



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

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## 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>
- C 35 Specification for Inorganic Aggregates for Use in Gypsum Plaster<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 shall be permitted to be 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. (4.76 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. (9.52 mm) or 3/4 in. (15.87 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 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<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:

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.

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

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 shall be permitted to be 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 clean, fresh, suitable for domestic water consumption, 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.

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

8.1.2 *Gypsum and Metal Lath*—Shall have been installed in compliance with C841.

8.2 *Conditioning of Surfaces*—All depressions in masonry and concrete surfaces deeper than 1/8 in. (3.2 mm) shall be

**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

brought flush to the surface with compatible materials prior to plaster application. Fins or protrusions extending more than  $\frac{1}{16}$  in. (1.6 mm) from the surface shall be removed. Protrusions less than  $\frac{1}{16}$  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 C841.

**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 approximately  $\frac{1}{4}$  in. (6.4 mm) below the top edge of the base, and be formed with a center groove that will permit the lath to extend  $\frac{3}{4}$  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 permitted to be adjusted but in no case shall the setting time be more than 4 h.

**9.2 Hand Mixing**—When permitted, 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

**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 permitted to be increased to 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.

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> (0.014 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

**TABLE 6 Trowel Finishes of Lime Putty Gaged With Gypsum Gaging Plaster Proportions**

Proportions of Fine Aggregate <sup>A,B,C</sup>		
Not Less Than	Not More Than	Per
1/2 ft <sup>3</sup> (0.014 m <sup>3</sup> )	1 ft <sup>3</sup> (0.028 m <sup>3</sup> )	100 lb (45.4 kg) gypsum gauging
or 1/4 ft <sup>3</sup> (0.0035 m <sup>3</sup> )	1/4 ft <sup>3</sup> (0.007 m <sup>3</sup> )	50 lb (22.7 kg) dry hydrated lime
or 1 U.S. gal (3.78 L)	2 U.S. gal (7.57 L)	1 ft <sup>3</sup> (0.028 m <sup>3</sup> ) lime putty
or 1 pt (0.473 L)	1 qt (0.946 L)	1 U.S. gal (3.78 L) lime putty

<sup>A</sup>Where such finish coats are to be applied over base coats containing perlite or vermiculite, the addition of not less than 1/2 ft<sup>3</sup> (0.014 m<sup>3</sup>) of fine aggregate, meeting the sieve analysis of Table 1 shall be added.

<sup>B</sup>For any of the above proportions, up to 1/2 ft<sup>3</sup> (0.014 m<sup>3</sup>) of fine aggregate in accordance with Table 1 shall be permitted to be added to the mix.

<sup>C</sup>The largest particle size of aggregate and its proportion ratio will determine the degree of coarseness of the sand finish. The specifier shall indicate the maximum size desired.

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

**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, ft³(m³)			ft³(m³)	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	1in! (.032)	8¾ (33)	100 (45.4)
Hard	100 (45.4)	25 (11.3)	0 <sup>A</sup>	1 (.028)	½ (.014)	0	1in%(.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.

mixed with water only in accordance with the manufacturer's printed directions.

9.6.9 Float finishes of job mixed plaster shall be proportioned in accordance with Table 6.

9.6.10 Float or textured ready mixed colored plaster shall be mixed in accordance with the manufacturer's printed directions.

9.6.11 Float or textured job mixed color plaster shall be proportioned in accordance with Table 5 or Table 6.

9.6.12 Special finishes shall be proportioned in accordance with the applicable provision of Table 5 or Table 6.

## 10. Application

10.1 *General*—Plaster shall be applied by hand or machine as specified herein.

### 10.2 *Plaster Thickness:*

10.2.1 Gypsum plaster shall be applied to the thickness specified in Table 1. Plaster thickness shall be measured from the face plane of all plaster bases (Note 4).

NOTE 4—Installation of wood or metal grounds or plaster screeds will assist in achieving specified thicknesses.

### 10.3 *Application of Base Coats:*

10.3.1 *Two-Coat Work* (see 3.2.2.6 and Note 5)—The first coat shall be applied with sufficient material and applied with enough pressure to form a good bond to the substrate. The second coat shall be applied by doubling back before the first coat sets and with the plaster brought out to the grounds or screeds or specified thickness.

NOTE 5—Two coat work is not recommended over any type metal plaster base.

10.3.1.1 The plaster shall be straightened to a true plane without application of water leaving the surface porous and rough enough to provide a mechanical bond for the finish coat.

10.3.2 *Three-Coat Work* (see 3.2.2.5 and Appendix X3)—The first coat or scratch coat shall be applied with sufficient material and applied with enough pressure to form tight contact with and a good bond to solid plaster bases, or to form full keys through metal reinforcement. The first coat shall have sufficient depth of material leaving the surface sufficiently porous and rough (scratched or raked) to provide mechanical bond for the second or brown coat.

10.3.2.1 After the first or scratch coat has set, screeds shall be applied over the first coat prior to application of the second coat to ensure full plaster thickness. The second or brown coat shall be applied with sufficient material and pressure to ensure tight contact with the scratch coat and to bring the thickness of the second coat out to the grounds or specified thickness. The second coat shall straighten the surface to a true plane without application of water, and leave the surface sufficiently porous and rough enough to provide mechanical bond for the third or finish coat.

10.3.2.2 Metal base and metal frames for hollow partitions shall be plaster grouted prior to plastering, or shall be grouted solid between base or frame and plaster base at the time of plastering (see 8.3.1 and 8.3.2).

10.3.3 *Plastering on Monolithic Concrete*—All applicable requirements of 8.1, 8.1.1, 8.2, 8.2.1, 8.2.1.1, 8.2.2, A2.5, A2.6 and Table 1 footnotes shall be followed.

10.3.3.1 Walls and columns shall have a coat of dash-bond, bonding compound as provided in A2.5 and A2.6, or metal plaster base or shall have a two coat plaster application as provided in 10.3.1 with a proportion of gypsum neat plaster to aggregate of 100 lb (45.4 kg) of plaster to not more than 3 ft<sup>3</sup> (0.085 m<sup>3</sup>) of aggregate.

10.3.3.2 Ceilings shall be prepared as in A2.5 and A2.6 and two coat work applied in accordance with 10.3.1.

10.3.4 *Solid Plaster Partitions with Steel Studs (Metal Lath and Plaster)*—Partitions shall be not less than 2 in. (51 mm) thick and shall have scratch, brown, and finish coats applied in accordance with 10.3.4.1-10.3.4.4. Where studs are temporarily braced, the bracing shall be maintained until the scratch coat on the lath side has set.

10.3.4.1 The scratch coat on the lath side shall be applied first, with sufficient material and pressure to form full keys and embed the lath and with sufficient depth of material to be scored to a rough surface immediately following its application.

10.3.4.2 The back-up coat on the channel side shall be applied in not less than two applications after the scratch coat on the lath side has set and partially dried. The first application shall completely cover the keys of the scratch coat. The second application shall bring the plaster out to the grounds in a true plane with the surface, left porous and sufficiently rough to provide mechanical bond for the finish coat. Extra water shall not be used in straightening the wall to a true plane.

10.3.4.3 The brown coat on the lath side shall be applied after the brown coat on the channel side has set, and left as specified for the finish coat.

10.3.4.4 Plaster shall extend to the floor, except that where plaster grouted combination metal bases and screeds are used, the plaster shall extend to the grout below the top of the base. Spaces between the grounds and all metal door frames shall be filled.

10.3.5 *Studless Solid Partitions (Metal Lath and Plaster)*—Partitions shall be not less than 2 in. (51 mm) thick, constructed using either rib lath or diamond mesh (flat expanded) lath, and with plaster applied in the same number of coats as for solid partitions with steel studs (see 10.3.4).

10.3.5.1 Where rib metal lath is used, the scratch coat shall be applied first to the flat side with temporary bracing on the rib side.

10.3.5.2 Where diamond mesh lath is used, the temporary bracing shall be attached to either side and the scratch coat applied on the opposite side.

10.3.5.3 Sequence application of brown coats in accordance with one of the following methods:

(1) Brown coat shall be applied over the face of the scratch coat followed by the brown coat on the opposite side of the partition, or

(2) Brown coat shall be applied on the rib side of the metal lath, or on the back side of the scratch coat followed by the brown coat applied over the face of the scratch coat.

10.3.6 *Studless Solid Partitions (Gypsum Lath and Plaster)*—Partitions shall be not less than 2 in. (51 mm) thick and shall be three-coat work on both sides.

10.3.6.1 Scratch coat shall be applied approximately 3/8 in.

(9.5 mm) thick with not less than  $\frac{3}{16}$  in. (4.8 mm) thickness at any point. The application shall be started at the side opposite the temporary bracing, then on the braced side without removing the bracing. The thickness shall be the same on both sides.

10.3.6.2 The brown coat shall be applied to the side opposite the bracing after the scratch coat has set and is partially dry. The bracing shall be removed when this brown coat has set and is partially dry. Both sides shall have been brought to  $\frac{1}{16}$  to  $\frac{1}{8}$  in. (1.6 to 3.2 mm) of the required thickness leaving a surface ready to receive a finish coat (see 10.3.4.2), which will bring the partition to an overall thickness of not less than 2 in. (51 mm).

10.3.7 *Studless Solid Partitions (Multiple-Thickness Gypsum Lath and Plaster)*—Partitions shall be not less than 2 in. (51 mm) thick with three coats on each side. Each side shall be not less than  $\frac{1}{2}$  in. (12.7 mm) thick.

10.3.8 *Gypsum Lath Ceilings Attached by Clips*—Plastered ceiling with clip attached gypsum lath shall be covered with three-coat work with the scratch coat not less than  $\frac{3}{16}$  to  $\frac{1}{4}$  in. (4.8 to 6.4 mm) thick over the face of the gypsum lath. The total thickness of scratch and brown coats shall be not less than  $\frac{7}{16}$  in. (11 mm).

#### 10.4 Application of Finishes:

10.4.1 Finish coats shall be applied to a partially dry base coat or to a thoroughly dry base coat that has been evenly wetted by brushing or spraying. No water shall be left standing on the surface prior to plaster application (Note 6).

NOTE 6—Precolored plaster is not recommended for smooth-trowel finishes. Where colored plaster is being applied, excessive water causes color variations. See A2.3 and A2.4.

10.4.2 Troweled finishes shall be applied by drawing the first application down tight to the entire base coat surface and doubling back to fill out to a true even surface of from  $\frac{1}{16}$  to  $\frac{1}{8}$  in. (1.6 to 3.2 mm) thick, free from catfaces and other blemishes or irregularities. Final troweling or texturing shall be done with a minimum of water after the finish coat has become firm.

10.4.2.1 Lime putty-gypsum gauged Keene's cement finish (see 9.6.3 and Note 7) shall be done in accordance with 10.4.2 except that the final troweling shall be continued until the finish has set.

NOTE 7—The thickness of this finish may be increased for decorative work as required.

10.4.2.2 Ready mixed gypsum troweled finishes (see 9.4.2) shall be applied in accordance with the printed directions of the manufacturer.

10.4.3 Textured/float finishes shall be applied in accordance with 10.4.2 except the float applied finish shall also meet the requirements of the specific texture required. The texture required shall be created by the type of float surface used (wood, carpet, cork, rubber, or other) and the length of time between trowel application and floating (take-up).

10.4.3.1 The mixes in 10.4.2.1 and 10.4.2.2 used for a float finish shall be applied in accordance with 10.4.3.

10.4.4 Texture or special finishes shall be applied in accordance with the printed directions of the manufacturer.

10.4.5 Job mixed finishes shall be applied in accordance with 10.4.2 or 10.4.3. The texture or special finish coat shall reduce the total thickness by not more than  $\frac{1}{16}$  in. (1.6 mm) while matching the approved sample as closely as possible.

10.4.5.1 Special finishes shall not reduce the combined thickness of the base coat and finish coat to less than that specified in Table 1. Inorganic coloring material added to the job mix shall be in accordance with A2.4.

10.4.5.2 Acoustical plaster and finish shall be applied in accordance with the printed directions of the manufacturer.

## 11. Keywords

11.1 aggregate; basecoat; ceiling; finish coat; gypsum; lath; plaster; texture

## ANNEXES

### (Mandatory Information)

#### A1. GENERAL INFORMATION

A1.1 Surfaces and openings shall be examined before plaster is applied thereto, the proper authorities shall be

notified, and unsatisfactory conditions shall be corrected prior to application of plaster.

## A2. TECHNICAL INFORMATION

**A2.1 Equivalent Measure for Aggregates**—Six No. 2 shovels of damp loose sand are approximately equivalent to 1 ft<sup>3</sup> (0.028 m<sup>3</sup>) and weigh approximately 100 lb (45.4 kg). Perlite and vermiculite are normally packed in bags marked with the cubic foot (or cubic metre) content.

**A2.2 Job Addition of Fiber**—Job added fiber, where specified, shall be nonstaining natural or synthetic fiber, well-shredded and free from grease, oil, dirt, or other materials that adversely affect the strength, bond, or setting time of the plaster. Uniform quantities of the fiber, as specified, shall be added to the mixer, batch by batch, after mixing water, aggregate and plaster have been added. The type and amount of fiber to be used is dependent on job specifications or on that quantity of the selected fiber that provides the desired application characteristics. Where the type and quantity of fiber is not specified by contractual agreement, gradually increased or decreased quantities shall be used until the desired application characteristics are obtained, and that quantity used thereafter.

**A2.3 Ready Mixed Colored Finish Plasters**, shall be mixed and applied in strict accordance with the directions of the manufacturer. Where specified by contractual agreement, sample panels prepared in accordance with the job specifications shall be submitted to the architect or builder for approval of final color prior to the start of any job application.

**A2.4 Job Mixed Colored Finish Plasters**—Job mixed floated or textured colored finish plasters shall be prepared with inorganic or organic water-disperseable, nonbleeding, nonfading, lime-proof coloring materials, dry powdered, paste or liquid. Coloring materials shall be proportioned and thoroughly dispersed into the finish plaster in strict accordance with the directions of the manufacturer of the coloring material. In the absence of specific directions by the manufacturer of the coloring material, uniform quantities, mixer batch by mixer batch, shall be thoroughly dispersed into the mixing water. Uniform, identical proportioning by weight of coloring material, mixing water and dry finish plaster components, and uniform, identical mixing procedure, mixing time and application. Each unbroken area shall be completed in one continuous operation from angle to angle or natural interruption for best uniformity of color. Where specified by contractual agreement, sample panels prepared in accordance with the job specifications, including floating or texturing procedures, shall be

submitted to the architect or builder for final color approval prior to the start of any job application. Floating or texturing procedure used for sample preparation shall be strictly followed for job application. The minimum quantity of coloring material necessary to obtain the specified or approved color shall be used, but in no case shall the proportion of coloring material exceed 8 weight % of the cementitious materials used.

### A2.5 Preparation:

**A2.5.1** All surfaces to be plastered shall be free from grease, oil, form release compounds, dirt, dust, paint, laitance, efflorescence or other foreign matter that would inhibit suction or mechanical keying, or cause staining.

**A2.5.2** Where a cast-in-place or other monolithic wall is to be plastered and bond is dependent upon the ability of the surface to absorb water (suction) and surface roughness for a mechanical key, bond is obtained by roughening the surface to be plastered by sandblasting, wire brushing, acid wash, or chipping.

**A2.5.3** Laitance or efflorescence on concrete and masonry shall be removed by washing first with a 10 % solution of commercial hydrochloric acid (muriatic acid) and water and then with clean water to remove all traces of acid. Grease, oil, and form release compounds shall be removed with cleaning agents compatible with surface and subsequent plastering.

**A2.5.4** The use of dressed (smooth) lumber, metal, plastic, or plywood forms, in conjunction with the vibration of concrete, produce bonding surfaces so dense and smooth, that the mechanical key necessary for plaster to bond is absent. In addition, certain kinds of lumber, oiled forms, and exposed reinforcement metals cause staining of the plaster.

**A2.6** Bonding compounds that are water re-emulsifiable shall not be used in areas of a building exposed to cyclic or continuous exposure to very humid or wet conditions, or where a dew point condition occurs on the plaster surface. (Dew point conditions frequently occur in commercial laundries, natatoriums, and other wet areas such as showers, hydrotherapy rooms, and where walls are to be washed with water or steam.)

**A2.6.1** Applied bonding compound shall be protected from dirt and dust when it will not immediately be covered with plaster. Some bonding compounds require immediate application of plaster to be effective.

## A3. MIXING

**A3.1 Hand Mixing**—Mixing boxes shall be watertight. Where mixing is done in a building, provide water-resistive protection under and around the mixing boxes and water containers.

### A3.1.1 Neat Plaster

The aggregate shall be added to the plaster and mixed dry to a uniform color, pulled to one end of the box, hoed and

chopped into water placed in the other end of the box until thoroughly mixed to the desired consistency.

### A3.1.2 Gypsum Ready Mixed Plaster

Plaster shall be placed at one end of the box without adding aggregate, water shall be placed in the other end and plaster hoed and chopped into water until thoroughly mixed to the desired consistency.

### A3.1.3 *Gypsum Wood-Fibered Plaster*

Where used without aggregate, the plaster shall be placed at one end of the box, hoed and chopped into water at the other end until thoroughly mixed to the desired consistency. Where aggregate is added, it shall be mixed in accordance with A3.1.1.

## A3.2 *Mechanical Mixing:*

### A3.2.1 *Gypsum Neat Plaster*

Aggregate shall be added at the job while the mixer is in continuous operation, as follows:

A3.2.1.1 Put in the approximate (less than total required) amount of water.

A3.2.1.2 If sand is used, add approximately half the sand. If vermiculite or perlite is used, add total amount required.

A3.2.1.3 Add all of the plaster.

A3.2.1.4 Add the remainder of the sand.

A3.2.1.5 Adding water as necessary, mix to the proper consistency. Do not overmix.

A3.2.1.6 Dump the entire batch and use. Clean the mixer for the next batch.

### A3.2.2 *Gypsum Ready Mixed Plaster*

Aggregate shall be added at the producer's plant. While the mixer is in continuous operation, do as follows:

A3.2.2.1 Put in the approximate (slightly less than total required) amount of water.

A3.2.2.2 Add the ready mixed plaster.

A3.2.2.3 Adding water or plaster as necessary, mix to the desired consistency.

A3.2.2.4 Dump the entire batch and use. Clean the mixer for the next batch.

### A3.2.3 *Gypsum Wood-Fibered Plaster*

Where used with aggregate added, the loading and mixing cycle shall be as prescribed in A3.2.1. Where used without aggregate, the loading and mixing cycle shall be as prescribed in A3.2.2.

## A4. BASE COAT PROPORTIONS

A4.1 For job mixed 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 Tables 5 and 6.

A4.1.1 Gypsum ready mixed plaster shall be permitted to be used instead of job-prepared mixes of gypsum neat plaster and aggregate provided the proportion of aggregate to plaster is not more than that specified in Tables 5 and 6. Gypsum ready

mixed plaster shall be used with the addition of water only, except as otherwise specified.

### A4.1.2 *Gypsum Wood-Fibered Plaster*

The addition of extra aggregate to gypsum wood-fibered plaster is not recommended, but in no case shall the addition of sand, perlite, or vermiculite be more than 1 ft<sup>3</sup> (0.028 m<sup>3</sup>) to 100 lb (45.4 kg) of gypsum wood-fibered plaster.

## APPENDIXES

### (Nonmandatory Information)

## X1. GENERAL INFORMATION

X1.1 The work includes all labor, materials, services, equipment, and scaffolding required to complete the plastering on the project in accordance with the drawings and specifications.

X1.2 Scaffolding shall be constructed and maintained in

strict conformity with applicable laws and ordinances.

X1.3 The work shall be coordinated with the work of other trades.

## X2. VENTILATION REQUIREMENTS

X2.1 Attics or similar unheated spaces above lath and plaster ceilings shall be adequately ventilated by providing effective cross ventilation for all spaces between roof and top floor ceilings by screened louvers or other approved or acceptable means.

X2.1.1 The ratio of total net free ventilating area to ceiling area shall be not less than 1:150, except that the ratio may be 1:300 provided:

X2.1.1.1 A vapor barrier having a transmission rate not

exceeding 1 perm is installed on the warm side of the ceiling, or

X2.1.1.2 Not less than 50 % of the required ventilation area is provided by ventilators located in the upper portion of the space to be ventilated (not less than 3 ft (914.4 mm) above eave or cornice vents) with the balance of the required ventilation area provided by eave or cornice vents.

X2.1.2 Attic space that is accessible and suitable for future habitable rooms or walled-off storage space shall have not less



than 50 % of the required ventilating area located in the upper part of the ventilated space as near the high point of the roof as practical and above the probable level of any future ceilings.

X2.2 In buildings with operable windows, ventilation shall be accomplished by keeping windows open approximately 2 in. (50 mm) top and bottom or side-pivoted windows approximately 4 in. (100 mm) to provide air circulation. In buildings without operable windows or having no windows, provisions shall be made to exhaust the moist air to the outside by mechanical means such as temporary circulators, exhaust fans, or the air conditioning system. A portion of the water used in

mixing gypsum plaster is necessary for the chemical reaction that rehydrates and hardens the plaster. The excess amount required for mixing and application shall be exhausted from the plastered area after set has taken place. Free circulation of air is necessary to avoid "sweat-outs." Vent enclosed areas lacking natural ventilation by use of temporary mechanical means. If windows are not glazed and the building is subjected to hot dry winds, openings shall be screened with cheesecloth or similar materials. Free circulation of hot dry winds over the face of freshly applied plaster causes "dry-outs" by removing water from the plaster before the rehydration is completed.

### X3. RECOMMENDED LOCATIONS OF THREE COAT WORK

X3.1 *Use Three-Coat Work on the Following Types of Construction:*

X3.1.1 Over gypsum lath attached to ceiling supports spaced more than 16 in. (406 mm) on center.

X3.1.2 Over gypsum lath attached to ceiling supports by clips.

X3.1.3 Over 3/8-in (9.5-mm) thick gypsum lath where a vapor retarder is used adjacent to the back of the lath.

X3.1.4 Over metal plaster bases.

### SUMMARY OF CHANGES

This section identifies the location of changes to this specification that have been incorporated since the last issue.

(1) Paragraphs A1.2 and A1.3 were moved to 1.3 and 1.4. Changes were made to the wording of 1.3.

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