

A.I.A. File 21-A-2

TECHNICAL INFORMATION

USG[®] GYPSUM PLASTERS AND FINISHING LINES

UNITED STATES GYPSUM

The Greatest Name in Building

General Offices: 300 West Adams St., Chicago 6, Ill.

1958



CS016 1186

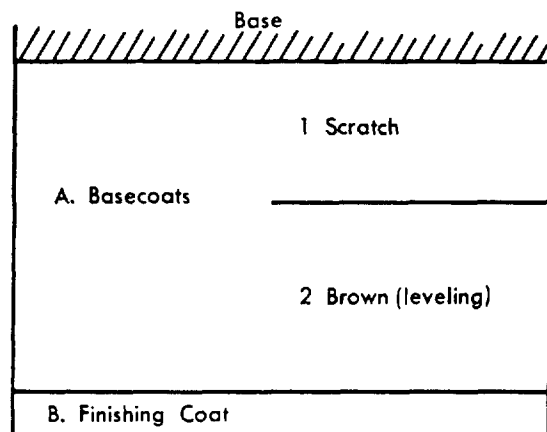
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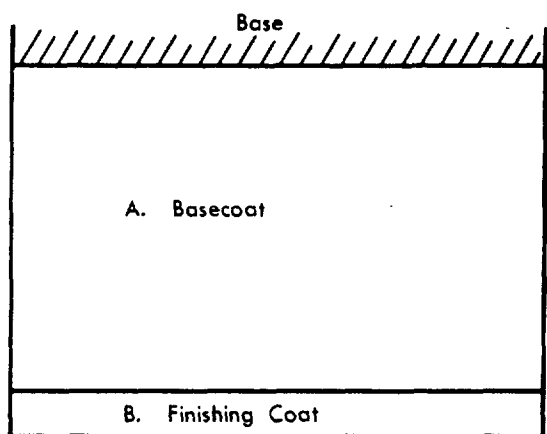
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THREE COAT PLASTER



In three coat work, the first (scratch) coat is raked to provide tooth for the second (brown) coat. In two coat work on gypsum lath and masonry the basecoat may be applied by scratching in and immediately doubling back to fill out to grounds. In all cases the basecoat should be left level under the rod, but rough to receive the finish coat.

TWO COAT PLASTER



Basecoat plaster is applied directly to the plaster base (usually lath or unit masonry) in sufficient thickness to hide the framework of the structure in the contour angles, curves or plane surfaces of the architectural design, and to provide a sound, durable base, with fire resistance as required, for the finish coat and subsequent decoration.

A. BASECOATS

Correct selection and application of U. S. Gypsum basecoat plasters over a properly prepared standard plaster base such as PYROBAR* gypsum tile, clay tile, concrete masonry units, ROCKLATH* plaster base, metal lath, or monolithic concrete, assures good basecoat plaster adhesion.

They are formulated to set and dry, under recommended job conditions as covered in the specifications, in sufficient time to prevent construction delay.

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Finish coat plaster provides the base for final decoration. It is applied to a thickness of from $\frac{1}{16}$ in. to $\frac{1}{8}$ in., usually over a gypsum plaster basecoat. There are several types of finish coats, each formulated to serve specific requirements and generally classified according to their principal ingredients.

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BASECOAT PLASTERS

GYPSUM PLASTER

DESCRIPTION

The base of all gypsum plasters is gypsum rock, or hydrous calcium sulfate, which has a water content of about 20 per cent in chemical combination. During manufacture $\frac{3}{4}$ of this water is removed. When water is added at the job, the material crystallizes (sets), reverting to its original chemical form. In RED TOP* Gypsum Plasters, other materials are added in small amounts to control working qualities and setting time. The character and proportions of these additives vary according to the type of intended use and the climatic conditions of the area in which the plaster will be used.

U. S. Gypsum basecoat plasters can be used on gypsum and metal lath; gypsum, clay, or concrete tile; concrete or cinder blocks; monolithic concrete; brick, or other approved plaster bases. When the proper plaster for the plaster base is applied correctly, it will bond firmly to the base to provide a sound foundation for the finish coat.

FUNCTION AND UTILITY

In selection of a basecoat plaster, several factors must be considered: Location; use to which the plastered surface will be put; fire ratings required; sound insulation properties desired; probable abuse of the plastered surface, etc. The principal problems to be considered are outlined below.

Fire Protection Gypsum base plasters, properly proportioned with approved aggregates, provide excellent fire protection. (See page 6 for technical data on fire ratings.) For maximum fire resistance in ceiling construction, use RED TOP gypsum plaster with lightweight aggregate over lathing base.

Strength (See page 6.) Strength varies with the type and quantity of aggregate used, the thickness of the basecoat, and the integrity of the plaster base over which the basecoat plaster is applied.

Sound Insulation. Base plasters add mass to masonry units or specially designed lathing systems, providing increased sound transmission losses for these assemblies. Basecoat plasters with sand aggregate, provide better sound insulation than those with lightweight aggregate, due to the greater weight of the sand.

Abuse For surfaces which must endure abuse (school corridors, etc.), wood fiber plaster, or RED TOP gypsum plaster with sand aggregate, will provide the best results.

PLASTER AGGREGATES

Sand

Sand is the most commonly used plaster aggregate. It is relatively inexpensive and readily available in most locations. Three important factors must be considered when sand is used:

1. Sand must comply with the requirements of ASTM Designation C35 for gradation.
2. Sand must be clean. Foreign matter weakens the plaster, reduces its hardness, and may lengthen or quicken the setting time.
3. Sand must be correctly proportioned with gypsum cement plaster as shown in the table below. Proper proportioning is readily accomplished by use of a standard shovel size. A No. 2 shovel, for example, holds approximately 15 pounds of damp, loose sand. For 1:2 mix, 13 shovelfuls of sand would be required with each 100-pound bag of plaster, 20 shovels for a 1:3 mix.

Vermiculite and Perlite

The use of lightweight plaster aggregates, vermiculite and perlite, is steadily increasing as their advantages become better known. They are more easily loaded, unloaded, transported, and stored. For cold-weather plastering, they have the advantage that they can be stored indoors ready for use at seasons when wet sand stored outside will freeze.

Plaster made with these aggregates and ready for application weighs approximately half as much as sanded plaster and offers greater fire resistance.

Plaster made with perlite or vermiculite provides excellent fireproofing for steel beams or columns when used over metal or gypsum lath. The saving in weight is as much as 200 lbs per foot of length compared to concrete fireproofing. Because perlite and vermiculite have greater insulation and a much lower expansion than sand, the plaster stands up much longer when exposed to fire.

Vermiculite and perlite are mixed with gypsum plaster on the basis of volume of aggregate to weight of plaster. See the table below for proper proportions.

Lightweight aggregates should not be used in conjunction with radiant heating systems.

Vermiculite and perlite must conform to ASTM Specification C35.

USE OF AGGREGATES WITH GYPSUM CEMENT PLASTER—Maximum Recommended Proportions

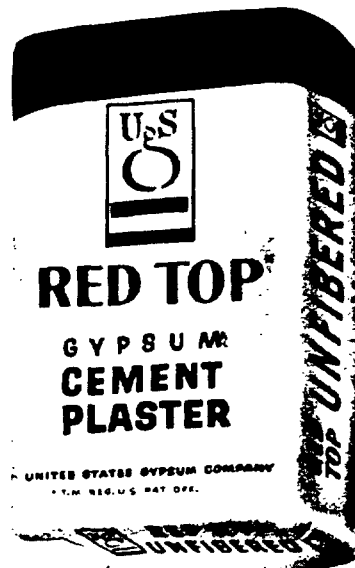
Plastering Base	Number of Coats	Plaster to Sand By Weight	Vermiculite, Perlite Weight of Plaster to Cubic Feet of Aggregate
Gypsum Lath	Three coats: Scratch coat Brown coat	1:2 1:3	100:2 100:3
	Two coats Basecoat	1:2½	100:2½
Metal Lath	Three coats: Scratch coat Brown coat	1:2 1:3	100:2 100:3
	Two coats: Basecoat	1:3	100:3
Unit Masonry: Gypsum Tile Clay Tile Brick Cement Block	Three coats: Scratch coat Brown coat	1:3 1:3	100:3 100:3
	Two coats: Basecoat	1:3	100:3



RED TOP CEMENT PLASTER

RED TOP Cement Plaster is a neat gypsum basecoat plaster to which water and an aggregate are added on the job. Complies with ASTM Designation C28 for neat gypsum plaster and Federal Specification SS-P-402, Type N. Used for both first (scratch) and second (brown) coats.

Available in two formulations: Regular, for use with sand aggregate, and LW for use with lightweight aggregates.



Function and Utility

Architects and builders specify RED TOP Cement Plaster:

1. To meet specific published fire ratings as established by local fire codes or insurance rating bureaus;
2. To provide mass for better sound insulation properties;
3. To provide a harder, stronger basecoat;
4. For real economy. The neat gypsum used in RED TOP Cement Plaster is inexpensive. It is mixed with economical aggregate which increases its bulk and its coverage. Highly plastic, it is easily and quickly applied. Ordinarily it requires no maintenance.

LIMITATIONS OF USE

1. RED TOP Cement Plaster should have aggregate added strictly according to specifications. Use of too much aggregate drastically decreases its strength.
2. Under no conditions should RED TOP Gypsum Plasters be applied directly to concrete. Use BOND-CRETE Plaster, described on page 5.
3. Gypsum Plasters should not be used where contact with excessive water or moisture is expected. In such instances, use portland cement-lime plaster.
4. Gypsum Plaster is an interior basecoat plaster and should not be used on exterior surfaces exposed to wetting.
5. Plaster application on masonry walls and concrete that have been coated with bituminous compounds is not recommended.
6. Because of the possibility of condensation or water seepage, plastering directly to the interior side of solid exterior masonry walls is not recommended. Such walls should be furred before plastering.

RED TOP WOOD FIBER PLASTER

RED TOP Wood Fiber plaster is a gypsum basecoat plaster which contains selected wood fiber, finely shredded. It requires the addition of only water on the job.

RED TOP Wood Fiber Plaster complies with ASTM Designation C28-55, gypsum wood-fibered plaster, and Federal Specification SS-p-402, Type W.

By comparison with plaster sanded 1:3, RED TOP Wood Fiber plaster has approximately three times greater compressive strength, two and one half times greater impact strength, and 50 per cent greater hardness. Offers far greater resistance to cracking.

RED TOP Wood Fiber Plaster has greater fire resistance than sanded plaster basecoats at equal thickness. See data on page 6. It is ready for use—needs only water. Eliminates risk of improper proportioning of plaster and aggregate. Over masonry, because of excessive suction, one part of sand must be added.

A wood fiber basecoat plaster job costs approximately 10 to 15 per cent more than the same job done with RED TOP Cement Plaster sanded on site.

RED TOP STRUCTO-LITE*/PLASTER

RED TOP STRUCTO-LITE plaster is a high quality basecoat plaster prepared at the mill by a careful proportioning of expanded perlite and gypsum plaster. For use on the job it requires only the addition of water.

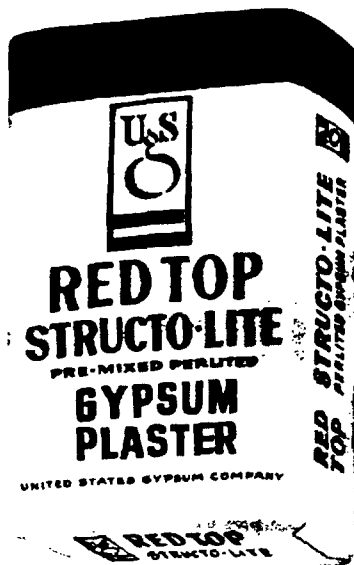
This plaster complies with ASTM Designation C28 for gypsum ready-mixed plaster. The perlite used in it complies with ASTM Designation C35 for inorganic aggregate for use in interior plaster.

The proper proportioning of gypsum cement plaster with a well graded, controlled-density perlite aggregate, and the establishment of a mill-controlled set, help to assure uniform strength in the plaster slab.

Because the perlite in STRUCTO-LITE conforms with exacting specifications for density, strength, and gradation, and is thoroughly mixed with the cement plaster at the mill, the plaster coat is of uniform hardness throughout.

While many fire-tests have been completed on partition and ceiling assemblies, additional tests are scheduled, and until these are complete, "STRUCTO-LITE" cannot be specified to meet all code and insurance rating requirements. (See technical data on Page six.)

The "k" factor of STRUCTO-LITE plaster is approximately 1.4, or about three times that of a gypsum-sand basecoat.



BONDCRETE* PLASTER

RED TOP BONDCRETE is a gypsum basecoat plaster specially formulated to bond firmly with rough interior monolithic concrete surfaces. It is factory-mixed, and on the job requires only the addition of water to make it ready for use. Complies with ASTM Specification C-28.

BONDCRETE provides a base to receive a brown or leveling coat of RED TOP Cement plaster or Wood Fiber Plaster where three coats are to be used.

If a leveling coat is not required, the finish plaster can be applied directly to the BONDCRETE with excellent results.

BONDCRETE has approximately the same coefficient of expansion as concrete.

BONDCRETE adheres to properly prepared concrete surfaces. For proper conditioning of surfaces, see Specifications, Surface Preparation, page 10. Correct preparation is important.

The low cost of BONDCRETE makes it an economical bonding coat for application directly to rough concrete surfaces.

7. When used in conjunction with radiant heating systems, the temperature at the surface of the plaster shall not exceed 115° Fahrenheit. The thermal conductivity of gypsum-sand plaster is approximately three times that of STRUCTO-LITE, and if STRUCTO-LITE is used over radiant heating panels, the heating system must be designed to allow for this insulating value.

8. BONDCRETE should be used only on concrete that is properly prepared for plastering. It should be applied only to concrete having sufficient roughness

to provide proper bond. See specifications page 11.

9. Maximum thickness of BONDCRETE and basecoat shall not exceed $\frac{3}{8}$ " on ceilings or $\frac{1}{2}$ " on walls. If additional thickness is required, metal lath shall be secured to the concrete surfaces.

10. Basecoat plasters must not be applied about hollow metal door frames or metal base, unless provision is made to lessen the vibration by grouting, special anchors, or both. Lath and plaster should recess into or behind the frame or base.

CS016 1190



PORTLAND CEMENT-LIME PLASTER AND EXTERIOR STUCCO BASECOAT

Portland cement-lime plaster is prepared on the job from Portland cement, lime, sand, and water, in the following proportions: For the scratch coat 1 bag of Portland cement, 2 bags of MORTASEAL* lime, 7½ cubic feet of sand, and (over metal lath or stucco mesh) 2 lb fiber. For the brown coat, 1 bag Portland cement, 2 bags MORTASEAL, and 9 cubic feet of sand. It is used for application directly to concrete block, clay tile, or metal lath as a base for ceramic tile, or in areas subject to high-moisture conditions.

It is the basecoat for ORIENTAL* Exterior (colored) finish. It is used for the scratch (first) coat and brown (second) coat over cement block or clay tile, or over sheathing to which STUCCO MESH or self-furring metal lath has been properly applied.

Limitations of Use

1. Each coat requires curing with water after set.
2. Must not be applied directly to smooth, dense surfaces, gypsum lath, or gypsum block. Metal lath must be secured to such surfaces before plaster is applied.
3. Provision is needed for relief of shrinkage in setting and drying at points where ceiling and wall meet, or where beams, columns, and fixtures pass through the plaster. Expansion joints should be provided to avoid excessive continuous areas.

FINISHING COAT PLASTERS

Description

Finish coat plaster provides the base for wall or ceiling decoration. It is usually applied over a gypsum plaster basecoat, and to a thickness of ¼ to ⅝ inch. Each of the several available types of finish coat has individual characteristics to meet special requirements. These types are generally classified according to the principal cementitious ingredient.

Types

1. Gypsum-gauged-lime, commonly known as "white coat," for a smooth, white trowel finish. It consists of lime soaked to a smooth putty and mixed with gypsum gauging plaster. With the addition of sand, it is adaptable for sand float finishes. Structo-gauge is a recent development in gauging plaster which produces high compressive strengths. Lime putty, gauged with Structo-gauge produces economically an extremely hard smooth trowel finish.

For a good white coat, the lime must be highly plastic and properly hydrated. Gauging plaster must be correctly proportioned to lime putty, and ingredients must be thoroughly blended. Careful application and sufficient troweling are essential to produce a smooth, glossy surface.

2. Keene's Lime: for a hard, smooth, white trowel finish. With

the addition of sand, it is adaptable for sand float finishes. Also available mill-mixed and colored under ORIENTAL Interior Finish brand.

3. Gypsum, for trowel (smooth) or sand float prepared finishes.

4. Acoustical Plaster, for sound absorption. Available in SABINITE*, AUDICOTE*, and HI-LITE* types. See page 9.

Dolomitic Lime Hydration

The United States Gypsum Company was the leader in solution of the dolomitic lime hydration problem with the development of IVORY* Double Hydrated finishing lime. This is a "fully" or "pressure" hydrated (less than 8 per cent unhydrated) Ohio dolomitic finishing lime.

ASTM Specification C206 for special finishing lime, and proposed amendments to Federal specifications, cover fully (92 per cent) hydrated limes. The National Lime Association has published its own specifications. This type of finishing lime is required by American Standards Association Specifications for Gypsum Plastering, A42.1-1955.

All high calcium hydrated limes, properly soaked, comply with these requirements, as do high calcium quicklimes, properly slaked.

TECHNICAL DATA—FINISH PLASTERS

	GAUGING PLASTER TO LIME	STRUCTO-GAUGE TO LIME		QUICK TROWELING KEENE'S TO LIME		GYPSUM TROWEL FINISH	GYPSUM FLOAT FINISH	ORIENTAL FINISH
Mix by weight of dry materials:	1:2	1:2 Medium Hard	1:1 Hard	2:1 Medium Hard	4:1 Hard	NEAT	NEAT	NEAT
Color	White	White	White	White	White	White	White or Gray	7 Colors
Finish Texture	Smooth	Smooth	Smooth	Smooth	Smooth	Smooth	Float	Float
Hardness in Kilograms (†)	34	56	108	50	70	55	(‡)	(‡)
Workability	1	1	2	4	7	3	6	5
Cost Factor Labor & Mat'l.	100	125	150	170	180	125	125	160

(†) Kilograms required to force a 10mm ball .01" into plaster face.

(‡) These are hard finishes but the aggregate in the surface does not permit an indication with this test.

BASECOAT PLASTERS FINISHING PLASTERS

FIRE TEST DATA (All tests made at nationally recognized fire testing laboratories)

CONSTRUCTION	PANEL TYPE			RATING
	TYPE BASE	PLASTER & AGGREGATE	THICKNESS	
PARTITIONS				
Wood Frame	3/4" ROCKLATH® Plain	Gypsum-Sand 1:2, 1:2	1 1/2"	45 Minutes
Wood Frame	3/4" ROCKLATH Plain	Gypsum Wood Fiber	1 1/2"	1 Hour
Wood Frame	3/4" Perf. ROCKLATH	Gypsum-Sand 1:2, 1:2	1 1/2"	1 Hour
Wood Frame	3/4" Perf. ROCKLATH	Gypsum-Perlite 100:2 1/2	1 1/2"	1 Hour
Wood Frame	3/4" Perf. ROCKLATH	Gypsum Vermiculite 100:2 1/2	1 1/2"	1 Hour
Wood Frame	Metal Lath	Gypsum-Sand 1:2, 1:3	3/4"	45 Minutes
Wood Frame	Metal Lath	Gypsum-Sand 1:2, 1:2	3/4"	1 Hour
Wood Frame	Metal Lath	Gypsum Wood Fiber	3/4"	1 1/2 Hours
Wood Frame	Metal Lath	Gypsum-Vermiculite 100:2 1/2, 100:3 1/2	3/4"	1 Hour
3" Hollow PYROBAR®		Gypsum-Sand 1:3	1 1/2"	3 Hours
4" Hollow PYROBAR		Gypsum-Sand 1:3	1 1/2"	4 Hours
Solid	Metal Lath	Gypsum-Sand 1:2, 1:3	2"	45 Minutes
Solid	Metal Lath	Gypsum-Sand 1:2, 1:2	2"	1 Hour
Solid	Metal Lath	Gypsum-Perlite 100:2, 100:3	2 1/2"	2 Hours
Solid	ROCKLATH	Gypsum-Sand 1:1, 1:2	2"	1 Hour
Solid	ROCKLATH	Gypsum-Perlite 100:2, 100:3	2"	1 1/2 Hours
TRUSSTEEL® Stud	Metal Lath	Gypsum-Sand 1:2, 1:3	3/4"	45 Minutes
TRUSSTEEL Stud	Metal Lath	Gypsum-Sand 1:2, 1:2	3/4"	1 Hour
TRUSSTEEL Stud	Metal Lath	Gypsum Wood Fiber	3/4"	2 Hours
TRUSSTEEL Stud	Metal Lath	Gypsum-Perlite 100:2, 100:3	1"	2 Hours
TRUSSTEEL Stud	3/4" Perf. ROCKLATH	Gypsum-Sand 1:2 or STRUCTO-LITE®	1 1/2"	1 Hour
	BRACE-TITE® Clips			
CEILINGS				
Wood Frame	3/4" Perf. ROCKLATH	Gypsum-Sand 1:2	1 1/2"	45 Minutes
Wood Frame	3/4" Perf. ROCKLATH (A)	Gypsum-Sand 1:2	1 1/2"	1 Hour
Wood Frame	3/4" Perf. ROCKLATH	Gypsum-Perlite 100:2 1/2	1 1/2"	1 Hour
Wood Frame	Metal Lath (B)	Gypsum-Sand 1:2, 1:3	3/4"	1 Hour
Wood Frame	Metal Lath	Gypsum Wood Fiber	3/4"	1 Hour
Steel Joist (C)	3/4" Perf. ROCKLATH	Gypsum-Perlite 100:2 1/2	3/4"	1 Hour
	BRACE-TITE Clips	or STRUCTO-LITE		
	Channels 16" o.c.			
Steel Joist (C)	Same, plus	Gypsum-Perlite 100:2 1/2	1 1/2"	2 Hours
	14 Ga diagonal wire			
	connecting clips			
Steel Joist (C)	Same, except channels 12" o.c.	Gypsum-Perlite 100:2 1/2	3/4"	3 Hours
Steel Joist (C)	Metal Lath	Gypsum-Sand 1:2, 1:3	3/4"	2 Hours
Steel Joist (C)	Metal Lath	Gypsum-Vermiculite 100:2, 100:3	3/4"	3 Hours
Steel Joist (C)	Metal Lath	Gypsum Wood Fiber	1"	3 Hours
Steel Joist (C)	Metal Lath	Gypsum-Vermiculite 100:2, 100:3	1"	4 Hours
Cellular Steel Floor	Metal Lath (D)	Gypsum Wood Fiber	1"	4 Hours
Cellular Steel Floor	Metal Lath (E)	Gypsum-Vermiculite 100:2, 100:3	1"	4 Hours
Cellular Steel Floor	Metal Lath (D)	Gypsum-Perlite 100:2, 100:3	1"	4 Hours
COLUMNS				
Steel Section	Metal Lath	Gypsum-Sand 1:2, 1:3	3/4"	1 Hour
Steel Section	Metal Lath (F)	Gypsum-Perlite 100:2, 100:3	1"	2 Hours
Steel Section	Metal Lath (F)	Gypsum-Perlite 100:2, 100:3	1 3/4"	3 Hours
Steel Section	Metal Lath (F)	Gypsum-Perlite 100:2, 100:3	1 3/4"	4 Hours
Steel Section	PYROBAR®-2" Solid, or 3" Hollow	Gypsum-Sand 1:3	1 1/2"	4 Hours
Steel Section	3/4" Perf. ROCKLATH	Gypsum-Sand 1:2 1/2	1 1/2"	1 Hour
Steel Section	3/4" Perf. ROCKLATH	Gypsum-Sand 1:2 1/2	1 3/4"	1 1/2 Hours
Steel Section	3/4" Perf. ROCKLATH	Gypsum-Perlite 100:2 1/2	1"	2 Hours
Steel Section	3/4" Perf. ROCKLATH	Gypsum-Perlite 100:2 1/2	1 3/4"	3 Hours
Steel Section	2 layers L. L. R. L.	Gypsum-Perlite 100:2, 100:3	1 1/2"	4 Hours
	Plus 1" 20-ga. mesh			

(A) Lath applied with 1 1/4", 13 gauge nails, 3/4" head and joints covered with Striplath, 1 3/4" nails. (B) Lath applied with 1 1/4", 11 gauge, 7/16" head barbed roofing nails, 6" O.C. (C) 2 1/4" reinforced concrete slab on Riblath or 2" precast gypsum tile above. (D) Ceiling 9" or more below floor slab. (E) Ceiling 3" or more below floor slab. (F) Self-furring metal lath wrapped tight to column or diamond mesh on channel frame not filled solid to column.

TECHNICAL DATA—AVERAGE TEST RESULTS (NOTE—results from separate producing plants may vary somewhat—above or below these average figures)

Plaster	Mix	Strength		Weight (lb/cu ft dry)	Conductivity "K"
		Compressive	Tensile		
STRUCTO-LITE (Regular)		900	150	52	1.4
WOOD FIBER	Neat	2100	400	80	—
CEMENT	1:1	1900	245	105	—
PLASTER	1:2	1200	170	113	4.32 to 5.55
Sand	1:3	750	120	113	4.24 to 5.77
Vermiculite	100:2	500	130	52	1.78 to 1.84
	100:3	300	90	45	1.44 to 1.63
Perlite	100:2	1000	165	50	1.32 to 1.68
	100:3	650	105	44	1.23 to 1.33

Average test results. Figures may vary slightly for products from individual mills.



LIME AND GAUGING (White Coat)

GAUGING PLASTERS

CHAMPION* and STAR* White Gauging Plasters for blending with lime putty to provide initial set and strength. CHAMPION for fast set, STAR for slow set. Ground to blend readily and completely, minimizing risk of check-cracking and crazing. Give strength and hardness to surface finish. Comply with ASTM Designation C28-55 and Federal Specification SS-P-402, Type G.

RED TOP Gauging Available with slow or quick set. Distinguished from White Gauging Plasters by its darker color; otherwise the equal of CHAMPION and STAR in every respect. Complies with same ASTM and federal specifications.

STRUCTO-GAUGE A new high strength gypsum gauging plaster for use with lime putty to produce surfaces of extreme hardness and durability. Has excellent mixing qualities, is easily applied, and needs minimum troweling to give a smooth finish. Complies with same ASTM and Federal Specifications with added requirement of compressive strength (neat) of not less than 5000 psi (dry).

LIME AND KEENE'S

FINISHING LIMES

Hydrated Finishing Lime (or Finishing Quicklime) is soaked (or slaked) to putty consistency, properly blended with gypsum gauging plaster, and troweled to a smooth, hard finish, usually over a gypsum basecoat. Ease of application, flexibility, whiteness, and economy make this by far the most widely used plaster finish coat.

IVORY*. A double hydrated special finishing lime that will not expand measurably in the wall. Requires no soaking to produce smooth, uniform, white, and highly plastic putty. Complies with ASTM Designation C206-49 Types S and Federal Specification SS-L-351, Type F, including the added requirement of not more than 8% unhydrated oxides.

RED TOP and GRAND PRIZE* Normal Ohio dolomitic hydrated finishing limes. Comply with ASTM Designation C6, Type N, and Federal Specification SS-L-351, Type F, but not with specifications limiting unhydrated oxides to not more than 8 per cent.

RED TOP and CHESHIRE* High calcium finishing quicklimes. When properly slaked and aged at least 16 hours, hydration is virtually complete. Comply with ASTM C5 and Federal Specification SS-Q-351, including added requirement of not more than 8% unhydrated oxides (when properly slaked).

KEENE'S CEMENT

RED TOP Keene's cement is a high strength, white gypsum plaster. Keene's lime finish is composed of lime putty blended with keene's cement in proportions required to obtain desired hardness. Complies with ASTM Designation C61-40 and Federal Specification SS-C-161, Type I (Regular) and Type II (Quick Troweling). Regular Keene's sets slowly, requires more troweling and may be used with any proportion of lime.

Quick Troweling Keene's sets faster, requires less troweling and must be used with a minimum of 25 lbs. of dry hydrated lime per 100 lbs. of Keene's cement.

LIMITATIONS OF USE—FINISHES

1. All finishes (except ORIENTAL Exterior) should be used for interior application only, generally over a gypsum basecoat not exposed to water. If exposure to wetting is extreme or continuous use portland cement—lime plaster base-coat and finish.

2. Recommended proportions must be observed. Failure to use sufficient gauging plaster or keene's, to blend thoroughly or to trowel adequately often results in check-cracking, crazing, lack of hardness and bond failure.

3. Gypsum gauged—lime finishes are designed for normal usage. Where greater hardness and resistance to

abrasion are required use **STRUCTO-GAUGE**, Gypsum Trowel Finish, or Keene's cement.

4. **STRUCTO-GAUGE** Gypsum Trowel Finish, and Keene's cement must be applied over basecoats of high compressive strength only.

5. Acoustical plasters are designed for use on ceilings and areas not exposed to rough usage.

6. Acoustical plasters are not recommended over radiant heated panel areas due to low thermal conductivities.

7. **ORIENTAL Exterior** colored finish must be applied to a Portland cement—lime basecoat only.

CS016 1193

PREPARED GYPSUM

RED TOP Gypsum Trowel and RED TOP GYPSUM Sand Float.

Mill-prepared gypsum finish coat plasters which require only the addition of water. There are no ASTM or Federal Specifications covering this type of plaster.

RED TOP Gypsum Trowel Finish is used where hard, smooth finishes are desired.

RED TOP Gypsum Sand Float Finish is used where a quality float finish is desired.

Strength. Approximately twice the impact strength of ordinary lime-gauging finishes.

Early decoration. May be painted as soon as plaster is set and dry. Nonalkaline. These finishes contain nothing injurious to paint or other decoration.

COLORED

ORIENTAL Interior A mill prepared, mill colored finish plaster which requires only the addition of water. There are no ASTM or Federal Specifications covering this type of plaster.

Colors: White, with 81% light reflection for float finish; Pewter Gray, 52%; Surf Green, 56%; Old Ivory, 77%; Desert Rose, 56%; Azure, 58%; Sahara Gold, 63%.

Use on interiors only for a finely floated surface or special textured finish. Do not use for a smooth finish. Very great hardness protects against abrasion.

ORIENTAL Exterior A mill-prepared stucco for exterior use over a portland cement-lime basecoat only; requires only the addition of water.

Colors: Pewter Gray, Eggshell Ivory, Sun Tan, Stone Gray, Copper Rose, Alamo Buff, Mission Cream, Cascade Green, Pueblo Tan, Indian Coral, Rancho Brown, White. Adaptable to any texture. Requires no decoration; mill preparation of color eliminates risk of variation due to job addition. Not designed for smooth trowel finish.

MOULDING PLASTERS

Moulding Plasters are made for specialized work such as casting ornamental enrichments or running cornices. In cast work, moulding plaster is used neat. For running cornice a small amount of lime is used. Moulding plaster is available in white and local grades and in quick or slow set.

CASTING PLASTER

RED TOP Superfine Casting Plaster is similar to RED TOP White Moulding Plaster, but with much finer particle size. Ideal for modeling done directly in plaster. The tiny particles assure smoother castings and excellent detail for fine plaques and art statuary. Requires only the addition of water.

ACOUSTICAL

SABINITE*. A highly efficient acoustical plaster which produces a continuous trowel or float finish of exceptional sound absorbent qualities. Manufactured in four standard colors and white. Requires addition of water only. Incombustible.

HI-LITE*. A highly efficient acoustical plaster with high light reflecting qualities; provides a stipple or stipple perforated finish. Has harder surface than SABINITE; more suitable for side walls above wainscots which require sound conditioning. White only. Over 75% light reflection. Requires addition of

water only. Can be applied over either gypsum or Portland cement-lime basecoats. Adaptable for acoustical treatment of areas similar to swimming pool enclosures.

AUDICOTE*. A prepared acoustical plaster requiring only the addition of water. May be applied by machine or by hand over gypsum plaster, portland cement-lime plaster, monolithic concrete surfaces that are clean and free of water-soluble materials or oily film. Made in Satin White (65% light reflection) and Special White (70% light reflection).

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Notes to Architect

Select one or more of the following basecoat plasters, aggregates and finish coat plasters as desired or required to meet fire-resistant ratings. Where conductivity of the plaster is a factor, see limitations on Pages 3, 4, and 10.

Where "contact," "furred" or "suspended" lath and plaster ceilings are located under roof deck construction, it is recommended that the space thus established be ventilated. Such ventilation, with or without vapor barrier and insulation, shall be designed in accordance with accepted engineering practice.

I. Scope. Unless otherwise specified or shown on the drawings, all walls and ceilings shall be plastered as herein described.

II. GENERAL PROVISIONS. In cold weather, the temperature of the building shall be maintained in the uniform range above 55° for an adequate period prior to the application of plaster, while the plastering is being done, and after the plaster is dry. The heat shall be well distributed in all areas, with deflection or protective screens used to prevent concentrated or irregular heat on plaster areas near source. When required, heat shall be furnished by

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

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

III. GROUNDS. The minimum thickness of plaster over 16"x48" gypsum lath shall be 1/2"; over gypsum partition tile brick, clay tile or other masonry, it shall be 3/8" thick; over metal lath, the plaster thickness shall be 3/8" measured from the face of the lath; and 3/4" over long length gypsum lath. Solid plaster partitions shall be (2"), (2 1/4"), (2 1/2"), (3"). (A greater thickness in grounds may be required for certain fire ratings. See table, page 37, and specify accordingly.)

IV. MATERIALS. Base Coat Plaster shall be (STRUCTO-LITE), (RED TOP Cement Plaster), (RED TOP Wood Fiber Plaster), (BONDCRETE) as manufactured by the United States Gypsum Company.

Aggregate (for cement plaster), (wood fiber over masonry), shall be (sand), (perlite), (vermiculite) meeting the requirements of ASTM Designation C35-54T—"Inorganic Aggregate for use in Interior Plastering."

Aggregate for job mixed sand float finish shall be a graded silica sand all passing a (30 mesh), (20 mesh) screen.

Water shall be clean, fresh and suitable for domestic consumption.

For (Exterior Stucco Base), (Portland Cement-Lime plaster) the Portland Cement shall comply with A.S.T.M. Designation C150-47, the Lime shall be MORTASEAL as manufactured by the United States Gypsum Company, and the Sand shall be clean and sharp and shall meet the requirements of American Standards Association Specifications A42-2.

Finish Coat Plaster shall be:

- a. Gypsum gauged lime putty trowel finish made from IVORY Double Hydrated Lime and (CHAMPION Gauging Plaster), (STAR Gauging Plaster), (RED TOP Gauging Plaster) as manufactured by the United States Gypsum Company.
- b. High strength gypsum gauged lime putty trowel finish made from IVORY Double Hydrated Lime and (STRUCTO-GAUGE) (RED TOP Quick Troweling Keene's Cement) as manufactured by the United States Gypsum Company.
- c. RED TOP Gypsum Trowel Finish as manufactured by the United States Gypsum Company.
- d. RED TOP Gypsum Sand Float Finish as manufactured by the United States Gypsum Company.
- e. ORIENTAL Interior Colored Finish as manufactured by the United States Gypsum Company.
- f. A job mixed sand float finish made from IVORY Double Hydrated Lime, RED TOP Keene's Cement and silica sand.
- g. (SABINITE), (AUDICOTE), (Hi-Lite) Acoustical Plaster as manufactured by the United States Gypsum Company.
- h. Ornamental run mouldings and Cast enrichments made with RED TOP Moulding Plaster and USG Casting Plaster as required.
- i. Exterior finish coat shall be ORIENTAL Exterior Colored finish as manufactured by the United States Gypsum Company.

V. SURFACE PREPARATION.

- a. Monolithic concrete to which BONDCRETE is to be applied shall be cleaned of all dust, loose particles and other foreign matter. Laitance and efflorescence shall be removed by washing with a 10% solution of commercial muriatic acid and water, and then cleaning with water to remove all traces of acid. Grease and oil shall be completely removed. Concrete surfaces shall have sufficient roughness to provide proper bond. If surfaces are not rough, they shall be hacked or bush-hammered, or dash coated with Portland cement grout composed of one part of cement and one and one-half parts of fine sand mixed to a mushy consistency. Using a stiff fiber brush, the Portland cement

grout shall be forcibly dashed on the concrete surface 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 the plaster, the surface shall be evenly dampened if necessary to reduce suction.

- b. United masonry surfaces that exhibit high suction shall be moderately wetted immediately before plastering.
- c. Where RED TOP AUDICOTE acoustical plaster is indicated for application direct to smooth monolithic concrete low reinforcing bar chair legs shall be galvanized. Bottom ends of high reinforcing bar chairs shall be coated with rust inhibitive paint and use of nails or other raw steel against forms or surface of concrete held to a minimum.

VI. BASE COAT PROPORTIONS.

- a. STRUCTO-LITE shall be regular formula for all lath bases and masonry formula for masonry bases.
- b. RED TOP Cement Plaster for the scratch or first coat over all lath bases in three-coat work shall be mixed in proportion of (one part of plaster to not more than two parts of sand by weight), (100 pounds of plaster to two cubic feet of perlite), (100 pounds of plaster to two cubic feet of vermiculite).

RED TOP Cement Plaster, when mixed for two-coat work over gypsum lath, shall be mixed in the proportion of (one part of gypsum to not more than 2 1/2 parts of sand by weight), (100 pounds of gypsum to not more than 2 1/2 cubic feet of perlite), (100 pounds of gypsum to not more than 2 1/2 cubic feet of vermiculite).

- c. RED TOP Wood Fiber Plaster. For application over all types of lath, shall be mixed with water only.

For masonry surfaces (except monolithic concrete), the scratch and brown coats of wood fiber plaster shall have (one part of sand by weight), (one cubic foot of perlite per 100 pounds), (one cubic foot of vermiculite per 100 pounds) added.

- d. BONDCRETE shall be mixed with clean water only.
- e. For (Exterior Stucco), (Portland Cement-Lime plaster), the scratch (first coat) shall be mixed in the proportion of one bag of Portland cement; two bags of MORTASEAL (or two cubic feet of lime putty) and seven and one-half cubic feet of sand (approximately 45 No. 2 shovels). For application over stucco mesh or self-furring metal lath,

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approximately two pounds of fiber or hair shall be added to each mix of the above proportions.

The brown coat (second coat) shall be mixed in the proportion of one bag of Portland cement, two bags of MORTASEAL (or two cubic feet of lime putty) and nine cubic feet of sand (approximately 55 No. 2 shovels).

VII. GROUT. Grout for door frames and metal base shall be (STRUCTO-LITE), (RED TOP Cement Plaster) and not more than (200 pounds sand), (2 cubic feet of perlite) per bag of plaster.

VIII. MIXING OF BASE COATS. For hand mixing, the mixing boxes shall be water-tight and thoroughly clean of all set or hardened material. All tools and equipment shall be cleaned after mixing each batch. Do not mix more material than can be used in one hour.

- a. STRUCTO-LITE shall be mixed with clean water only and hoed to uniform application consistency.
- b. RED TOP Cement Plaster and aggregate shall be mixed dry to a uniform color at one end of the box, hoed into the water at the other end and thoroughly mixed to proper consistency.
- c. RED TOP Wood Fiber Plaster shall be mixed with clean water only and hoed to uniform application consistency. (For application over masonry aggregate shall be added and dry mixed prior to adding water.)
- d. BONDCRETE shall be mixed with clean water only and hoed to uniform application consistency.

For mechanical mixing, 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. Material that has partially set shall not be retempered or used. Mix no more material than can be used in one hour.

- a. For STRUCTO-LITE plaster, no aggregate shall be added. Put the approximate amount of water in the mixer and add the STRUCTO-LITE and mix to proper application consistency, adding water if necessary, and dump the entire batch and use.
- b. RED TOP Cement Plaster; put the approximate amount of water required in the mixer, then, while the mixer is in continuous operation, add approximately half the amount of aggregate required, add all of the plaster and add the remainder of the aggregate. Mix to proper application consistency, adding water if necessary, and dump the entire batch.
- c. For Gypsum Wood Fiber Plaster; add the approximate amount of water required. Then add the plaster and mix to proper application consistency. When sand is added for application over masonry bases, add the water, then the sand, and then add the plaster and mix to proper application consistency.

- d. For BONDCRETE Plaster, add clean water only, then add the plaster and mix to proper application consistency.

IX. GROUTING.

- a. All steel door frames in (solid lath and plaster partitions) (steel stud partitions) shall be fully grouted prior to lathing, leaving a groove to receive the lath.
- b. All $2\frac{1}{2}$ " flush metal base for solid lath and plaster partitions and furred exterior walls shall be grouted. Provide a V-Groove to receive (ROCKLATH plaster base) ($\frac{3}{8}$ " Riblath). (Grout after channel studs are erected for channel stud metal lath partitions.)
- c. All metal base applied to masonry or stud partitions shall be grouted.

X. BASE COAT APPLICATION.

- a. For two-coat work over gypsum lath and masonry, the base (first) coat shall be applied with sufficient material and pressure to form a good bond on the gypsum lath or masonry, as the case may be and to cover well, and then be doubled back to bring the plaster out to grounds, straightened to a true surface with rod and darby, and left rough, ready to receive the finish (second) coat.
- b. For three-coat work, the scratch (first) coat shall be applied with sufficient material and pressure to form good full keys on metal lath, and a good bond on gypsum as the case may be, and to cover well, and then be cross scratched to a rough surface. The brown (second) coat shall be applied after the scratch (first) coat has set firm, and hard, brought out to grounds and straightened to a true surface with rod and darby and left rough, ready to receive the finish (third) coat.
- c. For ($2\frac{1}{4}$ ") solid gypsum lath and plaster partitions, apply a scratch coat of plaster with a maximum 3-hour set, about $\frac{3}{8}$ " thick, to each side of the lath. In no case, shall application of scratch coat to second side of lath be delayed longer than the setting time of the scratch coat applied to the first side. Scratch lightly in horizontal direction only.

After the scratch coats have set firmly and have partially dried (but not less than 16 hours), the brown coat shall be applied to the unbraced side, bringing it out to within $\frac{1}{4}$ " of ground dimension for finish coat. When brown coat has set firmly (but not less than 3 hours), braces shall be carefully removed from opposite side and brown coat applied to that side in a manner similar to that described for the other brown coat.

- d. For ($2\frac{1}{4}$ ") solid studless metal lath and plaster partitions apply scratch coat and allow it to set and partially dry. Then apply brown coat to side opposite braces, allowing it to set thoroughly before removing temporary braces. Next apply brown coat to previously braced side, bringing it out to sufficient

thickness to bring overall partition thickness to grounds when finish coats are applied to both sides.

- e. For ($2\frac{1}{4}$ ") channel stud, metal lath and plaster partitions apply scratch coat on lath side and allow it to set and partially dry. Then apply back-up coat on channel side applied to full grounds in not less than two operations and allow to set. Next apply brown coat on lath side bringing it out to sufficient thickness to bring overall partition thickness to grounds when finish coats are applied to both sides.
- f. For resilient ROCKLATH ceilings, three coat plaster work shall be used. Apply a full scratch coat, cross rake and allow to set. Then apply brown coat to bring total thickness of plaster to $\frac{1}{2}$ " over the lath, darby level and leave rough ready for finish coat.
- g. For (exterior wall furring) (hollow partitions) having long length ROCKLATH three-coat plaster work shall be used to a total thickness of $\frac{3}{4}$ " over the lath.
- h. For column fireproofing total thickness of plaster over lath face shall be ($\frac{1}{2}$ "), ($\frac{3}{8}$ "), (1"), ($1\frac{3}{8}$ "), ($1\frac{3}{4}$ "). Apply a full scratch coat, cross rake and allow to set. Then apply brown coat to within $\frac{1}{8}$ " of thickness required and leave level and rough ready for application of finish coat.
- i. Where plaster finish is flush with metal bases, door frames, window frames or similar constructions, both the brown coat and the finish coat should be grooved back at the intersection to reduce possibility of chipping of plaster at these points.
- j. At windows, doors and other openings all base coat plaster across head of opening and 12 inches down, each side, shall be cut free of frame or grounds with edge of trowel, after stiffening but before setting, to allow for expansion.
- k. Scratch coat of (Exterior stucco) (Portland cement—Lime plaster) shall be applied in a full $\frac{3}{8}$ " coat, with sufficient pressure to form a good bond with masonry surfaces or to force it through and completely embed the metal reinforcement. Cross scratch and, after set, damp cure for not less than 48 hours.

Brown coat shall be applied over the dampened scratch coat in a full $\frac{3}{8}$ " coat with sufficient pressure to form a good bond, rod level and left rough, using a broom if necessary. After set, damp cure for at least 48 hours before applying the finish (third) coat.

Damp curing of each coat shall be accomplished by applying water in a fine, fog spray. Apply only as much water as is readily absorbed. The frequency of spraying required will depend on the weather exposure, more frequent applications being required during hot, dry and windy weather.

- XI. PREPARATION OF LIME PUTTY. IVORY Finishing Lime shall be mixed with clean water only, using approximately $5\frac{1}{2}$ to 6

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gallons per bag. The putty may be prepared by overnight soak, or by mixing by hand or machine. Run mixer for sufficient time to get a smooth, thoroughly mixed putty which can be used immediately or run into a box for use as required. When stored in a box after mixing, do not permit putty to get crusty or to dry out. Mixer, tools and equipment must be clean.

XII. PROPORTIONS OF FINISH COATS.

- a. Gypsum gauged lime putty finish shall be mixed in the proportions of 100 pounds of gauging plaster to 200 pounds of dry lime (400 pounds, or 34 gallons, of lime putty).
- b. Medium hard STRUCTO-GAUGE-Lime Putty Finish shall be mixed in the proportion of 100 pounds of (Structo-Gauge) to 200 pounds of dry lime (400 pounds, or 34 gallons, of lime putty).
- c. Hard STRUCTO-GAUGE-Lime Putty Finish shall be mixed in the proportion of 100 pounds of STRUCTO-GAUGE to 100 pounds of dry lime (200 pounds, or 17 gallons, of lime putty).
- d. Medium hard Keene's Cement-Lime Putty Finish shall be mixed in the proportion of 100 pounds of Keene's Cement to 50 pounds of dry lime (100 pounds, or 8½ gallons of lime putty).
- e. Hard Keene's Cement-Lime Putty Finish shall be mixed in the proportion of 100 pounds of Keene's Cement to 25 pounds of dry lime (50 pounds, or 4¼ gallons of lime putty).
- f. Keene's Cement-Sand Float Finish shall be mixed in the proportion of 100 pounds of Keene's Cement to 50 pounds of dry lime and 400 pounds of sand (100 pounds, or 8½ gallons of lime putty) and 4 to 5 cubic feet of sand (27 No. 2 shovels of sand).
- g. RED TOP Gypsum Trowel Finish shall be mixed with clean water only to proper application consistency.

h. RED TOP Sand Float Finish shall be mixed with clean water only to proper application consistency.

i. ORIENTAL Interior Colored Finish shall be mixed with clean water only to proper application consistency.

j. ORIENTAL Exterior Colored Finish shall be mixed with clean water only to proper application consistency.

XIII. APPLICATION OF FINISH COATS. Finish coat shall be applied over a partially dry, level and roughened gypsum base coat.

The finish coat shall be scratched in thoroughly and immediately doubled back to fill out to a true, even surface. Thickness to be ¼" to ⅜". (Except Acoustical Plaster which shall be ½" thick.)

a. Trowel finishes shall be water troweled during set to provide a smooth, dense surface for decoration, free of irregularities and blemishes.

b. Float finishes shall be floated with shingle, wood, carpet or rubber float to bring aggregate to the surface and produce a finish free of slick spots, cat faces, and other blemishes. In natural color finishes, use water sparingly while floating. Do not use water while floating colored finishes.

c. Textures shall be applied in such a manner that they will match the sample approved by the architect.

d. SABINITE Acoustical Plaster finish shall be (Trowel) (Float) applied according to manufacturer's directions which are hereby made a part of this specification.

e. HI-LITE Acoustical Plaster finish shall be (stipple-perforated) applied according to manufacturer's directions, which are hereby made a part of this specification.

f. RED TOP AUDICOTE Acoustical Plaster finish shall be (Spray Texture) (Float) (Stipple-perforated) (Trowel) applied according to manufacturer's directions

which are hereby made a part of this specification.

g. Ornamental plaster shall be executed in accordance with the full-sized details shown on the drawings. Cornices and moldings shall be run full, straight and true with molding plaster, using clean cut metal templets conforming to the profiles shown on the drawings. Lines shall be in alignment, with true intersections, and accurate mitres at corners and angles. Enriched ornamental work which cannot be run in place shall be cast with casting plaster in gelatine molds. The work shall be solidly backed with jute or burlap, shall be properly reinforced with galvanized iron, and shall be securely stuck and wired in place with copper wires not lighter than 16 gauge. All joints shall be carefully made and neatly pointed so as to be invisible. All rough spots shall be eliminated with fine sandpaper, and the entire work left in proper condition, ready for decoration.

h. ORIENTAL Exterior colored finish shall be mixed and applied in strict accordance with the manufacturer's directions. Color and texture to be designated and approved by the architect or his representative.

XIV. PATCHING. Point up around trim and other work. Cut out and patch defective and damaged plaster. Patching of plaster shall match existing work in texture and finish and joinings with plaster previously applied shall finish flush and smooth.

XV. COMPLETION. At the completion of the finish plaster work, clean all plaster from beads, screeds, metal base and metal trim, leaving work ready for decoration by others. Remove all plaster rubbish from the building, leaving floors broom clean. Remove excess material from the job site. Remove all scaffolding, tools and other equipment from the building and job site.

"STRUCTOLITE," "RED TOP," "BONDCRETE," "PYROBAR," "ROCK-LATH," "ORIENTAL," "SABINITE," "IVORY," "GRAND PRIZE," "MORTASEAL," "CHESHIRE," "CHAMPION," "STAR," "TRUSSTEEL" and "USG" are registered trade-marks; "HI-LITE," "AUDICOTE" and "STRUCTO-GAUGE" are trade-marks owned by United States Gypsum and are used by it to distinguish products of its manufacture.

"STRUCTO-LITE" identifies the particular prepared plaster manufactured only by United States Gypsum.

"RED TOP" identifies the particular plasters and finishes manufactured only by United States Gypsum.

"BONDCRETE" identifies the particular plaster for concrete surfaces manufactured only by United States Gypsum.

"PYROBAR" identifies the particular gypsum partition tile manufactured only by United States Gypsum.

"ROCKLATH" identifies the particular gypsum lath or plaster base manufactured only by United States Gypsum.

"ORIENTAL" identifies the particular colored finishes manufactured only by United States Gypsum.

"SABINITE," "AUDICOTE" and "HI-LITE" identify the particular acoustical plasters manufactured only by the United States Gypsum Company.

"IVORY" and "GRAND PRIZE" identify the particular hydrated lime manufactured only by the United States Gypsum Company.

"CHESHIRE" identifies the particular high calcium finishing lime manufactured only by United States Gypsum.

"MORTASEAL" identifies the particular masonry lime manufactured by United States Gypsum.

"CHAMPION" and "STAR" identify the particular white gauging plasters manufactured only by the United States Gypsum Company.

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