (13 mm) or a structurally sound wood subfloor at a minimum of ¾ in. (19 mm) which when dry form an integral part of the floor ceiling assembly for fire resistance and sound ratings, satisfy building codes for thick poured gypsum concrete underlayments, and provide a suitable floor surface for the installation of resilient floor coverings.

3.2.6 *sound mat, n*—a membrane installed between a structurally sound subfloor and a thick poured gypsum concrete underlayment to increase sound reduction in the floor ceiling assembly.

#### 4. Significance and Use

4.1 This practice provides minimum recommendations for the installation of thick poured gypsum concrete floor underlayments suitable to receive resilient floor coverings. This practice establishes the proper preparation, installation and quality control for thick poured gypsum concrete floor underlayments.

4.2 Actual requirements for thick poured gypsum concrete underlayments are generally included as part of project plans or specifications and may vary from the recommendations set forth in this practice. Project plans or specifications, or both, shall supersede the recommendations set forth in this practice.

#### 5. Product Requirements

5.1 For the purposes of this practice, thick poured gypsum concrete underlayment shall be compounds consisting primarily of a mixture of gypsum cement, Portland cement and sand.

5.2 When tested in accordance with Test Methods C472, thick poured gypsum concrete underlayment shall have a minimum compressive strength of 2000 psi (13.8 MPa) for use over wood subfloor and 3000 psi (20.7 MPa) for use over concrete subfloors.

5.3 When tested in accordance with Test Methods C472, the density shall be a minimum of 105 pcf (1680 kg/m<sup>3</sup>).

#### 6. Storage and Handling of Thick Poured Gypsum Concrete Underlayments

6.1 Thick poured gypsum concrete underlayments included in this practice are typically delivered to the jobsites as dry powder in bags on pallets. Product shall be delivered in original, unopened, undamaged bags with identification labels intact. Bags and the enclosed material should not be damaged and should be protected from the elements after delivery to the jobsite. To avoid damage, bring raw materials to the jobsite just prior to the time it will be needed.<sup>3</sup>

#### 7. General Guidelines

7.1 Recommended thickness of thick poured gypsum concrete over structurally sound wood is ¾ in. (19 mm) minimum.

Recommended minimum thickness over structurally sound concrete or precast concrete is ½ in. (13 mm). Minimum thickness over a floor ceiling assembly which contains a sound mat shall be 1 in. (25 mm). Subfloor must support design loads with maximum L360 deflection.

7.2 Wood and concrete subfloors shall be structurally sound, clean and dry so as to support both the design live and dead loads in compliance with the local building code and the resilient flooring manufacturers installation requirements.

7.3 The finished surfaces of the wood or concrete subfloor shall be properly prepared, clean, dry, smooth, and free of construction wastes such as acoustic and wall texture, overspray, dirt, solvents, oil, grease, residual construction adhesives, adhesive removers, and other foreign materials.<sup>3</sup> Concrete subfloors shall be fully cured and 28 days or older.

7.4 Before, during and after installation of thick poured gypsum concrete underlayment, the general contractor shall be responsible for ensuring that the building shall be ventilated and heated to a minimum of 50°F (10°C) until subfloor and ambient temperatures have stabilized. Temperature during and after installation shall be maintained until material has completely cured. The general contractor shall provide heat and ventilation as necessary to dry the thick poured gypsum concrete underlayment.<sup>3</sup>

7.5 Installation of thick poured gypsum concrete underlayment shall not begin until the building is enclosed, including roof, windows, doors and other openings. The general contractor shall be responsible to provide continuous ventilation until the underlayment is dry. Thick poured gypsum concrete underlayment can be installed before or after the installation of drywall depending on the compressive strength specified and any sound control system requirements (see manufacturers recommendations). Ceilings shall be sprayed or stippled to avoid overspray.<sup>3</sup>

7.6 Before installation of thick poured gypsum concrete underlayment, the condition of the structural subfloor and any required elevations shall be inspected and approved by the general contractor or owner, or both. All required flooring and nailing inspections shall be completed.<sup>3</sup>

7.7 Thick poured gypsum concrete underlayment installation shall be by an applicator recommended to do this type of installation by the manufacturer, experienced in performing the work of this practice, who has been trained in installation of work similar to the project under construction.

#### 8. Preparation of Subfloor

8.1 The subfloor shall be of wood structural panel construction or concrete, dry, level, securely nailed in the case of panels, and clean, without projections. Loose boards or panels shall be renailed or screwed. Damaged, delaminated, badly cupped or warped board subfloors shall be replaced before installation of underlayment. Concrete subfloors shall be 28 days or older.

8.2 All cracks and voids shall be covered or filled with a quick-setting taping compound or crack filler to prevent leakage.

<sup>3</sup> International Conference of Building Officials, a subsidiary of the International Conference of Building Officials, Evaluation Report No. ER-4147 and Evaluation Report No. ER-3433.

## 9. Installation of Underlayment

9.1 To minimize damage caused by other trades, the procedures in Section 11 shall be followed.

9.2 Subfloor shall be prepared and primed, following manufacturer's recommendations using a manufacturer's approved primer, prior to installation of thick poured gypsum concrete underlayment.

9.3 Bags of dry gypsum concrete underlayment shall be mixed in accordance with manufacturer's recommendations in manufacturer's approved mixing and pumping equipment.

9.4 Thick poured gypsum concrete underlayment shall be poured or pumped onto subfloor at specified thickness and spread and screed to a smooth surface. Thick poured gypsum concrete underlayment shall be placed as continuously as possible until installation is complete so that no thick poured gypsum concrete underlayment is placed against thick poured gypsum concrete underlayment that has obtained its initial set, except at authorized joints.<sup>3</sup>

## 10. Field Quality Control

10.1 Thick poured gypsum concrete underlayment shall be tested for slump as it is being installed using a 2 by 4 in. (51 by 102 mm) cylinder. The patty size shall be as recommended by the manufacturer of the thick poured gypsum concrete underlayment.

10.2 Field cube samples of thick poured gypsum concrete underlayments shall be taken using split brass molds and tested in accordance with Test Methods C472. Manufacturer shall recommend how often sample cubes shall be taken.

## 11. Protection

11.1 Because satisfactory performance of the finish flooring depends in part on the condition of the surface of the thick poured gypsum concrete underlayment, care shall be taken to avoid traffic on the thick poured gypsum concrete underlayment after installation. Damage to the thick poured gypsum concrete underlayment surface can occur if water, oil, paint, oil

based sweeping compounds, solvent, dirt, or other debris are spilled, applied or tracked onto the thick poured gypsum concrete underlayment. The thick poured gypsum concrete underlayment shall be protected by temporary walking boards wherever the thick poured gypsum concrete underlayment will be subject to heavy wheeled or concentrated loads.

## 12. Preparation of Thick Poured Gypsum Concrete Underlayment Surface

12.1 Final preparation of the thick poured gypsum concrete underlayment shall be accomplished just prior to application of the floor covering. The surface of the floor shall be cleaned of all loose material by scraping, brushing, vacuuming, or other methods, or combination thereof, recommended by the resilient flooring manufacturer, immediately before commencing installation of resilient flooring.

12.2 Prior to installation of finished floor goods, thick poured gypsum concrete underlayment shall be tested in accordance with Test Method D4263 or with an electronic moisture meter with a gypsum scale recommended by the manufacturer of the thick poured gypsum concrete underlayment. Acceptance criteria for the suitability of the substrate for installation of resilient floor covering shall be provided by the manufacturer of the resilient floor covering.

12.3 The thick poured gypsum concrete underlayment shall be prepared with a topcoat/sealer if required by the manufacturer of the thick poured gypsum concrete underlayment.

12.4 Final surface preparation of the thick poured gypsum concrete underlayment shall be in accordance with the recommendations of the finished floor goods manufacturer. The thick poured gypsum concrete underlayment shall be primed prior to the installation of resilient floor covering in accordance with the recommendations of the manufacturer of the resilient floor covering.

## 13. Keywords

13.1 concrete; flooring; gypsum; poured gypsum concrete; practice; resilient; sound mat; underlayment

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