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Standard Specifications:

GYPSUM PLASTERING

PLAINTIFF'S EXHIBIT

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GYPSUM ASSOCIATION

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American Standard Specifications for

Gypsum Plastering

Sponsors
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Approved April 27, 1964
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Foreword

(This Foreword is not a part of American Standard Specifications for Gypsum Plastering, A42.1-1964.)

This standard provides architects, specification writers, engineers, contractors, building regulatory officials, and others with a specification for gypsum plastering. The provisions of the standard are intended to serve as minimum requirements which will reasonably assure satisfactory results. It is the belief of Sectional Committee A42, which is responsible for the formulation of this standard, that compliance with these provisions will effect attractive, permanent, safe, and sanitary gypsum plastering.

Establishment of a project for the development of American Standard specifications for plastering was requested by the Finishing Lime Association of Ohio on August 17, 1928. After some months of correspondence and discussion leading to national agreement, initiation of a project was authorized by ASA in April, 1929, and Project A42, Specifications for Plastering, was established. The American Institute of Architects and the American Society for Testing and Materials accepted cosponsorship and proceeded with formation of the sectional committee which held its organization meeting on February 24, 1930. A number of subcommittees appointed at that time worked productively for about a year, but then for a number of reasons progress was retarded to the extent that reorganization of Sectional Committee A42 was undertaken at a meeting in July, 1936.

The work was also reorganized at that time and thereafter the sectional committee completed a draft standard on gypsum plastering, and lathing and furring, based on an earlier draft prepared by the Gypsum Association. After its very thorough consideration by the committee, the draft was submitted to ASA with favorable recommendations by the sponsors, and it was approved on September 29, 1938 as American Standard Specifications for Gypsum Plastering, Including Requirements for Lathing and Furring, A42.1-1938. Revisions of this standard were approved on June 17, 1942, September 26, 1946, and December 28, 1950. In the 1950 revision, the sectional committee decided on separation of the lathing and furring requirements, so A42.1-1950 became American Standard Specifications for Gypsum Plastering, and American Standard Specifications for Interior Lathing and Furring, A42.4-1950 was approved as a separate standard.

A further revision of A42.1 was approved on January 11, 1955, and thus the present revision, A42.1-1964, represents the sixth edition of this important standard. This edition culminates three years of intensive activity by the sectional committee and several task forces undertaken at the request of the Gypsum Association for revision of the 1955 standard. It embodies a long list of further improvements including two significant changes. One of these is the provision for use of normal or "N" type finishing lime with certain limitations. The other is a modification of the proportioning of light-weight aggregates used in gypsum plaster.

Suggestions for improvement gained in the use of this standard will be welcomed. They should be sent to the American Standards Association, Incorporated, 10 East 40th Street, New York, N. Y. 10016.

Sectional Committee A42, which developed this standard, had the following personnel at the time this standard was submitted to it for approval:

MAX BARTH, *Chairman* ERWIN M. LURIE, *Secretary*
GENE ERWIN, *Assistant Secretary*

Organization Represented	*Name of Representative*
American Concrete Institute	W. J. McCOY
The American Institute of Architects	R. J. PIPER
	P. W. NORTON
American Society for Testing and Materials	J. A. HARDESTY
	W. J. McCOY
	R. L. SELBE
	V. S. TADSEN
Contracting Plasterers' and Lathers' International Association	G. ERWIN
Federal Housing Administration	R. E. EGGLESTON
Finishing Lime Association of Ohio	W. H. PRICE II
General Services Administration	Representation Vacant
Gypsum Association	D. G. HAMME
	H. OMSON
	L. YEAGER (*Alt*)
Members-at-Large	E. M. LURIE
	N. MITCHELL
Metal Lath Association	R. N. PARKER
National Association of Real Estate Boards	H. W. WILDS
National Bureau of Standards	E. T. CARLSON

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Organization Represented	*Name of Representative*
National Lime Association	R. S. Boynton
National Lumber Manufacturers Association	J. G. Shope
Operative Plasterers' and Cement Masons' International Association of the United States and Canada	T. D. Turnbull
Perlite Institute	R. E. Barnes
Portland Cement Association	S. H. Westby
U. S. Department of the Army (*Liaison*)	H. E. Gatchell
U. S. Department of Defense	M. Barth
	C. E. Lord (*Alt*)
U. S. Department of the Navy	L. W. Giles
Vermiculite Institute	E. R. Murphy
	L. A. Barron (*Alt*)
Veterans Administration	W. Von Blon
Wood, Wire, and Metal Lathers' International Union	L. A. Mashburn*

Former members of the committee, who were especially active in the preparation of American Standard A42.1-1964 but who were not members at the time the standard was submitted for approval, were: T. I. Coe,* Fellow of the American Institute of Architects, former chairman, A42; Dr. J. W. McBurney,* former secretary, A42; L. M. Ritter, U. S. Department of the Navy; L. E. Johnson, Finishing Lime Association of Ohio; Fred R. Knoblock, General Services Administration; Jack Fisher, Metal Lath Association; R. E. Faber, Gypsum Association.

* Deceased.

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American Standard Specifications for

Gypsum Plastering

1. Scope and General Provisions

1.1 This standard specifies the minimum requirements for approved gypsum plastering. The use of equivalents or better is permissible.

1.2 Where a specific degree of fire resistance is required for plastered assemblies and constructions, applicable building code regulations shall be followed. Details of construction to achieve required fire resistance may be obtained from official reports of fire tests conducted at recognized fire testing laboratories in accordance with American Standard Methods of Fire Tests of Building Construction and Materials, A2.1-1956 (ASTM[1] E 119-55).

1.3 To secure, in largest measure, the desirable results of plastering, it is recommended that those who use this standard coordinate its provisions with American Standard Specifications for Interior Lathing and Furring, A42.4-1955.

1.4 General information regarding matters of a contractual nature concerning plasterwork will be found in Appendix A. Additional technical information related to plastering and plastering materials is provided in Appendix B.

2. Materials

2.1 Gypsum Plasters. The following plasters shall conform to American Standard Specification for Gypsum Plasters, A49.3-1961 (ASTM[1] C 28-60):

Neat
Bond
Ready-mixed
Wood-fibered
Gypsum gauging for finish coat

[1] American Society for Testing and Materials. The ASTM specifications, methods of testing, definitions and terms, and recommended practices are published in the 32-volume *1964 Book of ASTM Standards*, as well as being available separately. Each volume (Part) covers a specific field of interest. Part 4 of the *1961 Book of ASTM Standards*, and the *1963 Supplement to Part 4*, covered cement, lime, gypsum, mortar, concrete, mineral aggregates, bituminous materials, and soils. The *1964 Book of ASTM Standards* covers concrete and mineral aggregates in Part 10; cement, lime, and gypsum in Part 9; bituminous materials for highway construction, waterproofing, and roofing and the subject of soils, in Part 11; mortars, clay and concrete pipe and tile, masonry units, asbestos-cement products, and building stone in Part 12. Also available from ASTM: *Compilation of ASTM Standards on Gypsum Products and Plaster Aggregates, With Related Standards*, and a *Compilation of ASTM Standards for Building Codes.*

2.2 Gypsum Molding Plaster. Specifications for Gypsum Molding Plaster shall conform to American Standard Specifications for Gypsum Molding Plaster, A49.4-1951 (ASTM C 59-50).

2.3 Keene's Cement. Specifications for Keene's cement shall conform to American Standard Specifications for Keene's Cement, A66.1-1951 (ASTM C 61-50) or Federal Specification SS-C-161, Keene's Cement, August 10, 1956, as an allowable alternate.

2.4 Lime

2.4.1 ***Special Finishing Hydrated Lime*[2].** Specications for special finishing hydrated lime shall conform to American Standard Specifications for Special Finishing Hydrated Lime, K67.12-1960 (ASTM C 206-49).

The requirements for popping and pitting of hydrated lime as prescribed in American Standard K67.12-1960 (ASTM C 206-49) shall be replaced by the autoclave method for "soundness" (popping and pitting) as described in Appendix B. In this test, if the specimen shows the presence of pops or pits, the sample shall be reported "unsound" and the shipment shall be rejected.

2.4.2 ***Normal Finishing Hydrated Lime*[2].** Specifications for normal finishing hydrated lime shall conform to American Standard Specifications for Normal Finishing Hydrated Lime, K67.2-1960 (ASTM C 6-49).

The requirements for popping and pitting described for special finishing hydrated lime apply to normal finishing hydrated lime.

This type of lime may be used on furred and suspended plaster bases, spaced as in suspended ceilings, beams or columns, from poured concrete or unit masonry, or where the plaster is applied over metal lath, wire lath or wire fabric, or similar plaster bases, or over gypsum lath, where any of such types of plaster bases are attached to supports in such manner that no part of the plaster is in direct contact with poured concrete or with unit masonry, as defined in dagger (†) footnote in 4.1.

2.4.3 ***Quicklime for Structural Purposes.*** Specifications for quicklime for structural purposes shall conform to American Standard Specifications for Quicklime for Structural Purposes, K67.1-1960 (ASTM C 5-59).

The requirements for popping and pitting of quicklime as prescribed in American Standard K67.1-1960 (ASTM

[1] American Standards listed with ASTM references in parentheses mean that the pertinent ASTM document has been approved as an American Standard.

[2] American Standard K67.12-1960 (ASTM C 206-49) covers both dolomitic and high calcium finishing hydrated limes.

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C 5-59) shall be replaced by the autoclave method for "soundness" (popping and pitting) as described in B1 of Appendix B. In this test, if the specimen shows the presence of pops or pits, the sample shall be reported "unsound" and the shipment shall be rejected.

Since this autoclave method for the determination of "soundness" is equally applicable to quicklime, provided a properly prepared lime putty is used, the quicklime shall be slaked in accordance with the directions given in B1 of Appendix B and the same requirements for popping and pitting as defined above shall be added to and made applicable to American Standard K67.1-1960 (ASTM C 5-59).

The requirements for plasticity prescribed in American Standard K67.12-1960 (ASTM C 206-49) shall apply to quicklime putty in finishes, and all lime used shall be suitable for finish coat plastering. Except as provided in the following paragraph, the total free (unhydrated) calcium oxide (CaO) and magnesium oxide (MgO) in the hydrated product shall not exceed 8 percent by weight calculated on the as-received basis in accordance with American Standard Methods of Chemical Analysis of Limestone, Quicklime, and Hydrated Lime, K67.3-1960 (ASTM C 25-58).

Any lime putty, after soaking the quicklime according to the lime manufacturer's directions, that does not meet the above requirement of not over 8 percent by weight unhydrated oxide content, shall be regarded as the equivalent of normal finishing hydrated lime and its use shall be subject to the same restrictions as provided herein for normal finishing hydrated lime; i.e., that it shall not be used as a finish coat on plaster any part of which is in direct contact with poured concrete or unit masonry as defined in dagger (†) footnote in 4.1.

2.5 Aggregates for Use in Gypsum Plaster. See American Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster, A107.1-1963 (ASTM C 35-62).

2.5.1 ***Sand.*** The grading requirements of sand as prescribed in American Standard A107.1-1963 (ASTM C 35-62) shall apply for base-coat plaster.

Sand for use in gypsum-sand float finish (see 10.5) shall be graded within the following limits:

Sieve Size	Retained on Sieve Percent by Weight Max.	Min.
No. 16 (1,000 micron)	0	0
No. 30 (595 micron)	20	50
No. 50 (297 micron)	50	70
No. 100 (149 micron)	80	100

NOTE: See American Standard Specifications for Sieves for Testing Purposes, Z23.1-1961 (ASTM E 11-61).

Fine sand, sand having rounded particles uniform in size (frequently called "quicksand"), shall not be used.[3]

2.5.2 ***Perlite.*** Perlite used for base-coat plastering shall conform to the requirements of American Standard A107.1-1963 (ASTM C 35-62).

2.5.3 ***Vermiculite.*** Vermiculite used for base-coat plastering shall conform with the requirements of American Standard A107.1-1963 (ASTM C 35-62).

Vermiculite used in finish-coat plastering shall weigh not less than 7 nor more than 12 pounds per cubic foot and shall be graded within the following limits:

Sieve Size	Retained on Sieve Percent by Volume Max.	Min.
No. 8 (2,380 micron)	0	0
No. 16 (1,000 micron)	5	0
No. 30 (595 micron)	65	15
No. 50 (297 micron)	98	60
No. 100 (149 micron)	100	90

NOTE: See American Standard Z23.1-1961 (ASTM E 11-61).

The density and gradation of vermiculite finish-coat aggregate shall be determined in accordance with American Standard A107.1-1963 (ASTM C 35-62).

2.5.4 ***Fine Aggregates.*** Fine aggregates for use in lime putty gypsum trowel finish shall be graded within the following limits:

Sieve Size	Percent Retained on Sieve: Perlite by Volume Max.	Min.	Fine Silica Sand, Marble Dust, Pulverized Limestone by Weight Max.	Min.
No. 20 (841 micron)	0	—	0	—
No. 30 (595 micron)	10	—	10	—
No. 100 (149 micron)	100	40	100	40
No. 200 (74 micron)	100	70	100	70

NOTE: See American Standard Z23.1-1961 (ASTM E 11-61).

2.6 Bonding Agents. Bonding agents may be used at the discretion of the specifier. See 3.6.2.2 and B2 of Appendix B.

2.7 Water. Water shall be clean, fresh, suitable for domestic consumption, and free from such amounts of mineral and organic substances as would affect the set of the plaster.[4]

2.8 Delivery and Protection of Materials

2.8.1 All manufactured materials shall be delivered in the original packages, containers, or bundles bearing the name of the manufacturer and the brand.

2.8.2 Plaster and other cementitious materials shall be kept dry until ready to be used; they shall be kept off the ground, under cover, and away from sweating walls and other damp surfaces.

2.8.3 Metal products shall be protected against rusting.

3. Preparations for Plastering

3.1 Temperature. When the prevailing outdoor tem-

[3] Such material produces a weak plaster and causes it to work short.

[4] Water containing salt or alum, or water in which tools have been washed, accelerates the "set". Water from stagnant pools and wells frequently contains organic or vegetable matter which may retard the "set".

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perature at the building site is less than 55 F, a uniform temperature of not less than 55 F, and not more than 80 F, shall be continuously maintained in the building for a period[5] of not less than one week prior to the application of plaster, while the plastering is being done, and for a period of at least one week after the plaster is dry. Heat shall be well distributed in all areas, and deflection or protective screens shall be used to prevent concentrated or uneven heat on plaster areas near the heat source. Where required, heat shall be furnished by_____[6].

NOTE: Provisions for furnishing heat are covered in A6 of Appendix A.

3.2 Ventilation. To properly dry[7] the plaster during and subsequent to its application, ventilation shall be provided. In glazed buildings this shall be accomplished by keeping windows open approximately 2 inches top and bottom (or side-pivoted windows approximately 4 inches) to provide air circulation.[8] For enclosed areas or buildings which lack natural ventilation, provision 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.

3.2.1 If glazed sash are not in place and the building is subjected to hot, dry winds[9] or temperature differentials from day to night of 20 F or more, openings shall be screened with cheesecloth or similar materials.[10]

3.2.2 See B3 of Appendix B for provisions for ventilating portions of underside of roofs enclosed with lath and plaster ceilings.

3.3 Examination. *All surfaces including, but not limited to, unit masonry, monolithic concrete, lathing of all types, and accessories which are to receive plaster shall be carefully examined before the plaster is applied, and the proper authorities shall be promptly notified of all unsatisfactory conditions. No plaster shall be applied until after such unsatisfactory conditions are rectified to the satisfaction of the plastering contractor and made suitable for the application of plaster.*

3.3.1 Plaster shall not be applied over any surfaces of unit masonry or concrete which have been coated with any bituminous compound or other detrimental waterproofing or dampproofing agent.

3.4 Conditioning of Surfaces to Receive Plaster

3.4.1 Masonry surfaces on which suction must be reduced shall be properly wet down immediately before the plaster is applied. This is particularly important if wood-fiber plaster is used.

3.4.2 Metal grounds and other accessories, such as corner beads, screeds, picture molds, etc, shall be carefully examined to see that they are straight, curved, plumb, level, square, or true to the required angles, as the case may require, before the plaster is applied.

3.5 Lath

3.5.1 Wood lath shall be thoroughly wet down from 12 to 24 hours and in very dry weather again from 1 to 3 hours prior to the application of plaster.

3.5.2 Gypsum lath shall not be wet down.

3.6 Monolithic Concrete Surfaces. Monolithic concrete surfaces shall be cleaned of all dust, loose particles, and other foreign matter. Laitance and efflorescence shall be removed by washing first with a 10 percent solution of commercial hydrochloric acid (muriatic acid) and water and then with clean water to remove all traces of acid. Grease and oil shall be completely removed.

3.6.1 Monolithic concrete surfaces shall have sufficient roughness to provide proper bond. (See Note below). If surfaces are not sufficiently rough, they shall be hacked or bushhammered to provide proper bond for the plaster, or treated as described in 3.6.2. If necessary, the surface shall be evenly wetted, but not saturated, to provide proper suction.

NOTE: The use of dressed (smooth) lumber, metal, and plywood forms, or oiling or greasing or both of such forms, and the vibrating of concrete, produce concrete surfaces which are so smooth that mechanical bond necessary for plaster is absent.

3.6.2 In lieu of hacking or bushhammering, an adequate bond for the plaster on concrete surfaces may be provided by either a dash coat or a bonding agent (see B2 of Appendix B) or in accordance with the following procedures, and, where applicable, in accordance with limitations stated in 3.6.2.2 and its Notes.

3.6.2.1 A dash coat of portland cement grout, composed of 1 part cement to 1½ parts of fine sand mixed to a mushy consistency shall be applied. The portland cement grout shall be forcibly dashed with a whipping motion on to the concrete surface, using a stiff fiber brush or by equivalent mechanical means. The coat shall be kept damp for at least 2 days immediately following its application and then allowed to dry. Before application of plaster, the dash coat shall be evenly dampened if necessary to provide proper suction.

3.6.2.2 Bonding agents (see B2 of Appendix B) may not be used in lieu of metal lath or wire lath for the bonding of plaster to monolithic concrete ceilings or wall surfaces which require more than ⅜ inch or ⅝ inch of

[5] To minimize the possibility of plaster cracking due to structural movements caused by thermal changes, the building should be permitted to become adjusted to the uniform temporary heating conditions for at least one week prior to the start of plastering.

[6] The name of the parties who shall furnish heat or mechanical ventilation or both may be inserted here, or as provided in A6 of Appendix A.

[7] A portion of the water used in mixing gypsum plaster is necessary for the chemical reaction which sets and hardens the plaster. The excess amount required for mixing and application must be dried out after set has taken place.

[8] In addition to drying the plaster, free circulation of air is necessary to avoid "sweat-outs," particularly in enclosed areas lacking natural ventilation.

[9] Free circulation of hot, dry winds over the face of freshly applied plaster should be prevented. It causes "dry-outs" by removing the water from the plaster before the setting action is completed.

[10] This minimizes the possibility of plaster cracking due to thermal stress or "shock" of the nature that occurs when new plaster is subjected to high temperatures during daytime and reduced temperatures at night at that time when the plaster has set but is not dry.

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plaster, respectively, (see 4.1) to produce required lines or surfaces.

NOTE 1: A bonding agent (see B2 of Appendix B) for plaster shall not be employed where the use of gypsum plaster is required to assure that a specific fire retardance rating is attained by a structural assembly of which it is a part, unless standard fire tests in a recognized testing laboratory have demonstrated that the bond of the gypsum plaster provided by the specific bonding agent to the structural assembly is adequate to assure that the fire retardance rating of the assembly is not diminished.

NOTE 2: A bonding agent (see B2 of Appendix B) for gypsum plaster shall not be used in areas of a building in which a dew point condition may occur in the plaster. These conditions occur frequently in buildings such as commercial laundries and natatoriums.

3.7 Metal Bases. Metal bases for solid partitions shall be fully grouted. The grout shall be screeded approximately ¼ inch below the top edge of the base, and in such fashion as to form a center groove which will permit the lath to extend ¾ inch below the top edge of the base, or grout may be placed after installation of lath.

4. Thickness of Plaster

4.1 Plaster shall be of the following thicknesses, in inches, measured from the face of plaster base to finished plaster surfaces. Wood or metal grounds or plaster screeds shall be installed to assure such thicknesses:

Plaster Base	Thickness in Inches of Plaster, Including Finish Coat
Metal lath*, wire lath, and wire fabric	⅝ min.
All other types of laths	½ min.
Unit masonry†	⅝ min.
Vertical monolithic concrete surfaces‡§	⅝ max.
Horizontal monolithic concrete surfaces§	⅜ max. ⅛ min.

* Plaster thickness, when measured from the back plane of metal lath exclusive of ribs, shall be ¾ inch minimum.

† Unit masonry referred to in the above table includes all types of unit masonry such as clay, shale, concrete, gypsum, etc, which are set in mortar, except glass and plain concrete, as defined in American Standard Building Code Requirements for Masonry, A41.1-1953. Base coat plastering of the same proportions as required in the above table for unit masonry may be applied over plain or reinforced concrete provided that such concrete shall first be covered with a base of metal lath or other metal plastering base to furnish a positive mechanical bond for the plaster, or such concrete shall first be coated with gypsum bond plaster or a bonding agent.

‡ The finish coat of plaster on vertical monolithic concrete surfaces shall not exceed a thickness of 3/16 inch where applied over a bonding agent which has been applied to such concrete surfaces. If a thickness of more than 3/16 inch of such finish coat plaster is required to bring such walls to a true plane, a base coat of plaster shall first be applied to the bonding agent.

§ If horizontal or vertical monolithic concrete surfaces require more than ⅜ inch or ⅝ inch of plaster, respectively, to produce required lines or surfaces, metal lath or wire lath bonding for the plaster shall be attached to the concrete before application of plaster. Where such concrete surfaces require the application of an excessive thickness of plaster to produce required lines or surfaces, lath shall be applied over metal furring secured to the concrete.

4.2 Metal grounds shall be furnished and installed by the plastering or lathing contractor.

4.3 Plaster screeds shall be installed by plastering contractor.

4.4 See A5 of Appendix A for provision relating to installation of wood grounds.

5. Base Coat Proportions

Proportions[11] of sand, perlite or vermiculite to 100 pounds of gypsum neat plaster for ready-mixed plaster or job mixed plaster shall not exceed those in Table 1, page 10.

5.1 Gypsum Ready-Mixed Plaster. Where gypsum ready-mixed plasters are used, the material shall be prepared for use by the addition of water only, except as otherwise provided herein.

Gypsum ready-mixed plasters may be used in lieu of job-prepared mixes of gypsum neat plaster and aggregate provided the proportion of aggregate to plaster does not exceed that specified in Table 1.

5.2 Gypsum Wood-Fibered Plaster. This is normally applied without addition of aggregate. If it is desired to add aggregate, the proportions per 100 pounds of gypsum wood-fibered plaster shall not exceed 1 cubic foot of damp loose sand, or perlite, or vermiculite.

5.3 Bond Plaster. This shall be applied without the addition of aggregate.

5.4 Equivalent Measure for Aggregates. Six No. 2 shovelsful of damp, loose sand are approximately equivalent to 1 cubic foot and weigh approximately 100 pounds. [See the asterisk (*) under Table 1.] Perlite and vermiculite are normally packed in bags marked with the cubic-foot content. A 100 pound bag of gypsum has a volume of approximately 1.6 cubic feet.

6. Hand Mixing

Material that has partially set shall not be retempered or used. Frozen, caked, or lumpy material shall not be used. The mixing boxes shall be watertight and thoroughly cleaned of all set or hardened material. If mixing is done in the building, waterproof protection shall be provided under the mixing boxes and water barrels. Tools shall be cleaned after mixing each batch.

6.1 Gypsum Neat Plaster. Aggregate shall be added at the job. Plaster and aggregate shall be mixed dry to a uniform color at one end of the box, hoed into water at the other end, and thoroughly mixed to the proper consistency.

Plaster shall be accelerated, if necessary, to provide a setting time of not more than 4 hours beginning with the addition of the mixing water to the batch of mortar.

6.2 Gypsum Ready-Mixed Plaster. Aggregate shall not be added. Plaster shall be placed at one end of the

[11] The proportions in Table 1 are applicable for both hand and machine application of plaster. See manufacturers' instructions for application of machine applied plaster.

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Table 1
Base Coat Proportions

PLASTER BASE	AGGREGATES		
	Sand		Perlite or Vermiculite
	By Volume (Cubic Feet)* Damp and Loose	By Weight (Pounds) Damp and Loose	By Volume (Cubic Feet)
Over Gypsum Lath			
Two Coat Work			
Basecoat	2½	250	2
Three Coat Work			
Scratch Coat	2	200	2
Brown Coat	3	300	2†
or			
Scratch and Brown Coats	2½	250	—
Over Metal Lath			
Three Coat Work			
Scratch Coat	2	200	2
Brown Coat	3	300	2†
or			
Scratch and Brown Coats	2½	250	—
Over Unit Masonry†,‡			
Two Coat Work			
Basecoat	3	300	3
Three Coat Work			
Scratch Coat	3	300	3
Brown Coat	3	300	3
Over Monolithic Concrete			
For base coat proportions applicable to monolithic concrete, see 8.3.			

* Use of an accurate device such as a measuring box or container to measure quantities is highly essential. Where such a device is not available, six No. 2 square edge (not scoop) shovels with a blade approximately 8½ inches wide and 11 inches long, with the maximum depth of sides not more than 1½ inches higher than the face of the blade, and filled to an average depth of 4 inches of damp loose sand may be considered as the approximate equivalent to 1 cubic foot.

† Where the plaster is 1 inch or more in total thickness, the proportions for the brown coat may be increased to 3 cubic feet.

‡ See the (†) footnote under 4.1 for definition of unit masonry.

box, hoed into water at the other end, and thoroughly mixed to the proper consistency.

6.3 Gypsum Wood-Fibered Plaster. When used without aggregate, the plaster shall be placed at one end of the box, hoed into water at the other end, and thoroughly mixed to the proper consistency. When aggregate is added, the plaster and aggregate shall be mixed dry to a uniform color at one end of the box, hoed into water at the other end, and thoroughly mixed to the proper consistency.

7. Mechanical Mixing

Material that has partially set shall not be retempered or used. Frozen, caked, or lumpy material shall not be used. The mixer shall be cleaned of all set or hardened material before materials for a new batch are loaded. Each batch shall be mixed separately.

7.1 Gypsum Neat Plaster. Aggregate shall be added at the job. The following cycle of operations shall be followed while the mixer is in continuous operation:

(1) Put in the approximate amount of water

(2) If sand is used, add approximately half the amount of aggregate

If vermiculite or perlite is used, add all the aggregate

(3) Add all the plaster

(4) Add the remainder of the sand aggregate

(5) Mix to the proper consistency, adding water if necessary

(6) Dump the entire batch and use

Plaster shall be accelerated, if necessary, to provide a setting time of not more than 4 hours beginning with the addition of mixing water to the batch of mortar.

7.2 Gypsum Ready-Mixed Plaster. Aggregate shall not be added. The following cycle of operations shall be followed while the mixer is in continuous operation:

(1) Put in the approximate amount of water

(2) Add the plaster

(3) Mix to the proper consistency, adding water, or plaster, if necessary

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(4) Dump the entire batch and use

When the mixer is used intermittently, a small amount of water shall be added after dumping each batch and the mixer run for a few minutes. After dumping the water, the mixer will be clean and ready for a new batch.

7.3 Gypsum Wood-Fibered Plaster. When used without aggregate, the plaster shall be mixed as prescribed in 5.1 for gypsum ready-mixed plaster. When aggregate is added, the plaster and aggregate shall be mixed as prescribed in 5.2.

8. Application of Base Coats

8.1 Two-Coat Work. Base (first) coat shall be applied with sufficient material and pressure to form good bond on gypsum lath or masonry as the case may be, and to cover well. Then, before this scratch coat has set, and without raking its surface, material of the same proportions shall be doubled back to bring the plaster out to grounds. Straighten to a true surface without application of water, and cross rake or scratch to receive the finish (second) coat.

8.2 Three-Coat Work. Scratch (first) coat shall be applied with sufficient material and pressure to form good full keys on wood, metal, and wire lath, wire fabric, and to provide a rigid surface, and good bond on gypsum lath or masonry, as the case may be, and shall cover the face of the plaster base with sufficient depth of material to allow for scratching.

8.2.1 Brown (second) coat shall be applied, after the scratch (first) coat has set firm and hard, brought out to grounds, straightened to a true surface without application of water and be cross raked or scratched, to receive the finish (third) coat.

NOTE: To insure full plaster thickness, plaster screeds should be applied to the scratch coat prior to the application of the brown coat.

8.2.2 Only three-coat work shall be used on the following construction:

(1) Over gypsum lath attached to horizontal ceiling supports spaced more than 16 in. on center.

(2) Over gypsum lath attached to horizontal ceiling supports by clips providing edge support only.

(3) Over 3/8-inch thick perforated gypsum lath where a vapor barrier is used adjacent to the back of the lath.

8.2.3 Metal base for hollow partitions shall be grouted prior to plastering, or shall be filled solid between lath and base at the time of plastering.

8.3 Plastering on Monolithic Concrete. Walls and columns shall have a scratch coat of bond plaster or other bonding means as provided in 3.6.1 and 3.6.2 followed by a brown coat of gypsum plaster (in the proportion of 100 pounds of gypsum neat plaster to not more than 3 cubic feet of sand, perlite or vermiculite) troweled into the scratch coat before it has set. The brown coat shall be brought out to grounds, using a double-back application if required, straightened to a true surface without application of water, and be cross raked or scratched, to receive the finish coat.

Ceilings shall have a coat of bond plaster, scratched in thoroughly, doubled back, and filled out to a true, even surface without application of water, and be cross raked or scratched, to receive the finish coat.

NOTE: For use of bonding agents for plastering on monolithic concrete see 3.6.1 and 3.6.2 and B2 of Appendix B.

8.4 Solid Plaster Partitions with Steel Studs (Metal Lath and Plaster). These partitions shall not be less than 2 inches in thickness and shall have scratch, back-up, brown, and finish coats in accordance with 8.4.1 through 8.4.4.

8.4.1 Scratch coat shall be applied on the lath side with sufficient material and pressure to form good keys and to cover well, and then be scratched to a rough surface. Where temporary bracing of studs is installed, the bracing shall be maintained until the scratch coat on the lath side has set.

8.4.2 Back-up coat shall be applied on the channel side, after the scratch coat on the lath side has set firm and hard, in not less than two operations; the first to adequately cover the keys of the scratch coat and the other coat or coats to bring the plaster out to the grounds. It shall then be straightened to true surface without application of water, and be cross raked or scratched.

8.4.3 Brown coat on the lath side shall be applied over the scratch coat, after the back-up coat on the channel side has set, and shall be as specified for the back-up coat.

8.4.4 Plaster shall extend to the floor, except that where metal bases are used, the plaster shall extend below the top edge of the base, to the grout. All spaces between grounds shall be filled. Hollow metal door frames shall be filled solid. Wherever possible, plastering shall be commenced at the bottom of the partitions.

8.5 Studless Solid Partitions (Metal Lath and Plaster). These partitions shall be not less than 2 inches in thickness, and plaster shall be applied in the same number of coats as for solid partitions with steel studs. See 8.4.

8.5.1 Where rib metal lath is used, the scratch coat shall be applied on the flat side and the temporary bracing on the rib side. Where diamond mesh (flat expanded) metal lath is used, the temporary bracing may be attached to either side, and the scratch coat shall be applied on the opposite side.

8.5.2 Sequence of application of brown coat and back-up coats shall be in accordance with one of the following alternate methods:

(1) Brown coat shall be applied over face of the scratch coat, then back-up coat shall be applied on reverse side of the partition, or

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

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8.6 Studless Solid Partitions (Gypsum Lath and Plaster). These partitions shall be not less than 2 inches in thickness and shall have scratch, brown, and finish coats on both sides.

8.6.1 Scratch coat approximately 3/8 inch in thickness with a minimum thickness of 3/16 inch at any point shall be applied first to the side opposite the temporary bracing with sufficient pressure to form a good bond, followed by a scratch coat approximately 3/8 inch thick applied to the side on which the bracing occurs. Scratch coats shall be scratched to form a rough surface. Hollow metal door frames shall be filled solid.

8.6.2 Brown coat shall be applied to the side opposite the bracing, after the scratch coat on that side has set firm and hard and is partially dry. When this brown coat has set firm and hard and is partially dry, temporary bracing shall be removed and brown coat applied to bracing side. Brown coat shall be straightened to a true surface without application of water, and be cross raked or scratched, ready to receive the finish coat, allowing 1/16 to 1/8 inch on each side for finish coat to bring overall partition thickness to not less than 2 inches.

8.7 Studless Solid Partitions (Gypsum Lath and Plaster, Multiple-Thickness Lath). These partitions shall not be less than 2 inches in thickness, and the combined thickness of the scratch, brown, and finish coats on each side shall be not less than 1/2 inch. The thickness of the separate coats and the sequence of plastering on each side depending on whether bracing is used, shall be in accordance with the proprietary specifications for the system employed.

8.7.1 Each scratch coat shall be applied with sufficient pressure to form a good bond and shall be scratched to form a rough surface.

8.7.2 Each brown coat shall be applied after the scratch coat has set firm and hard and is partially dry. Brown coat shall be straightened to a true surface without application of water, and be cross raked or scratched, ready to receive the finish coat, allowing 1/16 to 1/8 inch on each side for finish coat to bring over-all partition thickness to not less than 2 inches.

8.8 Gypsum Lath Ceilings Attached by Clips. Clips providing edge support only shall be plastered with a separate scratch, brown, and finish coat.

8.8.1 The scratch coat shall be from 3/16-inch to 1/4-inch thick over the face of the plaster base, shall stiffen and provide mechanical bond to the base and provide suction for the brown coat.

8.8.2 The total thickness of scratch and brown coats shall be not less than 7/16 inch.

9. Preparation of Lime Putty

9.1 Hydrated Lime. Hydrated lime shall be prepared in accordance with the printed directions of the manufacturer. The putty may be used immediately after preparation or following a soaking period as recommended by the manufacturer.

9.2 Pulverized Quicklime. Pulverized quicklime shall be slaked by sifting it into the amount of water called for in the printed directions of the manufacturer and then allowing it to cool before using.

9.3 Lump Quicklime. Lump quicklime shall be thoroughly slaked, run through a No. 8 (2,380 micron) sieve and allowed to stand at least two weeks before using.

NOTE: See American Standard Z23.1-1961 (ASTM E 11-61).

10. Finish Coat Proportions

10.1 Lime Putty, Gypsum Trowel Finish. This finish shall be mixed in the proportions of 1 part, by volume of gauging plaster (calcined gypsum) to not more than 4 1/2 parts, by volume of lime putty. This mix is approximately equivalent to:

One (100-pound) bag of gypsum gauging plaster
To: not more than 6 (50-pound) bags of hydrated lime
or
To: not more than 6.75 cubic feet of lime putty or
To: not more than 52.5 gallons of lime putty

Where the basecoat aggregate is perlite or vermiculite the lime putty, gypsum trowel finish specified in 10.1 shall, in addition, contain fine pulverized aggregate such as fine silica sand or other additives meeting the sieve analysis of 2.5.4 in the following proportions:

Not Less Than	Not More Than	
1/2 cubic foot	1 cubic foot	per 100 pound bag of gypsum gauging plaster used in the finish
or 1/8 cubic foot	1/4 cubic foot	per 50 pound bag of hydrated lime
or 1 gallon	2 gallons	per 50 pound bag of hydrated lime
or 1 gallon	2 gallons	per cubic foot of lime putty
or 1 pint	1 quart	per gallon of lime putty

10.2 Prepared Gypsum Trowel Finish. This finish shall be mixed with water to the proper consistency in accordance with the directions of the manufacturer.

10.3 Keene's Cement-Lime Putty Finish. This finish may be medium hard or hard finish.

10.3.1 ***Medium Hard Finish.*** This finish shall be mixed in the proportions of 100 pounds of Keene's cement to not more than 50 pounds of dry hydrated lime. The specified mix is equivalent to:

One (100 pound) bag of Keene's cement
To: not more than 1 (50 pound) bag of hydrated lime or
To: not more than 100 pounds of lime putty or
To: not more than 1 1/8 cubic feet of lime putty or
To: not more than 8 3/4 gallons of lime putty

10.3.2 ***Hard Finish.*** This finish shall be mixed in

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the proportions of 100 pounds of Keene's cement to not more than 25 pounds of dry hydrated lime. The specified mix is equivalent to:

One (100 pound) bag of Keene's cement

To: not more than ½ (50 pound) bag of hydrated lime or

To: not more than 50 pounds of lime putty or

To: not more than ⅝ cubic foot of lime putty or

To: not more than 4½ gallons of lime putty

NOTE: For any of the above proportions, up to ½ cubic foot of fine aggregate complying with 2.5.4 may be added to the mix for each 100 pounds of Keene's cement.

10.3.3 ***Mixing Keene's Cement-Lime Putty Finish.*** When mixing mechanically, the water shall be put into the mixer first, then the lime, the aggregate (if used) and finally the Keene's cement.

10.4 Prepared Gypsum Sand Float Finish. This finish shall be mixed with water to the proper consistency in accordance with the directions of the manufacturer.

10.5 Gypsum Sand Float Finish. This finish shall be mixed in the proportions of 1 part of gypsum neat unfibered plaster to 2 parts of sand, by weight.

10.6 Keene's Cement-Lime Putty Sand Float Finish. This finish shall be mixed in the proportions of 2 parts of lime putty, 1½ parts of Keene's cement, and 4½ parts of sand, by volume.

10.7 Colored Finishes for Float and Texture Work. This finish shall be mixed with water to the proper consistency in accordance with the directions of the manufacturer.

10.8 Vermiculite Finish Coat. This finish (for use over vermiculite base coat only) shall be mixed in the proportions of 100 pounds of gypsum gauging plaster or 100 pounds of unfibered gypsum plaster to one cubic foot of vermiculite finish aggregate. Gypsum plaster shall be placed in water and mixed. Vermiculite finish aggregate shall then be added and the materials thoroughly mixed (3 to 5 minutes).

More water shall be added, as necessary, to obtain workable consistency. (For best results the mixed plaster should have a setting time of 1 to 3 hours).

11. Application of Finishes

The finish coat shall be applied to a partially dry base coat or to a thoroughly dry base coat which has been evenly wetted by brushing or spraying. The use of excessive water shall be avoided in the application of all types of finish coat plastering.

11.1 Trowel Finishes

11.1.1 Lime putty, gypsum trowel finish shall be applied over the base coat, scratched in thoroughly, laid on well, doubled back and filled out to a true, even surface. The general thickness shall be 1/16 to ⅛ inch. The finish shall be allowed to draw a few minutes and then it shall be well-troweled with water to a smooth finish, free from cat faces and other blemishes or irregularities.

11.1.2 Vermiculite trowel finish shall be applied over the base coat, scratched in thoroughly, laid on well, doubled back and filled out to a true, even surface. The general thickness shall be 1/16 to ⅛ inch. The finish shall be allowed to draw a few minutes and then it shall be well-troweled with water to a smooth finish, free from cat faces and other blemishes or irregularities.

11.1.3 Prepared gypsum trowel finish shall be applied in accordance with the directions of the manufacturer. The general thickness shall be 1/16 to ⅛ inch. It shall be well-troweled with water to a smooth finish, free from cat faces and other blemishes or irregularities.

11.1.4 Keene's cement-lime putty finish shall be applied over the base coat, scratched in thoroughly, laid on well, and doubled back and filled out to a true, even surface. The general thickness shall be from 1/16 to ⅛ inch unless the finish coat is to be marked off or jointed, in which case the thickness may be increased as required by the depth of the marking or joint. The finish coat shall be allowed to draw a few minutes and then it shall be well-troweled with water to a smooth finish, free from cat faces and other blemishes or irregularities. Troweling shall be continued until the finish sets.

11.2 Float Finishes. The following float finishes shall be applied over the base coat, scratched in thoroughly, laid on with a trowel to an even surface, and then floated (with wood, carpet, cork, rubber or other type floats, depending on the texture desired) to a true, even surface free from slick spots or other blemishes:

Prepared gypsum—sand float finish

Gypsum—sand float finish

Keene's cement-lime putty—sand float finish

11.3 Colored Finishes or Float Texture Work. These shall be applied in accordance with the printed directions of the manufacturer.

11.4 Acoustical and Other Special Plasters. These shall be applied in accordance with the directions of the manufacturer.

12. Revision of American Standards Referred to in This Document

When the following American Standards referred to in this document are superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Methods of Fire Tests of Building Construction and Materials, A2.1-1956

American Standard Building Code Requirements for Masonry, A41.1-1953 (National Bureau of Standards Miscellaneous Publication 211, issued July 15, 1954)

American Standard Specifications for Interior Lathing and Furring, A42.4-1955

American Standard Specifications for Gypsum Plasters, A49.3-1961

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American Standard Specifications for Gypsum Molding Plaster, A49.4-1951

American Standard Specifications for Keene's Cement, A66.1-1951

American Standard Specifications for Quicklime for Structural Purposes, K67.1-1960

American Standard Specifications for Normal Finishing Hydrated Lime, K67.2-1960

American Standard Methods of Chemical Analysis of Limestone, Quicklime, and Hydrated Lime, K67.3-1960

American Standard Specifications for Special Finishing Hydrated Lime, K67.12-1960

American Standard Specifications for Inorganic Aggregates for Use in Gypsum Plaster, A107.1-1963

American Standard Specifications for Sieves for Testing Purposes, Z23.1-1961

APPENDIXES

(These Appendixes are not a part of American Standard Specifications for Gypsum Plastering, A42.1-1964, but are included to facilitate its use and provide general information and suggestions for inclusion to be made elsewhere by the user.)

Appendix A
General Information

A1. The work shall include all labor, materials, services, equipment, and scaffolding required for the completion of the plastering on the project in accordance with the plans and specifications.

A2. Scaffolding shall be constructed and maintained in strict conformity with applicable laws and ordinances, and so as not to interfere with and obstruct the work of others.

A3. The work shall be properly coordinated with the work of other trades.

A4. The following work shall be included:

.....

.....

.....

The following work shall not be included:

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.....

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A5. Wood Grounds shall be furnished and installed by:

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.....

.....

A6. Where required, natural or artificial heat or natural or mechanical ventilation, or both heat and ventilation shall be furnished by.....

.....,

in accordance with the following:

.....

.....

.....

A7. Surfaces shall be carefully examined before the plaster is applied thereto, and the proper authorities notified of all unsatisfactory conditions.

A8. Surfaces of unit masonry or concrete that are to receive plaster shall not prior to plastering be coated with any bituminous compound or other detrimental waterproofing or dampproofing agent.

Appendix B
Technical Information

B1. Method for Determining "Soundness" (Popping and Pitting) of a Lime Putty Made from Either a Hydrated Lime or Quicklime

B1.1 Hydrated Lime

(1) To a 100-gram sample of hydrated lime, sufficient water shall be added to make a fairly stiff putty. This putty shall be aged in a covered vessel at room temperature for not less than 16 nor more than 24 hours.

(2) Two volumes of the aged putty prepared from the hydrated lime in accordance with paragraph (1) shall be thoroughly mixed with 1 volume of unretarded calcined gypsum and sufficient water to form a paste. The calcined gypsum shall be previously tested to assure soundness (absence of popping or pitting) by steaming a duplicate specimen of the set neat gypsum for 2 hours in an autoclave at a pressure of 120 pounds per square inch as described in paragraph (3). A layer of this aged paste of from 1/16 to ⅛ inch in uniform thickness shall be spread on a 4 by 4-inch glass plate and the specimen set aside for 2 hours, thus allowing the calcined gypsum to set.

(3) The specimen shall be placed on a rack in an autoclave to which water has been added equal to 1 or 2 percent of the volume of the autoclave. The rack shall be provided with a cover that will prevent water from dripping on the specimen. The steam pressure shall be

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raised to 120 pounds per square inch and maintained for 2 hours, after which it shall be released through a valve at such a rate that atmospheric pressure is reached in about 5 minutes. The autoclave shall then be opened and the specimen examined for pops or pits.

B1.2 Quicklime

(1) Because of the variable slaking characteristics of different quicklimes, it is necessary to determine by preliminary experiment the amount of water required to hydrate the quicklime at or near the boiling point of water and produce a fairly stiff putty. It is essential that sufficient water be used to prevent "burning" of the lime and the possible production of a dry hydrate, as these unfavorable slaking conditions may, in themselves, cause an otherwise potentially sound quicklime to test unsound.

(2) A 200-gram sample of quicklime shall be slaked with the entire amount of water and in the manner previously determined to produce the desired stiffness of putty. The sample shall be stirred to insure even distribution of the water, thus avoiding local heating. The putty shall be aged in a covered vessel at room temperature for not less than 16 nor more than 24 hours.

(3) Two volumes of this aged putty prepared from the quicklime in accordance with paragraph (2) shall be thoroughly mixed with 1 volume of unretarded calcined gypsum and sufficient water to form a paste, and tested in accordance with (2) and (3) of B1.1. The specimen shall then be examined for pops or pits.

B2. Bonding Agents

Bonding agents such as those of the vinyl polymerization type have been satisfactorily used to bond plaster to portland cement concrete and other sound surfaces. Such bonding agents may be used at the discretion of the specifier who may require performance records from the manufacturer. The bonding agent shall be applied in accordance with the manufacturer's directions.

B3. Provisions for Ventilation

Provisions required for ventilating portions of roofs with lath and plaster ceilings on underside are as follows: Where lath and plaster ceilings are located under roof construction, the space thus enclosed shall be ventilated. Such ventilation, with or without vapor barrier and insulation, shall be provided in accordance with accepted engineering practice.

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American Standards

The standard in this booklet is one of over 2000 standards approved to date by the American Standards Association, Incorporated.

The ASA provides the machinery for creating voluntary standards. It serves to eliminate duplication of standards activities and to weld conflicting standards into single, nationally accepted standards under the designation "American Standard."

Each standard represents general agreement among maker, seller, and user groups as to the best current practice with regard to some specific problem. Thus the completed standards cut across the whole fabric of production, distribution, and consumption of goods and services. Manufacturers, consumers, technical organizations, and governmental agencies — all substantially interested and affected groups — are represented on the committees which develop and regularly revise American Standards. The completed standards are used widely by industry and commerce and often by municipal, state, and federal governments.

The ASA, under whose auspices this work is being done, is the American clearinghouse for standards activity on the national level. Founded in 1918, it is a federation of more than 100 trade associations, technical societies, professional groups, and consumer organizations. Some 2200 companies are affiliated with the ASA as company members.

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For a free list of all American Standards or information about membership in the ASA write:

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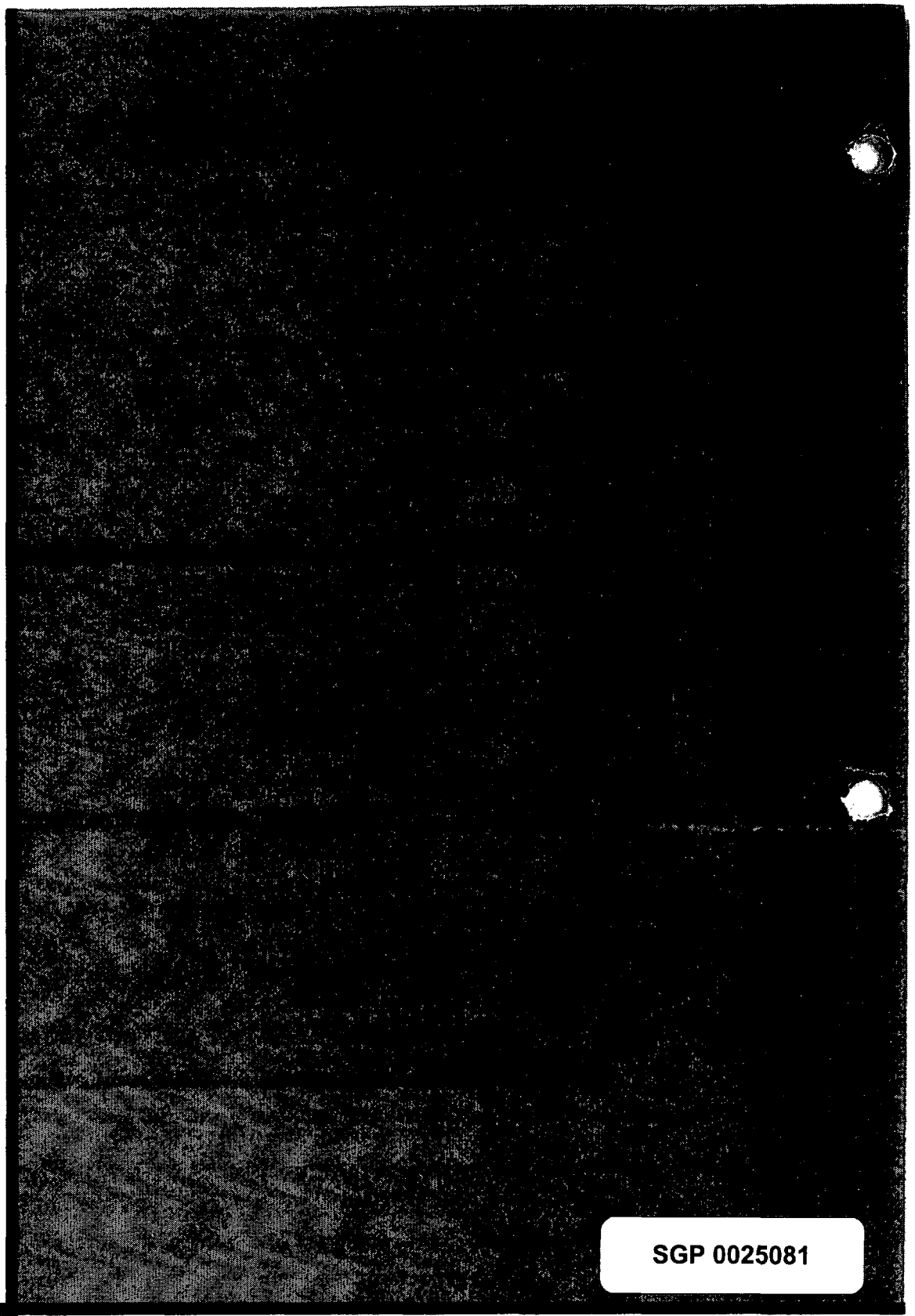

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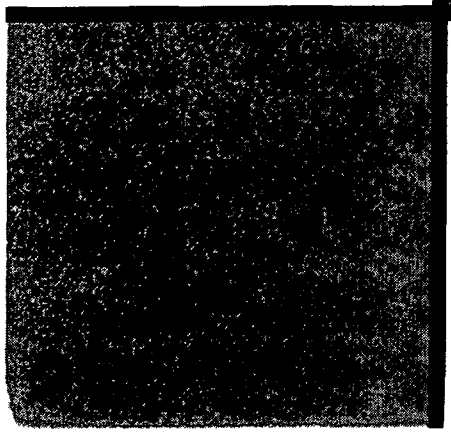

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RECOMMENDED SPECIFICATIONS

Gypsum Plastering



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SGP 0025052

FOREWORD

This specification incorporates portions of American Standards Association's Standard Specifications for Gypsum Plastering A42.1-1955 and has been published with the permission of the sponsors, The American Institute of Architects and American Society for Testing and Materials. This specification varies in format and organization from that in A42.1 to conform to the current recommendations of the Gypsum Association. Important areas of change revolve around proportioning of plaster to aggregate and the use of fines in trowel finishes.

A. SCOPE

1. Extent of Work: All plastering shall be done in accordance with the procedure as herein specified. This specification includes all labor, materials, services, equipment and scaffolding necessary to complete the project in accordance with the drawings and specifications.
2. Work not Included: The following items are not intended to be a part of these recommendations:
   (a) Spray-on fireproofing
   (b) Spray applied decorative finishes
   (c) Wood furring and wood grounds
3. General Requirements
   (a) A uniform temperature of not less than 55° F. shall be maintained in the building for a period of seven days prior to the application of the plaster, during the plastering operation and after plastering, as required, until the plaster is dry. When temporary heat is required, proper measures shall be taken to insure that the heat is evenly distributed into all plaster areas. Deflection or protective screens shall be used to prevent concentrated or uneven distribution of heat on plaster areas near the heat source. Where required, heat shall be furnished by (insert name of the party who is to furnish the temporary heat here).
   (b) Ventilation shall be provided for drying the plaster during and after the application. Windows shall be kept open (cracked about 2 in.) at top and bottom to provide air circulation. Where natural ventilation is absent, temporary air distribution systems or air conditioning units shall be used.
   (c) Where lath and plaster ceilings are located under roof constructions, the space thus enclosed either with or without a vapor barrier and/or insulation, shall be permanently ventilated in accordance with accepted engineering practice. The space above the ceiling shall be vented so that the ratio of the total net free ventilating area to the area of the ceiling shall be not less than 1/150. Location of the vents shall provide positive ventilation.
   (d) Areas, such as doors, windows, etc., shall be properly closed in to prevent drafts.
   (e) Scaffolding shall be constructed and maintained in strict conformity with applicable laws and ordinances and in such a manner as not to interfere with or obstruct the work of others.
   (f) The work shall be properly coordinated with the work of other trades.
   (g) All products shall be delivered in their original packages, containers or bundles bearing the name of the manufacturer and the brand.
   (h) The plaster and all other cementitious materials shall be kept dry until ready for use and shall be kept off the ground, under cover and away from damp walls or surfaces.
   (i) Metal products shall be protected against rusting.

B. MATERIALS

All materials shall conform to the latest edition of the following specifications:

1. Basecoat Plasters
   (a) Gypsum Neat Plaster, ASTM C28
   (b) Gypsum Ready-Mixed Plaster, ASTM C28
   (c) Gypsum Wood-Fibered Plaster, ASTM C28
   (d) Gypsum Bond Plaster, ASTM C28
2. Gypsum Gauging Plaster, ASTM C28
3. Gypsum Molding Plaster, ASTM C59
4. Keene's Cement, ASTM C61
5. Lime for Finish Plasters
   (a) Normal Finishing Hydrated Lime (Type N), ASTM C6 (for plaster finishes where plaster is not in contact with poured concrete or concrete unit masonry)
   (b) Special Finishing Hydrated Lime (Type S), ASTM C206
   (c) Quicklime for Structural Purposes, ASTM C5
6. Basecoat Plaster Aggregates
   (a) Sand, ASTM C35
   (b) Perlite, ASTM C35
   (c) Vermiculite, ASTM C35

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7. Aggregates for Finish Coats

Aggregates for use in gypsum lime putty trowel finish, such as silica sand, perlite, etc., shall be graded within the following limits:

SIEVE SIZE	PERCENTAGE RETAINED ON SIEVE			
	Perlite by Volume		Sand by Weight	
	Maximum	Minimum	Maximum	Minimum
No. 20 (841 micron)	0	—	0	—
No. 30 (595 micron)	10	0	10	0
No. 100 (149 micron)	100	40	100	40
No. 200 (74 micron)	100	70	100	70

8. Water

Water shall be clean, fresh, suitable for domestic consumption and free from such mineral or organic substances that would affect the set of the plaster. Water used to clean tools, that contains salt or alum, or other soluble salts, or from stagnant pools or wells shall not be used.

C. BASECOAT PROPORTIONS

1. Proportions of sand, perlite or vermiculite to 100 lb. of gypsum neat plaster shall not exceed the following:

PLASTER BASE	SAND		PERLITE OR VERMICULITE (Cu. ft.)
	By Volume (Cu. ft.)	By Weight (Lb.)	
	Damp & Loose	Damp & Loose	
OVER GYPSUM LATH			
Two Coat Work			
Basecoat	2½	250	2
Three Coat Work			
Scratch Coat	2	200	2
Brown Coat	3	300	2*
or			
Scratch and Brown Coats	2½	250	—
OVER METAL LATH			
Three Coat Work			
Scratch Coat	2	200	2
Brown Coat	3	300	2*
or			
Scratch and Brown Coats	2½	250	—
OVER UNIT MASONRY			
Two Coat Work			
Basecoat	3	300	3
Three Coat Work			
Scratch Coat	3	300	3
Brown Coat	3	300	3

*Where the plaster is 1 in. or more in total thickness, the proportions for the brown coat may be increased to 3 cu. ft.

Note 1.

The proportions in the preceding table are applicable for both hand and machine application of plaster. See manufacturer's instructions for application of machine applied plaster.

Note 2.

Use of an accurate device such as a measuring box or container to measure quantities is highly recommended. Where such a device is not available, six No. 2 shovels of damp, loose sand may be considered as the approximate equivalent of 1 cu. ft. or 100 lb.

2. Gypsum Wood-Fibered Plaster

(a) Gypsum wood-fibered plaster shall normally be used without the addition of aggregate.

(b) Over masonry bases or over lath as a brown coat, sand, perlite or vermiculite aggregates may be used; the proportions shall not exceed 1 cu. ft. of aggregate per 100 lb. of gypsum wood-fibered plaster.

3. Gypsum Ready-Mixed Plaster: The term "ready-mixed" means that aggregate has been incorporated with the gypsum plaster by the manufacturer. It requires the addition of water only for use.

D. PLASTER THICKNESS

1. Plaster shall be of the following thickness when measured from the face of the plaster base to the face of the finished plaster surface (allowing approximately $\frac{1}{16}$ in. to $\frac{1}{8}$ in. for finish coat).

(a) Metal Lath . . . $\frac{5}{8}$ in. minimum (when measured from the back of the lath, excluding rib-lath, thickness shall be $\frac{3}{4}$ in. minimum).

(b) Gypsum Lath . . . ½ in. minimum.

(c) Unit Masonry . . . $\frac{5}{8}$ in. minimum (except gypsum tile, ½ in. minimum).

(d) Monolithic Concrete

(1) Walls . . . $\frac{5}{8}$ in. maximum.

(2) Ceilings . . . $\frac{3}{8}$ in. maximum.

(3) Where greater thicknesses are required, metal lath shall be firmly attached to the concrete prior to the application of the plaster.

2. Plaster Grounds

(a) Metal grounds, screeds, etc., shall be furnished

and installed by the (lath) (plaster) contractor.

(b) Plaster screeds shall be applied by the plastering contractor.

(c) Wood grounds shall be furnished and installed by others.

E. PREPARATION FOR PLASTERING

1. Surfaces that are to receive plaster shall be carefully inspected before the plaster is applied thereto. Surfaces that are not satisfactory for plastering shall be called to the attention of the general contractor and architect. By proceeding with the plastering operation, the contractor accepts the responsibility that the surfaces were satisfactory to receive the plastering.

2. All metal grounds, corner beads, screeds, picture molds, etc., shall be carefully examined to see that they are straight, plumb, level, square and true to the required angles before the plaster is applied.

3. Plaster shall not be applied to masonry or concrete surfaces that have been coated with a bituminous compound or other waterproofing agents.

4. Masonry surfaces exhibiting high suction shall be evenly dampened to provide proper suction prior to plastering. Allow sufficient time for surface suction to equalize.

5. Monolithic Concrete

(a) Monolithic concrete surfaces to receive bond plaster shall be cleaned of all dust, loose particles and other foreign matter. Laitance and efflorescence shall be removed by washing with a ten per cent solution of commercial hydrochloric acid (muriatic acid) and water and then rinsed with clean water to remove all traces of acid. Grease and oil shall be completely removed.

(b) Concrete surfaces shall have sufficient roughness to provide a proper bond. If surfaces are not rough, they shall be hacked or brush-hammered or a dash coat of portland cement grout composed of one part cement to 1½ parts of fine sand mixed to a mushy consistency shall be applied. The portland cement grout shall be forcibly applied to the concrete surface, using a stiff fiber brush, with a whipping motion. This coat shall be kept damp for at least two days immediately following its application and then allowed to dry. Before application of plaster, the surface shall be evenly dampened, if necessary, to provide proper suction.

(c) The use of dressed (smooth) lumber, metal and plywood forms, oiled or greased forms, or vibrated concrete, produces concrete surfaces which are too smooth to receive plaster.

6. Grouting Metal Framing and Bases

(a) Hollow metal bases, metal door frames and metal framed openings, when used for solid partitions, shall be fully grouted prior to lathing. The grout shall be screeded approximately ¼ in. below the top edges of the base so as to form a center groove to permit the lath to extend below the top edge of the base.

(b) Metal door bucks and framed openings in hollow steel stud partitions shall be fully grouted prior to lathing. Where basecoat plaster is flush with metal base, metal frames, etc., plaster shall be cut free from these metal sections before the plaster sets. The finish coat shall be grooved at this junction to prevent chipping.

F. BASECOAT PLASTER MIXING

1. If mixing is done in the building, waterproof protection shall be provided under the mixer, mixing boxes and water barrels. Mixer, mixing box and tools shall be cleaned after mixing each batch. When the mixer is used intermittently, a sufficient amount of water shall be added to clean the mixer after dumping each batch. This water shall be run in the mixer for a few minutes and then dumped. The mixer then will be clean, ready for the next batch. Partially set material shall not be retempered or used. Frozen, caked or lumpy material shall not be used.

2. Hand Mixing

(a) Gypsum Neat Plaster—(Aggregate required) Aggregate and plaster shall be mixed dry to a uniform color at one end of the mixing box, hoed into the water and thoroughly mixed to the proper consistency.

(b) Gypsum Ready-Mixed Plaster — (Aggregate shall not be added) Plaster shall be hoed into the water and thoroughly mixed to the proper consistency.

(c) Gypsum Wood-Fibered Plaster — (Without aggregate) Plaster shall be hoed into the water and thoroughly mixed to the proper consistency.

(d) Gypsum Wood-Fibered Plaster—(With aggregate) Plaster and aggregate shall be mixed dry to a uniform color at one end of the box, hoed into the water and thoroughly mixed to the proper consistency (see section C-2).

3. Mechanical Mixing

With the mixer in operation, the following procedures shall be followed:

(a) Gypsum Neat Plaster

(1) Put in the approximate amount of water.

(2) If sand is used, add approximately half of the amount of sand. If perlite or vermiculite is used, add all of the aggregate.

(3) Add all of the plaster.

(4) Add remainder of the sand aggregate.

(5) Mix to proper consistency, adding water if necessary.

(6) Dump the entire batch and use.

(7) Clean the mixer.

(b) Gypsum Ready-Mixed Plaster

(1) Put in the approximate amount of water.

(2) Add the plaster.

(3) Mix to proper consistency, adding water if necessary.

(4) Dump the entire batch and use.

(5) Clean the mixer.

(c) Gypsum Wood-Fibered Plaster—May be used with or without the addition of aggregate. (See section C-2b.)

(1) When aggregate is added, the procedure outlined in section F-3a shall be followed.

(2) When used without aggregate, the procedure in section F-3b shall be followed.

G. BASECOAT PLASTER APPLICATION

1. Three coat plaster application shall be used on the following constructions:

(a) Metal lath, wire lath or paper-backed wire fabric.

(b) ½-in. gypsum lath attached to horizontal supports spaced more than 16 in. o.c.

(c) Gypsum lath on ceilings attached by clips providing edge support only.

(d) ⅜-in. perforated gypsum lath on ceilings.

2. Three Coat Work

(a) Scratch (first) coat shall be applied with sufficient pressure to form good full keys on metal lath, wire lath, or wire fabric and a good bond on gypsum lath or masonry. Sufficient materials shall be used to cover the face of the lath and to allow for scratching or cross raking.

(b) Brown (second) coat shall be applied after the scratch coat has set firm and hard, and shall be brought out to the grounds, straightened to a true surface without the application of water, and cross raked or scratched to receive the finish (third) coat. To insure full plaster thickness, plaster screeds should be applied to the scratch coat prior to the application of the brown coat.

(c) The plaster shall be accelerated, if necessary, to provide a setting time of not more than four hours.

3. Two Coat Work

(a) The base (first) coat shall be applied with sufficient pressure and material to form a good bond on the gypsum lath or masonry and to cover well. Then, before the plaster has set, and without raking its surface, material of the same proportion shall be doubled back to bring the plaster out to the grounds. Straighten to a true surface, without the application of water, and cross rake or scratch to receive the finish coat.

(b) The plaster shall be accelerated, if necessary, to provide a setting time of not more than four hours.

4. Monolithic Concrete

(a) Monolithic concrete walls and columns shall have a scratch coat of bond plaster, followed by a brown coat of gypsum plaster proportioned 100 lb. of gypsum neat plaster to not more than 3 cu. ft. of sand, perlite or vermiculite, troweled into the scratch coat before it has set. The brown coat shall be brought out to the grounds, straightened to a true surface without application of water and be cross raked or scratched to receive the finish coat.

(b) Monolithic concrete ceilings shall have a coat of bond plaster scratched in thoroughly, doubled back and filled out to a true, even surface, without the application of water and be cross raked or scratched to receive the finish coat.

5. Solid Plaster Partition (metal lath—channel studs)

(a) Solid plaster partitions with channel studs shall not be less than 2 in. thick and shall have a scratch, back-up, brown and finish coat.

(b) The scratch coat shall be applied to the lath side with sufficient material and pressure to form good full keys, to cover well, and then scratched to a rough surface. Where temporary bracing of the studs is required, bracing shall be attached to the channel side of the partition and maintained until the back-up coat of plaster has set.

(c) After the scratch coat has set firm and hard on the lath side of the partition, the back-up coat shall be applied to the channel side of the partition in not less than two coats. This coat shall adequately cover the keys of the scratch coat and the remaining coat or coats applied to bring the plaster out to full grounds.

Plaster thickness shall be not less than ½ in. over the unlathed face of the channel studs. It shall then be straightened to a true surface, without the application of water, and cross raked or scratched, to receive the finish coat.

(d) After the back-up coat on the channel side has set, a brown coat shall be applied on the lath side over the scratch coat, brought out to full grounds, straightened to a true surface without the application of water and be cross raked or scratched to receive the finish coat.

(e) Plaster shall extend to the floor except where metal bases are used, in which case the plaster shall extend below the top edge of the metal base to the grout. All spaces between grounds shall be filled. *Hollow metal door bucks shall be filled solid.* (Note: see section E-6.) Wherever possible, plastering shall be commenced at the bottom of partitions.

6. Solid Plaster Partitions (metal lath—studless)

(a) Studless solid partitions (metal lath and plaster) shall be not less than 2 in. in thickness, and the plaster shall be applied in the sequence below and in the same manner as specified for solid partitions with studs. (Note: see section G-5.)

(b) Where rib metal lath is used, temporary bracing shall be attached to the rib side and the scratch coat shall be applied on the flat side first. Where diamond mesh (flat expanded) metal lath is used, the temporary bracing may be attached to either side, and the scratch coat shall be applied to the opposite side.

(c) The sequence of application of brown and back-up coats shall be in accordance with one of the following alternate methods:

(1) The back-up coat shall be applied on the braced side of the metal lath and shall be followed by the brown coat applied over the face of the scratch coat.

(2) The brown coat (second) shall be applied over the face of the scratch coat, then the back-up coat shall be applied on the braced side of the partition.

(d) Plaster shall extend to the floor except where metal bases are used, in which case the plaster shall extend below the top edge of the metal base to the grout. All spaces between grounds shall be filled. *Hollow metal bucks shall be filled solid.* (Note: see section E-6.) Wherever possible, plastering shall be commenced at the bottom of partitions.

7. Solid Plaster Partitions (gypsum lath—studless)

(a) Studless solid partitions (gypsum lath and plaster) shall not be less than 2 in. in thickness and shall have a separate scratch, brown and finish coat on each side.

(b) The scratch coat shall average ⅜ in. in thickness with a minimum thickness of $\frac{3}{16}$ in. at any point and shall be applied first to the side opposite the temporary bracing with sufficient pressure to form a good bond. A ⅜ in. scratch coat shall be immediately applied to the opposite side. These coats shall be scratched or cross raked to form a rough surface.

(c) The brown coat shall be applied to the side opposite the bracing, after the scratch coat has set firm and hard and is partially dry. When this brown coat has set firm and hard and is partially dry, the temporary bracing shall be removed and the brown coat applied to the braced side. The brown coats shall be straightened to a true surface without application of water and cross raked or scratched to receive the finish coat, allowing $\frac{1}{16}$ to ⅛ in. on each side for the finish coat to bring the over-all partition thickness to not less than 2 in.

(d) Plaster shall extend to the floor except where metal bases are used, in which case the plaster shall extend below the top edge of the base to the grout. All spaces between grounds shall be filled. *Hollow metal bucks shall be filled solid.* (Note: see section E-6.) Wherever possible, plastering shall be commenced at the bottom of partitions.

8. Solid Plaster Partitions (multiple thickness gypsum lath)

(a) Studless solid partitions (gypsum lath and plaster, multiple thickness lath) shall be not less than 2 in. in thickness and the combined thickness of the base coats and finish coats on each side shall be not less than ½ in. The thickness of the separate coats and the sequence of plastering on each side shall be in accordance with the proprietary specifications for the system employed.

(b) The scratch coat shall be applied with sufficient pressure to form a good bond and shall be scratched or cross raked to form a rough surface.

(c) The brown coat shall be applied after the scratch coat has set firm and hard and is partially dry. The brown coat shall be straightened to a true surface without application of water, and cross raked or scratched to receive the finish coat, allowing $\frac{1}{16}$ to ⅛ in. on each side for the finish coat to bring the over-all partition thickness to not less than 2 in.

(d) The plaster shall extend to the floor except where metal bases are used, in which case the plaster shall extend below the top edge of the base to the grout. All spaces between grounds shall be filled. *Hollow metal bucks shall be filled solid.* (Note: see section E-6.) Wherever possible, plastering shall be commenced at the bottom of partitions.

H. FINISH COAT PROPORTIONS

1. Gypsum-Lime Putty Trowel Finish

   (a) Gypsum-lime putty trowel finish shall be mixed in proportions of one part gauging plaster (calcined gypsum) to not more than three parts of lime putty by volume.

   Note: This proportion is equivalent to 1 - 100 lb. bag of gypsum gauging plaster to not more than:
   4-50 lb. bags of hydrated lime, or
   4.5 cu. ft. of lime putty, or
   34 gal. of lime putty.

   (b) Where the basecoat plaster aggregate is perlite or vermiculite, a gypsum-lime putty trowel finish shall, in addition, contain fine aggregate such as silica sand, perlite or vermiculite in the proportions of not less than ½ cu. ft. nor more than 1 cu. ft. per 100 lb. bag of gypsum gauging plaster used in the finish. This finish, containing aggregate, may also be applied to sanded gypsum basecoat if desired.

2. Prepared Gypsum or Lime Based Trowel Finish

   Note: Additional materials, such as sand, shall be added only in accordance with the manufacturer's instructions.

3. Keene's Cement-Lime Putty Finish

   Keene's cement-lime putty finish may be proportioned to obtain a standard hard, medium hard or extra hard finish as follows:

   (a) A standard hard finish shall be mixed in the proportions of 100 lb. of Keene's cement to 100 lb. of dry hydrated lime.

   Note: This proportion is equivalent to 1 (100 lb.) bag of Keene's cement to:
   200 lb. of lime putty, or
   17½ gal. of lime putty.

   (b) A medium hard finish shall be mixed in the proportions of 100 lb. of Keene's cement to 50 lb. of dry hydrated lime.

   Note: This proportion is equivalent to 1 (100 lb.) bag of Keene's cement to:
   100 lb. of lime putty, or
   8-3/4 gal. of lime putty.

   (c) Extra hard finish shall be mixed in the proportions of 100 lb. Keene's cement to 25 lb. dry hydrated lime.

   Note: This proportion is equivalent to 1 (100 lb.) bag of Keene's cement to:
   50 lb. of lime putty, or
   4½ gal. of lime putty.

   (d) Where the basecoat plaster aggregate is perlite or vermiculite, a gypsum-lime putty trowel finish shall, in addition, contain fine aggregate such as silica sand, perlite or vermiculite in the proportions of not less than ½ cu. ft. nor more than 1 cu. ft. per 100 lb. bag of gypsum gauging plaster used in the finish. This finish, containing aggregate, may also be applied to sanded gypsum basecoat if desired.

4. Gypsum Sand Float Finish

   This finish shall be mixed in the proportions of 1 part of gypsum neat unfibered plaster to not more than 2 parts of sand, by weight.

5. Keene's Cement-Lime Sand Float Finish

   Sand Float Finish-mix 100 lb. of Regular Keene's Cement, 400 lb. of sand (4 to 5 cu. ft.) and 100 lb. of Hydrated Finish Lime (200 lb. or 17½ gal. of lime putty).

6. Vermiculite Finish Coat (for use over vermiculite basecoat only).

   This finish shall be mixed in the proportions of 100 lb. of unfibered gypsum plaster to one (1) cu. ft. of vermiculite finish aggregate.

I. FINISH COAT MIXING

1. Gypsum Lime Putty Trowel Finish

   Lime to be mixed or soaked in accordance with the manufacturer's directions.

   Mixing on a Mortar Board

   (a) The proper proportion of lime putty, as specified in H-1-a, shall be placed on a mixing board and formed into a ring.

   (b) Proper amounts of water, gauging plaster, and aggregate if used are added to the center of the ring. The gauging plaster shall be soaked until wet.

   (c) Materials are then inter-mixed until all ingredients are well dispersed throughout the lime putty.

   Mechanical Mixing

   (a) When mechanically mixing gypsum-lime putty finish, the water shall be put in first, then the dry lime (autoclaved) or the lime putty — whichever is used, the aggregate, and then the gauging plaster, and mixed until uniformly blended.

   (b) Dump the entire batch and use. Clean the mixer preparatory to mixing the next batch.

   (c) The mechanical mixer may be a conventional plaster mixer, which has been cleaned carefully so as to remove all adhering material, or a high-speed mechanical mixer designed for this use. A heavy duty ½ in. electrical drill, with a paddle type agitator, in combination with a clean metal drum of suitable size may be used.

2. Prepared Gypsum or Lime Based Trowel Finish

Mixing must be done with the high-speed mixer, or a paddle type, such as described in I-1-c – Mechanical Mixing.

(a) Put all but 1 to 2 quarts of the required mixing water in the mixer.

Note: Starting with an insufficient amount of mixing water will seriously degrade mixing and application performance.

(b) Add the prepared trowel finish and allow to soak for about 1 minute, then mix until thoroughly wetted. If preferred, the plaster may be added with the agitator of the mixer running.

(c) Add additional water, when required, to bring to the desired consistency and mix to a uniform lump-free consistency.

(d) Dump the entire batch and use. Clean the mixer preparatory to mixing the next batch.

J. APPLICATION OF FINISH COATS

1. General

(a) The finish coat shall be applied to a partially dry basecoat or to a thoroughly dry basecoat which has been evenly wetted, brushed or sprayed. The use of excessive water shall be avoided in the application of all types of finish coats.

(b) Where the plaster finish is flush with metal base, door bucks, or metal window frames, etc., the plaster finish shall have a V-groove finish at such intersections.

2. Application

(a) Gypsum-Lime Putty Trowel Finish

(1) Gypsum-lime putty trowel finish shall be scratched in thoroughly, double-backed and filled out to a true, even surface. The thickness shall be 1/16 to 1/8 in. The finish shall be permitted to draw up a few minutes and then it shall be well troweled, with water, to a smooth finish, free from blemishes or irregularities. Continue troweling until finish coat sets.

(b) Prepared Gypsum Trowel Finish

(1) Prepared gypsum trowel finish shall be applied in accordance with the directions of the manufacturer. The thickness shall be 1/16 to 1/8 in. The finish shall be well troweled, with water, to a smooth finish, free from blemishes or irregularities.

(c) Keene's Cement-Lime Putty Trowel Finish

(1) Keene's cement-lime putty trowel finish shall be scratched in thoroughly, double-backed and filled out to a true, even surface. The thickness shall be from 1/16 to 1/8 in. unless the finish coat is to be marked off or jointed, in which case the thickness may be increased as required by the depth of the marking or joint. The finish coat shall be allowed to take up and then well troweled, with water, to a smooth finish, free from blemishes or irregularities. Maintain in a damp condition until set.

(d) Float Finishes

(1) Sand float finishes shall be scratched in thoroughly with a trowel to an even surface and then floated (wood, carpet, cork, rubber, or other type floats, depending upon the texture desired) to a true, even surface, free from slick spots or other blemishes.

(e) Acoustical Plaster and Colored Finishes

(1) These plaster finishes shall be applied in accordance with the printed directions of the manufacturer.

APPENDIX

GYPSUM PLASTERING TO RECEIVE CERAMIC, METAL AND PLASTIC TILE OR PLASTIC FINISHED WALL PANELS (Adhesive Application)

All work shall be performed in accordance with the requirements of the Gypsum Association's "Recommended Specifications — Gypsum Plastering" and American Standards Association A42.4, "Standard Specifications for Interior Lathing and Furring," except as modified below:

1. Lath and plaster shall be kept a minimum of ¼ in. above the top of the tub or shower receptor. A casing bead or similar plaster stop is recommended.
2. Where the brown coat of plaster is to receive tile, it shall be brought out to the grounds, straightened to a true surface and troweled to a smooth, dense surface. Plaster shall be kept out of the space between the casing bead and the top of the tub or receptor.
3. If a finish coat of plaster is to be applied, materials and application of basecoat plaster and finish coat plaster shall be in conformance with the above mentioned "Recommended Specifications—Gypsum Plastering."
4. When mopped-in-place shower subpans are used, portland cement plaster shall be used for the curb and floor. The curb shall extend at least 1 in. above the base course of tile.
5. Waterproofing of the plaster shall be accomplished by one of the following two methods:

   (a) With the flat edge of a trowel, a full 1/16 in. skim coat of an approved grade of tile adhesive shall be evenly applied to the entire surface to receive the tile. Apply to the bottom edge of lath and plaster and fill the cut-out spaces around pipes, soap dishes, towel bars, etc. Allow to stand well beyond the normal "take-up" time, preferably 24 hours. The recommended adhesives for ceramic tile are those tested and found to comply with Commercial Standard 181-52. Particular attention is called to a list of such adhesives as published by the Tile Contractors' Association of America. All have been tested by an independent laboratory and found to comply with CS 181-52.

   After the skim coat has hardened, so that it cannot be grooved by the notches of the trowel, a bedding coat of the same adhesive is applied in the usual manner. The bedding coat shall extend down over the lip of the tub to form a water dam behind the bottom edge of the tile.

   (b) A waterproof sealer may be used in lieu of the skim coat of tile adhesive. Acceptable sealers shall be only those specifically made for the purpose, and compatible with the tile adhesive, such as certain rubber base sealants. A heavy brush application of sealer is necessary. All edges of cut-outs for pipes, soap dishes, towel bars, etc., must be sealed—and then caulked with waterproof, nonhardening caulking compound. After the sealer coat has thoroughly dried, the bedding adhesive is then troweled on to receive the tile. The bedding coat must be compatible with the sealer. The recommended adhesive for ceramic tile is one complying with CS 181-52.

GYPSUM PLASTER WITH RADIANT HEAT

Gypsum plaster can be satisfactorily used in conjunction with radiant heating installations, either hot water or electric systems. However, certain precautions must be taken to minimize the possibility of such things as cracking due to thermal shock, shadowing under pipes due to unequal rate of drying or calcination of the gypsum plaster due to overheating.

Gypsum lath and metal lath shall be installed in accordance with the requirements of American Standards Association A42.4 "Standard Specifications for Interior Lathing and Furring" and plastering shall be in conformance with the Gypsum Association's "Recommended Specifications—Gypsum Plastering" except as modified below:

1. In systems where the heating elements are embedded in or behind the gypsum plaster, the surface temperature of the plaster shall not exceed 115°F. This condition shall be met by requiring the temperature of the heating element, in contact with the plaster, not to exceed 125°F.
2. Electric heating elements may be securely attached to lath, but hot water coils must be supported by the framing members and not the lath.
3. All inspections and testing of the heating system shall be completed before the application of the gypsum plaster. Do not use the heating system for temporary heating of the building during plastering operations. Portable heaters or ventilating units should be provided.
4. The heating system shall not be used or put into operation until the plaster is thoroughly dry. At this time, the temperature rise in the heating elements shall not exceed 5°F. per 24-hour period until the maximum temperature of 125°F. has been reached.
5. Application of Plaster

   (a) Only sand aggregated plasters shall be used. Perlite and vermiculite have far greater resistance to heat flow and should not be used.

   (b) A minimum of ⅜ in. of gypsum plaster over the heating elements is required. The total plaster thickness shall not be less than ½ in. over gypsum lath and ⅝ in. over metal lath.

   (c) Where more than ½ in. total thickness of plaster is required over the face of gypsum lath, plastering shall be done by the three coat method.

   (d) Where the three coat method is used, the

scratch coat shall be thoroughly cross raked and shall dry at least one day before application of the brown coat.

(e) To avoid shadowing under the heating elements, the base coat shall be almost dry before the finish coat application. If the base coat is completely dry, it may be wetted down to reduce suction for the finish coat application.

(f) Decoration of the finish plaster, including sizing or sealing, shall not proceed until the heating system has been test operated for a minimum of 24 hours. The system should then be turned off before and during decorating.

APPLICATION OF GYPSUM PLASTER ON EXTERIOR LOCATIONS

Gypsum plaster may be used on ceilings of open porches, carports, or walkways, on soffits of eaves, or other exterior areas that are protected from direct exposure to water.

MATERIALS AND APPLICATION

Materials and application shall be in strict conformance with the applicable requirements of "Recommended Specifications – Gypsum Plastering," published by the Gypsum Association, and American Standards Association A42.4.

Adequate ventilation shall be provided for the space immediately above such installations. The ratio of the total net free ventilating areas to the area of the ceiling shall be not less than 1/150. Screening shall be not less than 8 mesh per in.

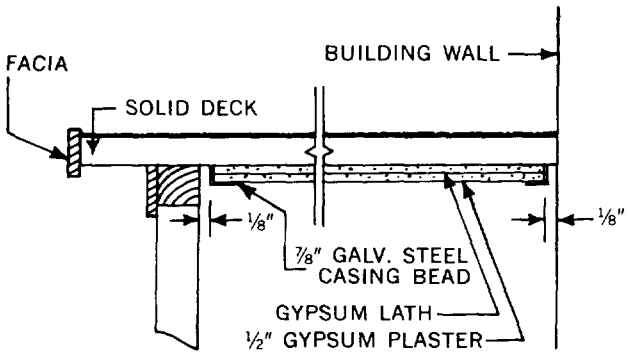
Expansion joints shall be provided at a minimum of 20 lineal ft. or 200 sq. ft. of area.

Where framing is spaced 24 in. o.c., use 1/2 in. gypsum lath and 1 in. No. 66 galvanized casing bead. Where framing is spaced 16 in. o.c., use 3/8 in. gypsum lath and 7/8 in. No. 66 galvanized casing bead. Insulating gypsum lath may be used.

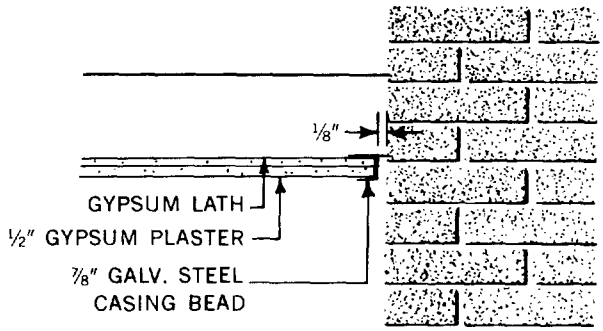
Gypsum basecoat plaster shall be used with sand aggregate only. Application of basecoat and finish coat plaster shall be done only when the temperature during application and set of the plaster is above freezing.

DECORATION

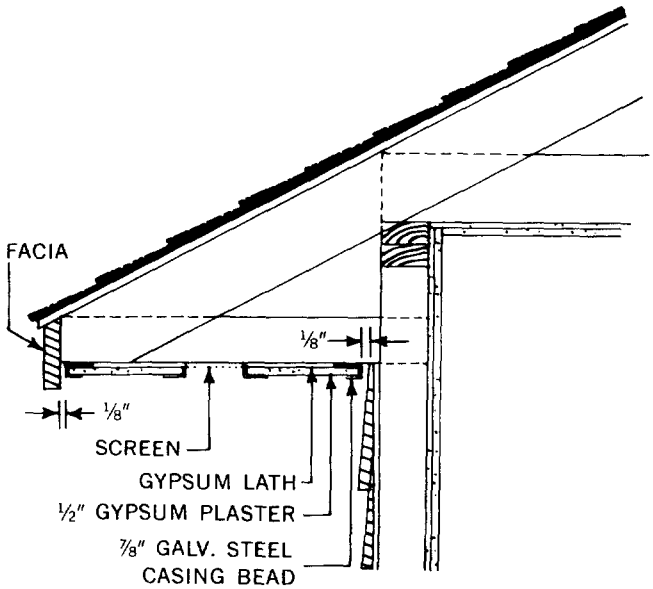
After the plaster is dry, paint with two coats of a good quality exterior paint, such as an acrylic paint.



CAR PORT or PORCH



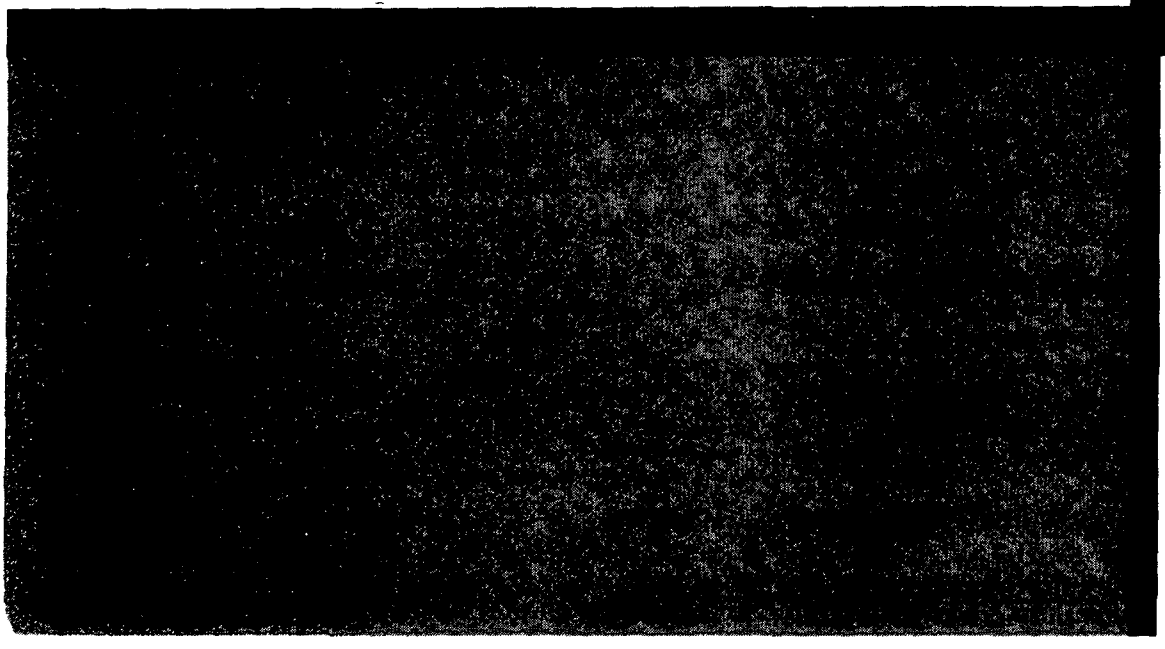
MASONRY WALL



FRAME WALL

GYPSUM ASSOCIATION





GYPSUM ASSOCIATION

201 NORTH WELLS STREET • CHICAGO, ILLINOIS 60606

1350 NORTH HIGHLAND AVENUE • HOLLYWOOD, CALIFORNIA 90028

SGP 0025063

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Application of

GYPSUM PLASTER ON EXTERIOR LOCATIONS

APPLICATION OF GYPSUM PLASTER ON EXTERIOR LOCATIONS

Gypsum plaster may be used on ceilings of open porches, carports, or walkways, on soffits of eaves, or other exterior areas that are protected from direct exposure to water.

MATERIALS AND APPLICATION

Materials and application shall be in strict conformance with the applicable requirements of "Recommended Specifications – Gypsum Plastering," published by the Gypsum Association, and American Standards Association A42.4.

Adequate ventilation shall be provided for the space immediately above such installations. The ratio of the total net free ventilating areas to the area of the ceiling shall be not less than 1/150. Screening shall be not less than 8 mesh per in.

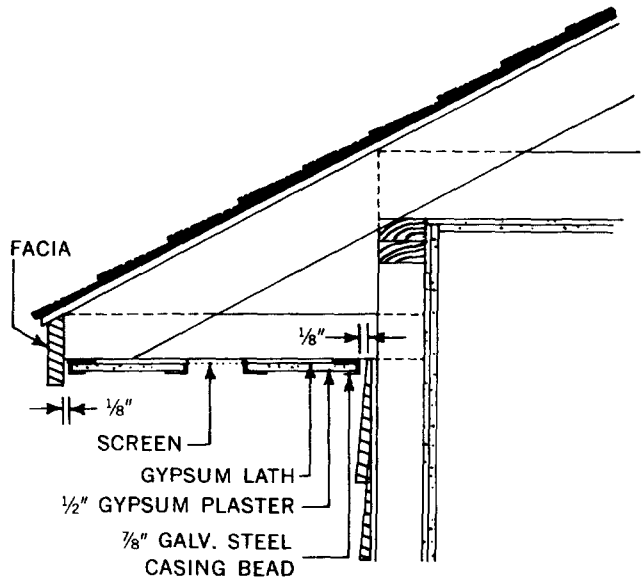
Expansion joints shall be provided at a minimum of 20 lineal ft. or 200 sq. ft. of area.

Where framing is spaced 24 in. o.c., use 1/2 in. gypsum lath and 1 in. No. 66 galvanized casing bead. Where framing is spaced 16 in. o.c., use 3/8 in. gypsum lath and 7/8 in. No. 66 galvanized casing bead. Insulating gypsum lath may be used.

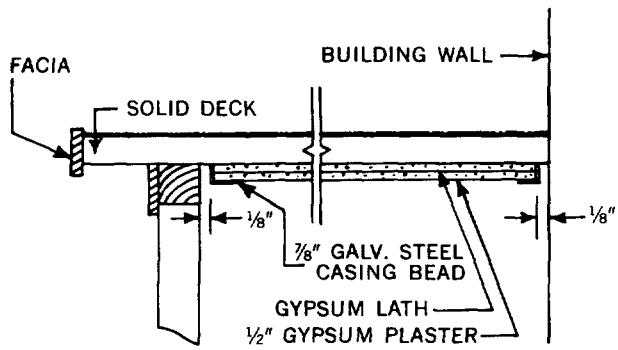
Gypsum basecoat plaster shall be used with sand aggregate only. Application of basecoat and finish coat plaster shall be done only when the temperature during application and set of the plaster is above freezing.

DECORATION

After the plaster is dry, paint with two coats of a good quality exterior paint, such as an acrylic paint.



FRAME WALL



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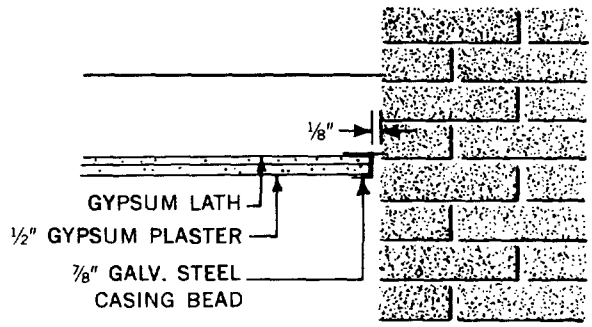


MASONRY WALL

AIA FILE NO. 21-A-2

Reprinted, September, 1965

SGP 0025093

FORM GPEL 3/64

Machine Applied Gypsum Plaster

SCOPE

This recommendation covers the application of gypsum basecoat plasters over gypsum, metal or wire fabric lath, and masonry by means of mechanical and pneumatic equipment.

PLASTER MIXERS

Plaster mixers shall be capable of producing a uniform and homogeneous plaster mix in the required quantities.

Plasters mixers shall be kept clean and in good mechanical condition.

PLASTER APPLICATION MACHINES

No more length of pipe and/or hose from the mixer to the spray nozzle should be used than the conveying equipment will handle without the use of extra retarder or more mixing water than is required to meet the slump test as provided in the section on "Gypsum Plaster Mix Proportions."

Plastering machines shall be capable of transporting the specified plaster mix and properly distributing this mix on the plaster base.

Plastering machines and accessory equipment shall be kept clean and in good repair at all times.

Plastering machines shall be cleaned and hoses washed out at least twice a day.

PROTECTION AND CLEANUP

All surfaces adjoining plaster areas which may be damaged by plaster shall be thoroughly protected during the application of plaster.

The debris caused by the application of machine applied plaster shall be cleaned up immediately after each operation is completed.

GYPSUM PLASTER MIX PROPORTIONS

Gypsum plaster mixes shall be identical, for each type of plastering, to those specified for gypsum plastering as published by the Gypsum Association.

Gypsum plaster mixes not covered above shall meet the requirements of applicable building codes.

All gypsum plaster and aggregate job batches shall be based on one (100 lb.) bag of plaster or a multiple thereof. Split sack mixes shall not be permitted.

All aggregates shall be accurately and uniformly proportioned to the bag or bags of plaster by weight or volumetric measurement.

The amount of water added to each batch of plaster shall be that quantity which results in a plaster slump of not more than 4 in., when tested in a 2 x 4 x 6 in. cone, or 9 in., when tested in a 4 x 8 x 12 in. cone.

Additives which increase the water demand of gypsum mixes shall not be used.

SGP 0025088

SLUMP CONE CONTROL OF PLASTER CONSISTENCY

Note: This method of controlling the plaster to water ratio is dependent upon strict adherence to recommended aggregate to plaster proportions.

The plastering contractor shall furnish at least one slump cone with accessory equipment for each operating plastering machine on the job.

Slump cone equipment shall be present on the job site when basecoat plastering begins and shall remain on the site until it is completed.

Slump cone equipment shall be available for the use of the building official, inspector, architect or engineer.

Slump tests shall be made in either the small or the large cones described above.

Slump tests shall be made in the manner described in the section titled "Method of Making Slump Tests."

APPARATUS FOR SLUMP TESTS

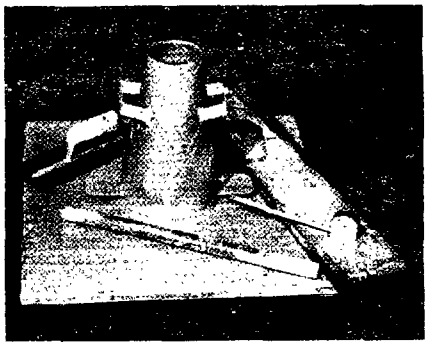
Small slump cone and equipment.

a. Material—22 gage galvanized sheet metal.
b. Size—6 in. high, 4 in. in diameter at the base, and 2 in. in diameter at the top.
c. Base Plate—12 x 12 in. nonabsorbent plane surface.
d. Tamping Rod—12 in. length of $\frac{3}{8}$ in. steel rod rounded at each end.
e. Small scoop or margin trowel.
f. Rule or tape measure.

Large slump cone and equipment.

Note: The large slump cone is described more particularly in American Society for Testing and Materials' Designation C143. This is the cone normally used for control of concrete mixes.

a. Material—16 gage galvanized sheet metal.
b. Size—12 in. high, 8 in. in diameter at the base, and 4 in. in diameter at the top.
c. Base Plate—24 x 24 in. nonabsorbent plane surface.
d. Tamping Rod—24 in. length of $\frac{5}{8}$ in. steel rod rounded at each end.
e. One pint scoop or cut-off brick laying trowel.
f. Rule or tape measure.





METHOD OF MAKING SLUMP TESTS

Place cone on center of dry base plate located on a level, firm surface. Hold cone tightly against plate.

Fill the cone with mortar obtained from the plaster mixer. Puddle mortar while filling to eliminate voids.

Screed mortar level with top of cone.

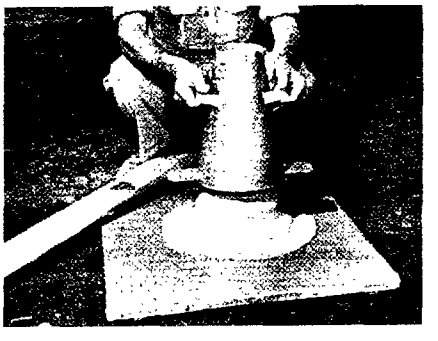
Clean off any material spilled onto base plate during filling operation.

Slowly and uniformly lift cone straight up from the base plate and carefully place it on the base plate next to the mortar sample. Lift in the same way from test to test.

Lay a straight edge or the tamping rod across top of cone, being careful not to disturb or jostle the plate.

Measure the slump as the distance in inches between the top of the cone (bottom of straight edge) and the top of the mortar sample.

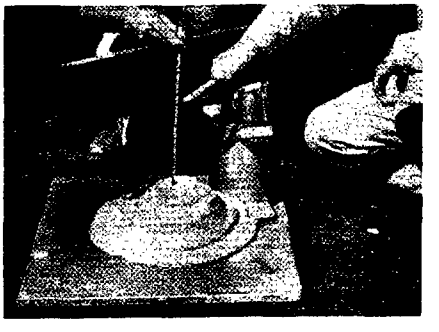




APPLICATION OF GYPSUM PLASTER

Plaster shall be applied in the same number of coats and to the same thicknesses as specified for hand plastering.

The quality of machine applied plaster shall be equivalent to that of hand applied work.



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COLD WEATHER PLASTERING

Past experience shows that plastering during winter months can be troublesome if certain job precautions are overlooked by the builder and plastering contractor. To prevent oversights this winter, it is advisable to heed the following recommended job practices.

It is known that the condition of basecoat plaster, the preparation of lime putty and the gauging of lime putty is vital to the success of the plastering application. But so are the elements of *temperature and ventilation.*

As stated in the American Standards Specifications ASA A42.1, 1955, Gypsum Association's *Recommended Specifications — Gypsum Plastering* and A42.4, the following job preparations must be adhered to — in connection with temperature and ventilation — to insure good results. "When the prevailing outdoor temperature at the building site is less than 55°F., a uniform temperature of not less than 55°F., and not more than 80°F., shall be continuously maintained in the building for a period[1] of not less than:

1. One week prior to the application of plaster.
2. While the plastering is being done.
3. And after the plaster is dry.

The heat shall be well distributed in all areas, and deflection or protective screens shall be used to prevent concentrated or uneven heat on plaster areas near the heat source. Where required, heat shall be furnished by _____.[2]

Ventilation shall be provided to properly dry the[3] plaster during and subsequent to its application. In glazed buildings this shall be accomplished by keeping windows open approximately 2 in. at top and bottom (or side-pivoted windows approximately 4 in.) to provide air circulation;[4] and by use of temporary circulators or the air conditioning system (in enclosed areas or buildings lacking openings for natural ventilation).

It must be remembered that any cementitious mixtures, like plaster or concrete, start life with very low strengths, and that their ultimate strengths depend on such factors as time or water content. The early strength of wet plaster is generally insufficient to withstand thermal shocks of even minor intensity. Greater precautions must be taken when the materials are wet than when they are dry.

[1]To minimize the possibility of plaster cracking due to structural movements caused by thermal changes, the building should be permitted to become adjusted to the uniform temporary heating conditions for at least one week prior to the start of plastering.

[2]The name of the party who shall furnish heat shall be inserted here _____.

[3]A portion of the water used in mixing gypsum plaster is necessary for the chemical reaction which sets and hardens the plaster. The excess amount required for mixing and application must be dried out after set has taken place.

[4]In addition to drying the plaster, free circulation of air is necessary to avoid "sweat-outs," particularly in enclosed areas lacking natural ventilation.

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