



Designation: C 842 – 99

# Standard Specification for Application of Interior Gypsum Plaster<sup>1</sup>

This standard is issued under the fixed designation C 842; 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 specification covers the minimum requirements for full-thickness (in accordance with Table 1) interior gypsum plastering on gypsum, metal, masonry, or monolithic concrete bases designed or prepared to receive gypsum plaster.

1.1.1 Gypsum plaster applied to the interior side of exterior walls of masonry or concrete shall be isolated from the exterior wall.

1.2 Gypsum plasters shall not be used in exterior locations or interior “wet” areas.

NOTE 1—To secure desirable results, this specification should be coordinated with the provisions of Specification C 841. General information concerning full thickness gypsum plastering is contained in Annex A2, Annex A3, and Annex A4.

1.3 Details of construction for a specific assembly to achieve the required fire resistance shall be obtained from reports of fire-resistance tests, engineering evaluations, or listings from recognized fire testing laboratories.

1.4 Details of construction to achieve required sound control shall be obtained from reports of tests conducted at recognized sound testing laboratories in accordance with the applicable sound tests of Test Methods E 90, C 423, or E 492.

1.5 The values stated in inch-pound units are to be regarded as the standard. The SI (metric) values given in parentheses are approximate and are provided for information purposes only.

1.6 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

## 2. Referenced Documents

### 2.1 ASTM Standards:

- C 5 Specification for Quicklime for Structural Purposes<sup>2</sup>
- C 11 Terminology Relating to Gypsum and Related Building Materials and Systems<sup>2</sup>
- C 28 Specification for Gypsum Plasters<sup>2</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee C-11 on Gypsum and Related Building Materials and Systems and is the direct responsibility of Subcommittee C11.03 on Specifications for Application of Gypsum and Other Products in Assemblies.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.01.

TABLE 1 Thickness of Plaster

Plaster Base	Thickness of Plaster Including Finish Coat, in. (mm)
Metal plaster base	5/8 (16) min
All other types of plaster base	1/2 (13) min
Unit masonry	5/8 (16) min
Monolithic concrete surfaces: <sup>A</sup>	
Vertical <sup>B,C</sup>	5/8 (16) min
Horizontal <sup>C</sup>	1/8 (3) to 5/8 (10)

<sup>A</sup> Base coat plastering of the same proportions as specified for unit masonry is not prohibited from being used over plain or reinforced monolithic concrete, provided the surface is first covered with a metal plaster base or first coated with a bonding compound.

<sup>B</sup> Finish coat plaster applied direct to a bonding compound over vertical monolithic concrete shall be not more than 3/16 in. (4.8 mm) in thickness. Where more than 3/16 in. of finish coat is required to bring such vertical surface to a true plane, a base coat of plaster shall first be applied to the bonding compound.

<sup>C</sup> Where horizontal or vertical monolithic concrete surfaces require more than 3/8 in. (9.5 mm) or 5/8 in. (15.9 mm) of plaster, respectively, to produce required lines or surfaces, metal plaster base shall be attached to the concrete before application of plaster. Where concrete surface requires the application of more than 1 in. (25.4 mm) of plaster to produce required lines or surfaces, lath shall be applied over furring secured to the concrete.

C 35 Specification for Inorganic Aggregates for Use in Gypsum Plaster<sup>2</sup>

C 59 Specification for Gypsum Casting and Molding Plaster<sup>2</sup>

C 61 Specification for Gypsum Keene’s Cement<sup>2</sup>

C 206 Specification for Finishing Hydrated Lime<sup>2</sup>

C 423 Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method<sup>3</sup>

C 631 Specification for Bonding Compounds for Interior Gypsum Plastering<sup>2</sup>

C 841 Specification for Installation of Interior Lathing and Furring<sup>2</sup>

E 90 Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions and Elements<sup>3</sup>

E 492 Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine<sup>3</sup>

## 3. Terminology

### 3.1 Definitions:

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.06.

\*A Summary of Changes section appears at the end of this standard.

3.1.1 Definitions shall be in accordance with Terminology C 11.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *catfaces, n*—blemishes or rough depressions in the finish coat.

3.2.2 *coat, n*—a thickness or layer of plaster applied over a surface in a single application.

3.2.2.1 *base coat, n*—the sum of the scratch and brown coats or the total coats in place prior to application of finish coats.

3.2.2.2 *brown coat, n*—the second coat of plaster applied in three-coat work.

3.2.2.3 *finish coat, n*—the last coat of plaster applied in either two-coat or three-coat work.

3.2.2.4 *scratch coat, n*—the first coat of plaster applied over a lath or other substrate.

3.2.2.5 *three-coat work, n*—plaster applied in three successive coats, leaving time between coats for setting or drying, or both, of the plaster.

3.2.2.6 *two-coat work, n*—scratch and brown coats applied from the same mix with no time allowed for setting of the scratch coat before the brown coat is applied.

3.2.3 *gypsum ready mixed plaster, n*—calcined gypsum plaster, mixed at the mill with a mineral aggregate, designed to function as a base coat to receive various finish coats.

3.2.4 *metal bases, n*—expanded metal, welded or woven wire, or punched sheet metal plaster bases.

3.2.5 *smooth-trowel finish, n*—a finish resulting from steel troweling.

3.2.6 *texture finish, n*—a finish resulting from (1) trowel application followed by floating or texturing of the surface with any of a variety of tools using a minimum of water or (2) machine application which is or is not hand textured.

**4. Delivery of Materials**

4.1 All manufactured materials shall be delivered in the original packages, containers, or bundles bearing the brand name and manufacturer (or supplier) identification.

**5. Protection of Materials**

5.1 Plasters and other cementitious materials shall be kept dry until used; they shall be stored off the ground, under cover, and away from walls with condensation and other damp surfaces. Metal products shall be protected, while stored, against rusting.

**6. Environmental Conditions**

6.1 *Temperatures*—Where the ambient outdoor temperature at the building site is less than 55°F (13°C), a temperature of not less than 55°F (13°C) and not more than 80°F (27°C) shall be maintained continuously inside the building for a period of not less than one week prior to the application of plaster (Note 2), while the plastering is being applied, and for one week after the plaster has set, or until the plaster has dried. Heat shall be distributed evenly by using deflective or protective screens to prevent concentrated or uneven heat or cold on the plaster.

NOTE 2—The requirement should minimize the possibility of plaster cracking due to structural movements caused by thermal changes from

outdoor temperature extremes during construction.

6.2 *Ventilation*—Sufficient ventilation shall be provided to remove excess water given off through the drying process. (See Appendix X2 for provisions for ventilating underside of roofs and glazed buildings with and without operable windows.)

**7. Materials**

7.1 *Gypsum Plasters*—The following plasters shall conform to Specification C 28:

7.1.1 Ready mixed.

7.1.2 Neat.

7.1.3 Wood-fibered.

7.1.4 Gauging for finish coat.

7.2 *Gypsum Casting and Molding Plasters*—Specification C 59.

7.3 *Gypsum Keene's Cement*—Specification C 61.

7.4 *Lime:*

7.4.1 *Finishing Hydrated Lime*—Specification C 206, Type S.

7.4.2 *Quicklime for Structural Purposes*—Specification C 5.

7.5 *Lime Putty*—Lime putty exceeding 8 weight % of unhydrated magnesium oxide shall not be used for finish coat plaster.

7.6 *Aggregates:*

7.6.1 *Aggregates for Base Coat Plaster*—Specification C 35.

7.6.2 *Aggregates for Finish Coat Plasters*—Specification C 35, except that gradation shall be within the limits specified in Table 2.

7.6.3 Sand for job mixed lime putty-gypsum gauged, sand float finish (see 9.6.6.1) shall be graded within the limits specified in Table 3.

7.7 *Water*—Water used in mixing and finishing plaster shall be potable, and free of such amounts of mineral or organic substances that affect the set, the plaster, or any metal in the system.

NOTE 3—Water containing salt or alum, or water in which tools have been washed, accelerates the “set” and may cause efflorescence. Water from stagnant pools and wells frequently contain organic or vegetable matter which may retard the “set,” cause staining, or interfere with the bond.

7.8 *Bonding Compounds*—Specification C 631.

**8. Surface Preparation**

8.1 *Substrates*—Surfaces of substrates for the application of gypsum plaster shall be free of materials that will inhibit bond or adhesion, shall be straight, plumb, level, square, and true to required plan angles and curves. See A2.5.

**TABLE 2 Aggregate for Finish Coat Plasters, Percentage Retained on Each Sieve, Cumulative**

Sieve Size	Perlite, Natural and Manufactured Sand			
	Volume, %		Weight, %	
	max	min	max	min
No. 20 (850 μm)	0	...	0	...
No. 30 (600 μm)	10	...	0.5	...
No. 100 (150 μm)	100	40	100	40
No. 200 (75 μm)	100	70	100	70

**TABLE 3 Sand for Job-Mixed Lime Putty-Gypsum Gaged Sand Float Finish, Percent Retained on Each Sieve by Weight, Cumulative**

Sieve Size	max	min
No. 16 (1.18 mm)	0	0
No. 30 (600 μm)	50	20
No. 50 (300 μm)	70	50
No. 100 (150 μm)	100	80

8.1.1 All accessories shall be securely attached to the substrate and be installed to accommodate embedment of flanges.

8.1.2 *Gypsum and Metal Lath*—Shall have been installed in compliance with Specification C 841.

8.2 *Conditioning of Surfaces*—All depressions in masonry and concrete surfaces deeper than 1/8 in. (3.2 mm) shall be brought flush to the surface with compatible materials prior to plaster application. Fins or protrusions extending more than 1/16 in. (1.6 mm) from the surface shall be removed. Protrusions less than 1/16 in. (1.6 mm) shall be feathered out with compatible materials prior to plaster application.

8.2.1 *Masonry*—All masonry surfaces shall be wetted immediately prior to the plaster application. No free water shall remain visible on the substrate surface.

8.2.1.1 Where the surface is too smooth to provide mechanical key, the surface shall be roughened or bonding compound shall be used. (See Annex A2.5 and A2.6.)

8.2.1.2 Where bond cannot be obtained over the entire surface by the methods specified in 8.2.1.1, self-furring metal lath shall be used in accordance with Specification C 841.

8.2.2 *Monolithic concrete*—bonding compounds shall be used prior to plastering all monolithic concrete surfaces. (See A2.6.)

8.2.3 Grounds, beads, and screeds shall be installed prior to the plastering as modified herein.

### 8.3 *Grouting*:

8.3.1 Metal bases for solid partitions shall be grouted with gypsum plaster leaving 1/4 in. (6.4 mm) below the top edge of the base, and be formed with a center groove so that the lath extends 3/4 in. (19 mm) below the top edge of the base, or plaster grout shall be placed after installation of lath.

8.3.2 *Metal Frames*—Hollow door and window frames shall be filled with gypsum plaster grout.

## 9. Mix Design

9.1 *Mixing, General*—All plaster mixing shall be done by mechanical means unless hand mixing is specified.

9.1.1 Retempered, partially set, frozen, caked or lumpy material shall not be used.

9.1.2 Each batch shall be mixed separately and mixers shall be free of all set and hardened materials prior to mixing each batch.

9.1.3 All tools shall be kept clean.

9.1.4 The setting time shall be not more than 4 h.

9.2 *Hand Mixing*—see Annex A3.1.

9.3 *Mechanical Mixing*—In accordance with manufacturer's printed directions. See Annex A3.2.

9.4 *Base Coat Proportions*:

9.4.1 *Gypsum Neat Plaster*—Proportions of sand, perlite, or vermiculite aggregate to 100 lb (45.4 kg) of gypsum neat plaster shall be not more than those specified in Table 4. (See A2.3 for equivalent measure for aggregates.)

9.4.2 *Gypsum Ready Mixed Plaster*—Shall be used with the addition of water only.

9.4.3 *Gypsum Wood-Fibered Plaster*—Proportion of damp, loose sand or perlite or vermiculite shall be not more than 1 ft<sup>3</sup> (0.028 m<sup>3</sup>) to 100 lb (45.4 kg) of gypsum wood-fibered plaster.

### 9.5 *Preparation of Lime Putty*:

9.5.1 Lime putty shall be prepared from Type S hydrated lime or pulverized quicklime, in accordance with the manufacturer's printed directions.

9.5.2 *Hydrated Lime*—Type S lime shall only be used after soaking for the time period required in accordance with the manufacturer's printed directions.

### 9.6 *Finish Coat Proportions*:

9.6.1 Finish coats shall be either ready mixed or job mixed in accordance with Table 5 and Table 6.

9.6.1.1 Where thickness of the finish coat is more than 1/8 in. (3.2 mm), the proportion of the gypsum gauging plaster shall be increased to minimize shrinkage type cracks.

9.6.2 Troweled Finishes of lime putty gauged with gypsum gauging plaster or ready mixed gypsum plaster shall be proportioned in accordance with Table 5.

9.6.2.1 Where finish in 9.6.2 is to be applied over base coats containing perlite or vermiculite, the addition of not less than 1/2 ft<sup>3</sup> (0.14 m<sup>3</sup>) or not more than 1 ft<sup>3</sup> (0.028 m<sup>3</sup>) of fine aggregate meeting the sieve analysis of Table 2 shall be added to the mix.

9.6.3 Troweled finishes of lime putty gauged with gypsum Keene's cement shall be specified as medium or hard and shall be proportioned in accordance with Table 5.

9.6.3.1 When finish in 9.6.3 is mechanically mixed, the water shall be placed in the mixer first, then the lime, the fine aggregate (if used), and finally the gypsum Keene's cement.

9.6.4 Troweled finishes of gypsum ready mixed plaster shall be mixed in accordance with Table 5.

9.6.5 Float finishes of lime putty gauged with gypsum gauging plaster shall be proportioned in accordance with Table 5.

9.6.5.1 When finish in 9.6.6 is to be mixed with sand, the sand shall be graded within the limits shown for basecoats in Specification C 35 except that all of the sand shall pass a No. 8 (2.36 mm) sieve.

9.6.6 Float finishes of lime putty gauged with gypsum Keene's cement shall be proportioned in accordance with Table 5.

9.6.6.1 When the finish in 9.6.6 is to be mechanically mixed wet, follow procedures in 9.6.3.1. For mixing dry, add lime first, then gypsum Keene's cement, and sand. This dry mix shall be mixed to a uniform color and then add water to achieve the desired consistency.

9.6.7 Float finishes of job mixed gypsum and sand shall be proportioned in accordance with Table 5 and Table 6.

9.6.8 Float finishes of ready mixed plaster and sand shall be mixed with water only in accordance with the manufacturer's printed directions.

**TABLE 4 Base Coat Proportions<sup>A</sup>**

Plaster Base	Aggregates <sup>B</sup>		
	Sand		Perlite or Vermiculite <sup>C</sup>
	By Volume, ft <sup>3</sup> (m <sup>3</sup> ), Damp and Loose	By Weight, lb (kg), Damp and Loose	By Volume, ft <sup>3</sup> (m <sup>3</sup> )
Over Gypsum Lath			
Two-coat work:			
Base coat	2½(0.071)	250 (113)	2 (0.06)
Three-coat work:			
Scratch coat	2 (0.056)	200 (91)	2 (0.06)
Brown coat	3 (0.085)	300 (136)	2 (0.06)
or			
Scratch and brown coats	2½(0.071)	250 (113)	...
Over Metal Lath			
Three-coat work:			
Scratch coat	2 (0.056)	200 (91)	2 (0.06)
Brown coat	3 (0.085)	300 (136)	2 (0.06)
or			
Scratch and brown coats	2½(0.071)	250 (113)	...
Over Unit Masonry (Note 6)			
Two-coat work:			
Base coat	3 (0.085)	300 (136)	3 (0.085)
Three-coat work:			
Scratch coat	3 (0.085)	300 (136)	3 (0.085)
Brown coat	3 (0.085)	300 (136)	3 (0.085)
Over Monolithic Concrete <sup>D</sup>			
For base coat proportions applicable to monolithic concrete, see 10.2.1.			

<sup>A</sup> The proportions in Table 3 are applicable for both hand and machine application of plaster. See plaster manufacturer's instructions for application of machine-applied plaster.

<sup>B</sup> Use of an accurate device to measure quantities, such as a measuring box or container of known capacity, is highly encouraged. Where such a device is not available, six No. 2, square-edge (not scoop) shovels, with a blade approximately 8½ in. (216 mm) wide and 11 in. (279 mm) long, with the maximum depth of sides not more than 1½ in. (38 mm) higher than the face of the blade, and filled to an average depth of 4 in. (102 mm) of damp, loose sand, shall be considered as the approximate equivalent to 1 ft<sup>3</sup> (0.028 m<sup>3</sup>).

<sup>C</sup> Where the plaster is 1 in. (25 mm) or more in total thickness, or where the finish coat is sand float, the proportions for the brown coat shall be not more than 3 ft<sup>3</sup> (0.085 m<sup>3</sup>).

<sup>D</sup> For use of bonding compounds for plastering on monolithic concrete, see 8.2.2, and Footnotes in Table 1 and A2.6.

**TABLE 5 Proportion of Gypsum To Not More Than Lime/Aggregate, with Dry and Wet Equivalents**

	Dry						Lime Putty Wet Equivalent		
	Weight, lb (kg)			Volume, ft <sup>3</sup> (m <sup>3</sup> )			ft <sup>3</sup> (m <sup>3</sup> )	U.S. gal (litres)	lb (kg)
	Gypsum	Lime	Aggregate	Gypsum	Lime	Aggregate			
Troweled Finishes: <sup>A</sup>									
Lime putty with: <sup>B</sup>									
Gypsum gauging	100 (45.4)	225 (102)	0 <sup>A</sup>	1 (.028)	3 (.085)	0	6.75 (.191)	52.5 (199)	450 (204)
Gypsum Keene's cement:									
Medium	100 (45.4)	50 (22.7)	0 <sup>A</sup>	1 (.028)	1 (.028)	0	1⅞ (.032)	8¾ (33)	100 (45.4)
Hard	100 (45.4)	25 (11.3)	0 <sup>A</sup>	1 (.028)	½ (.014)	0	⅝ (.018)	4½ (17)	50 (22.7)
Ready-mixed gypsum plaster	100 (45.4)	0	0	1 (.028)	0	0	0	0	0
Gypsum vermiculite	100 (45.4)	0	7 to 15 (3.2 to 6.8)	1 (.028)	0	1 (.028)	0	0	0
Floated Finishes:									
Lime putty with:									
Gypsum gauging	100 (45.4)	225 (102)	200 (90.7)	1 (.028)	3 (.085)	2 (.057)	6.75 (.191)	52.5 (199)	450 (204)
Gypsum Keene's cement:									
Medium	150 (68.0)	100 (45.4)	450 (204)	1½ (.042)	2 (.057)	4½ (.127)	2¼ (.064)	17½ (66)	200 (90.7)
Ready-mixed gypsum plaster <sup>C</sup>	100 (45.4)	0	0	1 (.028)	0	0	0	0	0
Gypsum-vermiculite	100 (45.4)	0	7 to 15 (3.2 to 6.8)	1 (.028)	0	1 (.028)	0	0	0
Gypsum-sand (job-mixed) <sup>D</sup>	100 (45.4)	0	200 (90.7)	1 (.028)	0	2 (.057)	0	0	0

<sup>A</sup> See 9.6.2, 9.6.3, 9.6.4 and 9.6.5.

<sup>B</sup> If additional hardness of finish coat is desired, increased amounts of gypsum shall be used; however, hard finishes shall not be used over lightweight aggregate base coats.

<sup>C</sup> Mixed with water only, in accordance with manufacturers' printed directions.

<sup>D</sup> Gypsum shall be neat, unfibred plaster.