

Perlite Institute Inc.



PLASTER / FIREPROOFING

Gypsum and Portland Cement

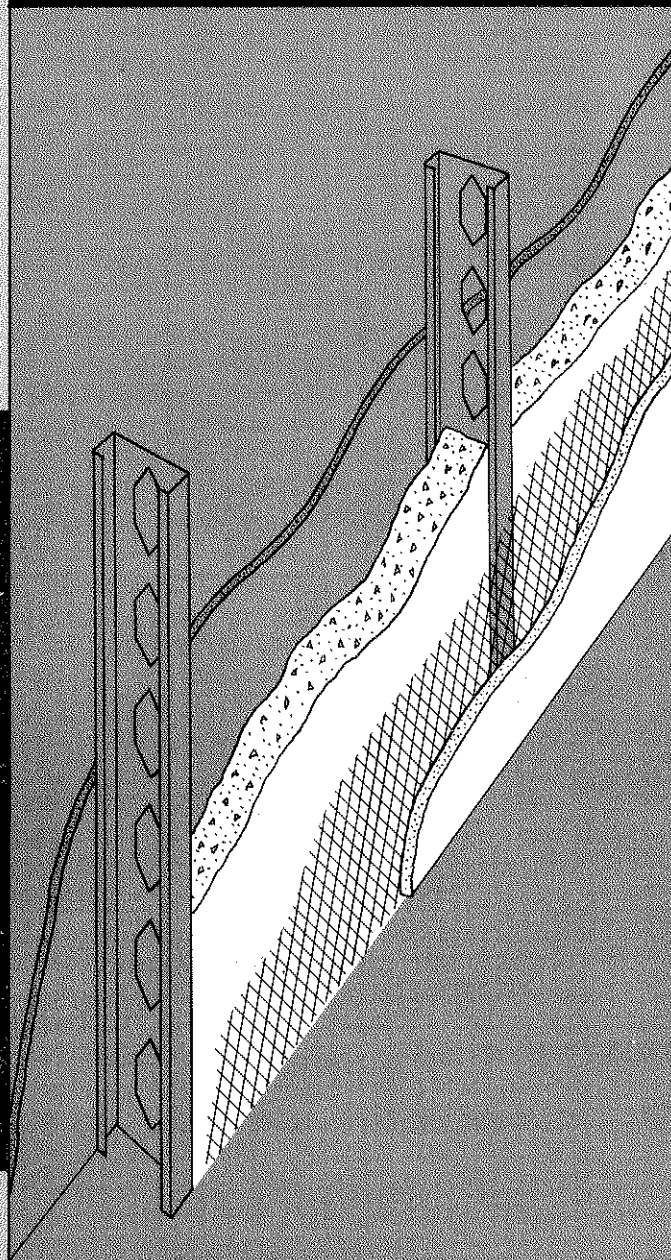
1980

**PORTLAND CEMENT  
BASED PLASTERS**

**GYPSUM BASED  
PLASTERS**

# Perlite

## PLASTER



**PERLITE INSTITUTE, INC.**

### scope of this catalog:

#### description

Perlite is a siliceous volcanic rock containing a small amount of combined water. When crude perlite ore particles are heated to plasticity, they expand to form countless sealed glassy cells. This accounts for the excellent insulating properties and light weight of expanded perlite.

Perlite plaster consists of a blend of expanded perlite aggregate and neat gypsum or portland cement mixed with water for application by gun or trowel to wall or ceiling surfaces or to metal wire or gypsum lath for structural steel membrane fireproofing. Mixed with portland cement or gypsum plaster, it is used for lightweight insulating curtain wall construction and stairwell encasement.

#### PORTLAND CEMENT

Perlite-portland cement based plaster can be used on new or remodel work - as a base coat for stucco finishes, ceramic tile or masonry veneer. Perlite portland cement plasters are approved for as much as 4-hour fire protection of structural steel columns. They are ideal for weather exposed structural steel elements requiring fire protection. Sand aggregate can be added to increase compressive strength. Where desirable all plasters containing portland cement must be applied over metal or wire lath or other suitable surfaces prepared with an approved liquid bonding agent. Plastering on metal or wire lath is typically three coat work but some building codes allow two coat plastering under certain conditions. Two coat plastering is most typically used in repair and remodeling operations.

#### GYPSUM

Perlite plaster aggregate mixed with gypsum provides an ideal base coat plaster for interior walls and ceilings and for membrane fireproofing to the underside of floor and roof assemblies, or structural steel members.

#### front cover:

Illustration on cover depicts construction design of a perlite-portland cement curtain wall system having a 4-hour exterior fire rating (See Ohio State University Research Report No. 5645).

**Note:** All numerical values include SI (International System of Units) equivalents. Dimensions are nominal for both U.S. and SI systems of measurement.

# Fire Protection/Curtain Walls/General Plastering

## contents:

### advantages

- **Lightweight** — Weighs approximately 60% less than ordinary sand plaster, saving about one ton (907 kg) for every 100 yd<sup>2</sup> (83.6 m<sup>2</sup>) of material applied ½ in. (13 mm) thick.
- **Insulating** — 4 times more resistant to heat transmission than sand plaster . . . permits savings in heating and air conditioning costs . . . conserves energy.
- **Fire Retardant** — Non-combustible and non-toxic . . . provides up to 5-hour fire protection with minimum weight and thickness . . . more than 50 fire tested designs by recognized laboratories.
- **Noise Reduction** — Reduces sound transmission between partitions.
- **Adaptable** — Packaged in 3 or 4 cubic feet (85 or 113 litre) bags in the United States and Canada and in 100 litre bags in most other countries . . . easy to measure, mix and handle . . . job mixing permits proper proportioning to meet different plaster based materials specifications.
- **Durable** — Cannot rot or decay . . . strong but not brittle . . . endures freeze-thaw exposure . . . successfully used on major construction projects since 1946.

### limitations

- Normal limitations for gypsum plaster and portland cement plaster apply.
- Plaster application on any surfaces that have been coated with bituminous compounds is not recommended.
- Perlite gypsum plaster is not recommended over radiant heating panels because of its insulating value.
- Long continuous runs of gypsum or portland cement based plaster should be broken to relieve stresses and strain caused by thermal or structural movement.
- Over monolithic concrete, the thickness of bonding plaster and perlite-gypsum basecoat shall not exceed 3 / 8 in. (10 mm) on ceilings and 5 / 8 in. (16 mm) on walls. If additional thickness is required to produce desired lines or surfaces, self-furred metal lath shall be secured to concrete surfaces.
- Gypsum plaster when used with perlite should be milled and set "for use with lightweight aggregates."
- Where perlite-gypsum plaster with smooth troweled finish is to be applied over expanded metal or wire lath, it is recommended that perlite fines be added to the finish coat mix.

### ■ guide specification / section 09 - PERLITE - PORTLAND CEMENT PLASTER

#### PART 1. - GENERAL

##### 1.01 SCOPE

The plastering contractor shall furnish all labor, materials, equipment and supervision for installing the perlite-portland cement based plaster in accordance with the recommendations as published by Perlite Institute, Inc., applicable drawings, and contract documents. Apply all perlite portland cement plaster to thickness indicated on the drawings and apply in two or three coats as required by building code.

##### 1.02 WORK BY OTHERS

Furring and lathing, sprayed fiber mixtures, decorative finishes, wall reinforcement, gypsum plaster, gypsum wallboard or additional material shall be provided by others.

#### PART 2. - PRODUCTS

##### 2.01 IDENTIFICATION AND MARKINGS.

Identify packaged materials with manufacturers' brand name. Provide similar information in the shipping advices accompanying the shipment of bulk materials.

##### 2.02 DELIVERY AND STORAGE OF MATERIALS.

Deliver materials to job site in original undamaged containers and store materials off the ground protected from moisture and dampness.

##### 2.03 MATERIALS.

Materials shall conform to requirements of the referenced specifications and standards and to the requirements specified herein:

- a) Portland Cement - ASTM C-150
- b) Hydrated Lime - ASTM C-206
- c) Perlite Aggregate - ASTM C-35
- d) Sand Aggregate - ASTM C-144
- e) Water: Clean and Potable
- f) Air-Entraining Admixtures: Liquid neutralized vinsol resin, or equal, as supplied by the perlite aggregate manufacturer.

##### 2.04 PLASTER PHYSICAL PROPERTIES.

The perlite-portland cement plaster shall have an oven dry density of \_\_\_\_\_ lbs / ft<sup>3</sup> (kg / m<sup>3</sup>) and a minimum compressive strength of \_\_\_\_\_ lbs / in<sup>2</sup> (kPa) at 28 days.

#### PART 3. - EXECUTION

##### 3.01 PROPORTIONS AND APPLICATION.

Mix perlite portland cement in a paddle type plaster mixer. Mix required amount of water and air entraining agent in the mixer followed by the cement and mix until a slurry is formed. Add proper amount of perlite aggregate to the slurry and mix until required wet density is reached. See Table 1 for proper mix proportions of all perlite portland cement based plasters and apply in three coats to not less than the specified minimum thickness. Note: On small jobs, two coat application, where allowable by code, is acceptable. Apply second coat as soon as the first coat has attained sufficient rigidity. Sand may be mixed with perlite aggregate in the maximum ratio of 1:1 to increase the tensile strength except in fire rated construction.

Expansion Joints. Install through-wall joints a maximum of \_\_\_\_\_ feet (metres) apart to permit contraction and expansion of all continuous wall areas, and at all points where the wall abuts columns or other framing members. Installation shall be such as to prevent structural movement from being transmitted between walls and framing members. Cure perlite portland cement plaster for a period of 48 hours and keep damp during this period.

**Note:** All numerical values include SI (International System of Units) equivalents. Dimensions are nominal for both U.S. and SI systems of measurement.

TABLE 1. MIX PROPORTIONS FOR PERLITE-PORTLAND CEMENT PLASTERS

| PERLITE-PORTLAND CEMENT PLASTER           |               |                                |   |  |                          |                             |
|---|---------------|--------------------------------|---|--|--------------------------|-----------------------------|
| COAT                                      | VOLUME CEMENT |                                | MAX. VOL. PERLITE PER VOL. CEMENT                   | APPROX. MIN. THICKNESS                         | MIN. PERIOD MOIST CURING | MIN. INTERVAL BETWEEN COATS |
| FIRST                                     | 1             |                                | 4   | 3/8 in. ( 10 mm )                              | 48 Hours                 | 48 Hours                    |
| SECOND                                    | 1             |                                | 4   | 1st and 2nd Coats<br>Total 3/4 in. ( 19mm )    | 48 Hours                 | 7 Days                      |
| FINISH                                    | 1             |                                | 3   | 1st, 2nd and finish<br>coats 7/8 in. ( 22 mm ) |                          |                             |
| PERLITE-PORTLAND CEMENT PLASTER WITH LIME |               |                                |   |  |                          |                             |
| COAT                                      | VOLUME CEMENT | MAX. VOL. LIME PER VOL. CEMENT | MAX. VOL. PERLITE PER COMBINED VOL. CEMENT and LIME | APPROX. MIN. THICKNESS                         | MIN. PERIOD MOIST CURING | MIN. INTERVAL BETWEEN COATS |
| FIRST                                     | 1             | 1                              | 4   | 3/8 in. ( 10 mm )                              | 48 Hours                 | 48 Hours                    |
| SECOND                                    | 1             | 1                              | 4-1/2   | 1st and 2nd Coats<br>Total 3/4 in. ( 19 mm )   | 48 Hours                 | 7 Days                      |
| FINISH                                    | 1             | 1                              | 3   | 1st, 2nd and finish<br>coats 7/8 in. ( 22 mm ) |                          |                             |

### ■ guide specification / section 09 - PERLITE - GYPSUM PLASTER

#### PART 1. - GENERAL

##### 1.01 SCOPE.

The plastering contractor shall furnish all labor, materials, equipment and supervision for installing the perlite-gypsum base coat plaster and finish coat in accordance with the recommendations as published by Perlite Institute, Inc., applicable drawings, and contract documents. Application of perlite-gypsum base coat plaster and finish coats shall be in accordance with ANSI Specification A42.1.

##### 1.02 WORK BY OTHERS.

Furring and lathing, sprayed fiber and cementitious mixtures, spray applied decorative finishes, gypsum wallboard or additional material shall be provided by others.

#### PART 2. - PRODUCTS

##### 2.01 IDENTIFICATION AND MARKINGS.

Identify packaged materials with manufacturers' brand name. Provide similar information in the shipping advices accompanying the shipment of bulk materials.

##### 2.02 DELIVERY AND STORAGE OF MATERIALS.

Deliver materials to job site in original undamaged containers and store materials off the ground protected from moisture and dampness.

##### 2.03 MATERIALS.

Materials shall conform to requirements of the referenced specifications and standards and to the requirements specified herein:

- a) Gypsum Neat Plaster - ASTM C-28
- b) Perlite Aggregate - ASTM C-35
- c) Water: Clean and potable

#### PART 3. - EXECUTION

##### 3.01 PROPORTIONS AND APPLICATION.

General: All metal lath surfaces and gypsum lath ceilings attached by resilient clips shall be three-coat work. Unit masonry and gypsum lath may be either three-coat or two-coat work.

##### Three Coat Work.

- 1) **Scratch Coat:** First coat shall be not more than 2 cubic feet (57 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum. On masonry surfaces, except

monolithic concrete, the mix shall be not more than 3 cubic feet (85 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum.

- 2) **Brown Coat:** The second coat shall be not more than 3 cubic feet (85 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum.

##### Two Coat Work.

- 1) **Gypsum Lath** - The mix for double-up work shall be not more than 2 cubic feet (57 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum.

- 2) **Unit Masonry** - The mix shall be not more than 3 cubic feet (85 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum.

- 3) **Monolithic Concrete** - A leveling coat mix of not more than 3 cubic feet (85 litres) of perlite to 100 lbs. (45.3 kg) of neat gypsum shall be applied over an approved liquid bonding agent.

- 4) **Proportioning of Finishing Coat** - When a smooth trowelled lime putty gypsum finish is used, it shall contain perlite fines in the proportions of .5 to 1.0 cubic feet (14 to 28 litres) per 100 lbs. (45.3 kg) of gauging plaster. Specifications presented herein incorporate portions of American National Standards Institute, Standard Specification for Gypsum Plastering A42.1 but vary in format and content to conform to the current recommendations of Perlite Institute, Inc.

#### SOUND CONTROL DATA

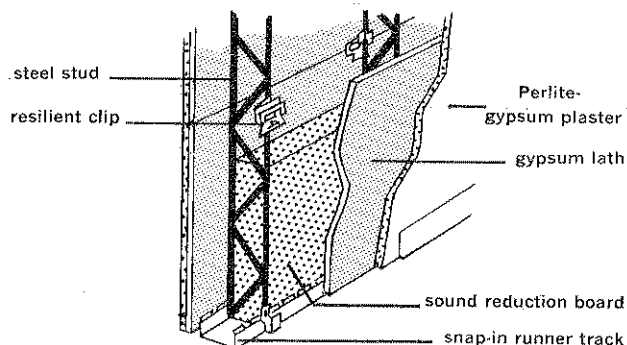


TABLE 2. RECOMMENDED MAXIMUM PROPORTIONS OF PERLITE PER 100 lb. (45.35 kg) OF GYPSUM PLASTER

|             | TWO COAT WORK            | THREE COAT WORK          |                            |
|-------------|--------------------------|--------------------------|----------------------------|
|             | DOUBLE-UP PLASTERING     | SCRATCH COAT             | BROWN COAT                 |
| GYPSUM LATH | 2 cu. ft.<br>(57 litres) | 2 cu. ft.<br>(57 litres) | **2 cu. ft.<br>(57 litres) |
| *MASONRY    |                          | 2 cu. ft.<br>(57 litres) | **2 cu. ft.<br>(57 litres) |
| METAL LATH  | 3 cu. ft.<br>(85 litres) | 3 cu. ft.<br>(85 litres) | 3 cu. ft.<br>(85 litres)   |

\*Except monolithic concrete.

\*\* Where plaster is 1 inch (26 mm) or more in total thickness the proportions for the second coat may be increased to 3 cu. ft. (85 litres).

| PARTITION SYSTEMS  |   | STC | Weight<br>psf<br>(kg/m <sup>2</sup> ) | Width<br>inches<br>(mm) |
|--|---|-----|---------------------------------------|-------------------------|
| 1/2 in. (13 mm) Perlite-gypsum plaster (1:2,1:2) on 3/8 in. (10 mm) gypsum lath each side of 3 1/4 in. (83 mm) steel studs. Lath held with resilient clips every other stud alternating each side and at free seams. | With 2 in. (51 mm) sound reduction board between studs.     | 50* | 12<br>(58.5)                          | 5 3/4<br>(146)          |
|  | Without sound reduction board.                              | 42* | 10.5<br>(51)                          | 5 3/4<br>(146)          |
| 1/2 in. (13 mm) sand-gypsum plaster (1:2, 1:2) on 3/8 in. (10 mm) gypsum lath each side of 3 1/4 in. (83 mm) steel studs. Lath fastened one side with resilient clips every stud.                                    | With 2 in. (51 mm) sound attenuation blanket between studs. | 50  | 14<br>(68)                            | 5 1/2<br>(140)          |
| 3/4 in. (19 mm) sand-gypsum plaster (1:2, 1:2) on 3/8 in. (10 mm) gypsum lath each side of 2 1/2 in. (64 mm) steel studs. Lath fastened one side with resilient clips every stud.                                    | With 2 in. (51 mm) mineral wool between studs.              | 50  | 18.2<br>(89)                          | 5 1/4<br>(133)          |

\* Data from Kodaras Acoustical Laboratories.



1 Scratch coat: 2 cu. ft. (57 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.  
Brown coat: 3 cu. ft. (85 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.

2 Scratch and brown coats: 2-1/2 cu. ft. (71 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.

3 Scratch and brown coats: 3 cu. ft. (85 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.

4 Scratch and brown coats: 4 cu. ft. (113 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.

5 Scratch and brown coats: 2 cu. ft. (57 litres) Perlite aggregate to 100 lbs. (45.35 kg) gypsum.

All tests conducted in accordance with American Standard Time-Temperature Test Procedure (ASTM E-119)

U.L.-Underwriters Laboratories

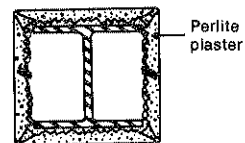
N.B.S.-National Bureau of Standards

I.C.B.O.-International Conference of Building Officials

O.S.U.-Ohio State University

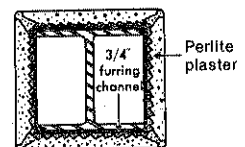
**4 HOURS**  
U.L. DESIGN  
No. X402

1-3/4 in. (45 mm) of perlite-gypsum plaster<sup>1</sup> on face of self-furring metal lath wrapped around column with expanded metal corner beads adjusted for the required plaster thickness.



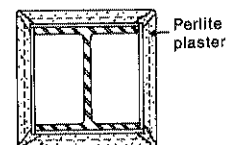
**4 HOURS**  
U.L. DESIGN  
No. X406

1-1/2 in. (38 mm) of perlite-gypsum plaster<sup>1</sup> on face of diamond mesh metal lath spaced from flanges by 3/4 in. (19 mm) cold-rolled furring channels at approx. 24 in. (610 mm) vertical spacings. Expanded metal corner beads. No back fill plaster required between metal lath and column flanges.



**4 HOURS**  
N.B.S.  
BMS-135

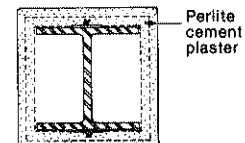
Two 3/4 in. (19 mm) coats of perlite-gypsum plaster<sup>1</sup> over two layers of 1/2 in. (13 mm) long-length gypsum lath held by tie wires and wrapped with 1 in. (26 mm) wire mesh. Expanded metal corner beads. Total thickness of plaster: 1-1/2 in. (38 mm).



**4 HOURS**  
U.L. DESIGN  
No. X407

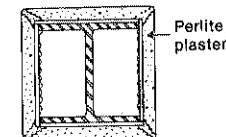
2-1/8 in. (54 mm) perlite-portland cement plaster<sup>\*\*</sup> machine applied to paperbacked wire fabric wrapped around column and reinforced with 2 in. (51 mm) wire mesh applied over scratch coat.

<sup>\*\*</sup>(Scratch and brown coat: 3-1/2 cu. ft. (100 litres) perlite plaster aggregate to 1 bag portland cement).



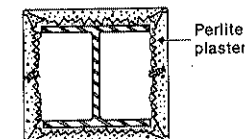
**3 HOURS**  
N.B.S.

1-3/8 in. (35 mm) of perlite-gypsum plaster<sup>1</sup> on 3/8 in. (10 mm) perforated gypsum lath boxed around column and fastened with wire ties.



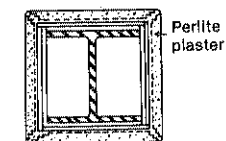
**3 HOURS**  
U.L. DESIGN  
No. X402

1-3/8 in. (35 mm) of perlite-gypsum plaster<sup>1</sup> on face of self-furring metal lath wrapped around column with expanded metal corner beads adjusted for the required plaster thickness.



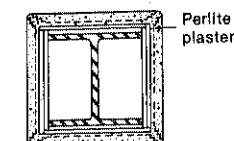
**3 HOURS**  
N.B.S.  
BMS-135

Two 3/4 in. (19 mm) coats of perlite-gypsum plaster, with 1 in. (26 mm) mesh fabric between coats; applied over one layer of 1/2 in. (13 mm) long-length gypsum lath held by tie wires. Expanded metal corner beads. Total thickness of plaster 1-1/2 in. (38 mm).



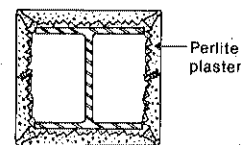
**3 HOURS**  
N.B.S.  
BMS-135

1 in. (26 mm) of perlite-gypsum plaster<sup>2</sup> over two layers 1/2 in. (13 mm) long-length gypsum lath held by tie wires and wrapped with 1 in. (26 mm) hexagonal wire mesh. Expanded metal corner beads.



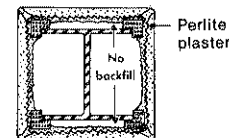
**2 HOURS**  
U.L. DESIGN  
No. X-402

1 in. (26 mm) of perlite-gypsum plaster<sup>1</sup> on face of self-furring metal lath wrapped around column with expanded metal corner beads adjusted for the required plaster thickness.



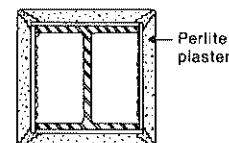
**2 HOURS**  
U.L. DESIGN  
No. X-401

1 in. (26 mm) of perlite-gypsum plaster<sup>1</sup> on face of metal lath furred 1-1/4 in. (32 mm) from flanges by metal lath spacers. No plaster fill behind metal lath. Expanded metal corner beads.



**2 HOURS**  
N.B.S.  
BMS-135

1 in. (26 mm) of perlite-gypsum plaster<sup>2</sup> on 3/8 in. (10 mm) thick perforated gypsum lath held by double strands of 18 ga. tie wires spaced 2 in. (51 mm) from ends of lath and spaced 15 in. (381 mm) at intermediate points. Expanded metal corner beads.

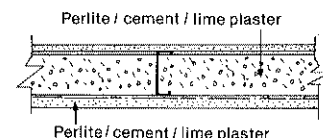


# Perlite

## Fire Ratings Walls and Partitions

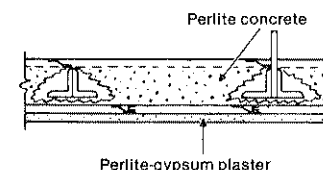
**4 HOURS**  
O.S.U.  
No. 5645

Non load-bearing exterior wall consisting of 7/8 in. (22 mm) perlite / cement / lime plaster over wire lath on exterior surface. Interior surface of 5/8 in. (16 mm) Type "X" gypsum wallboard screw attached to 3 5/8 in. (92 mm) Cee studs; 3 1/4 in. (83 mm) perlite / cement / lime backplaster spray applied in the stud cavity. Fire side-exterior surface. Achieved 2 hours when tested from gypsum wallboard side.



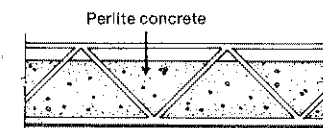
**4 HOURS**  
U.L. DESIGN  
No. U-201

Nonbearing wall 6 in. (152 mm) thick (not including weatherproof facade) consisting of 4 in. (102 mm) spray-applied perlite concrete on paper-backed wire fabric on one face; 1 in. (26 mm) perlite-gypsum plaster on paper and aluminum foilbacked wire fabric on other face, with furring channels forming 1 in. (26 mm) air space between the two sections.



**2 HOURS**  
U.L. DESIGN  
No. U-203

Non load-bearing wall consisting of 3 in. (76 mm) thickness perlite concrete spray-applied to paper-backed wire lath attached to 4 in. (102 mm) steel studs 16 in. (406 mm) on center.



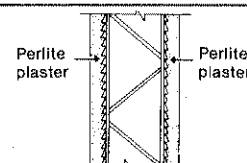
**2 HOURS**  
U.L. DESIGN  
No. U-413

2-1/2 in. (64 mm) thick non load-bearing solid partition of perlite-gypsum plaster<sup>1</sup> on a base of expanded metal lath supported by 3/4 in. (19 mm) cold-rolled steel channels set into floor base clips and ceiling runners.



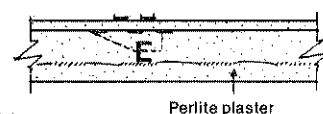
**2 HOURS**  
University  
of California  
Jan. 1948

Non load-bearing hollow partition of 4 in. (102 mm) metal studs protected on both sides with 1 in. (26 mm) perlite-gypsum plaster<sup>1</sup> on face of metal lath.



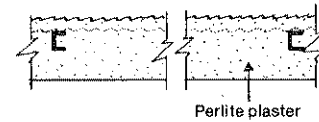
**2 HOURS**  
ICBO  
Research Report  
No. 2531

2-1/2 in. (64 mm) solid plaster nonbearing partition of 2-1/8 in. (54 mm) perlite-gypsum plaster applied on 3/8 in. (10 mm) type X gypsum lath; welded or woven wire lath is attached to the face side of the 3/4 in. (19 mm) metal channel studs.



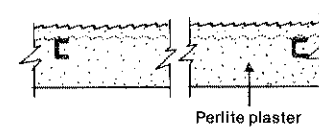
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2-1/2 in. (64 mm) perlite-gypsum plaster applied on self-furred metal lath attached to 3/4 in. (19 mm) metal channel studs, 12 in. (305 mm) on center.



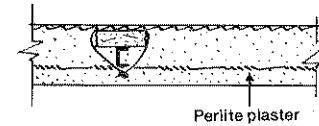
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2-1/2 in. (64 mm) perlite-gypsum plaster applied to self-furred paperback, welded or woven wire fabric wire tied to 3/4 in. (19 mm) metal channel studs, 12 in. (305 mm) on center.



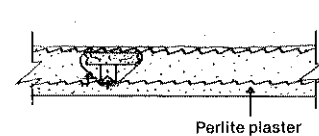
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2-1/2 in. (64 mm) perlite-gypsum plaster applied to welded or woven wire fabric wire tied to 3/4 in. (19 mm) metal channel studs with min. 5/8 in. (16 mm) thick gypsum strips attached to back side of studs.



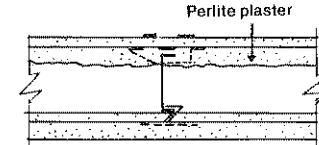
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2-1/2 in. (64 mm) perlite-gypsum plaster applied to metal lath or welded or woven wire fabric wire tied or nailed to 3/4 in. (19 mm) nailable channel studs with min. 5/8 in. (16 mm) thick gypsum strips attached to back side of studs.



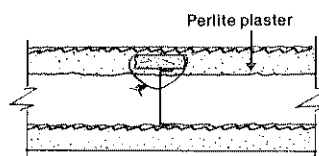
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Nonbearing partition 4-1/4 in. (108 mm) thick of 3/4 in. (19 mm) perlite-gypsum plaster applied over min. 3/8 in. (10 mm) type X gypsum lath attached to back side of 2-1/2 in. (64 mm) metal studs with resilient metal clips; 3/4 in. (19 mm) perlite-gypsum plaster applied over 3/8 in. (10 mm) type X gypsum lath attached perpendicular to front side of studs with standard metal clips.



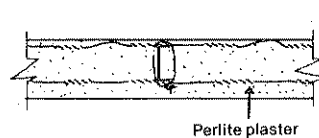
**2 HOURS**  
ICBO  
Research Report  
No. 2531

4-1/4 in. (108 mm) thick hollow nonbearing partition of 1 in. (26 mm) perlite-gypsum plaster applied over metal reinforcement installed on the back side of the assembly over 5/8 in. (16 mm) thick gypsum strips and wire tied to 2-1/2 in. (64 mm) metal studs; 1 in. (26 mm) perlite-gypsum plaster applied over paper-backed, welded or woven wire lath or metal lath wire tied to the front side of the assembly.



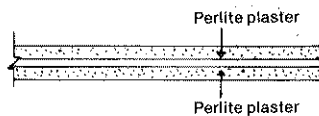
**2 HOURS**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2-1/2 in. (64 mm) perlite-portland cement plaster applied over self-furred paper-backed welded or woven wire lath, attached to the back side of 1-1/2 in. (38 mm) metal channel studs; welded or woven wire fabric lath without backing is attached to the face of the channel studs.



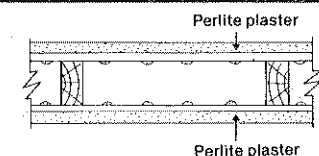
**1 1/2 HOURS**  
N.B.S.  
282 and 283

2 in. (51 mm) solid partition of perlite-gypsum plaster applied on 1/2 in. (13 mm) long-length gypsum lath 3/4 in. (19 mm) of plaster on both sides of lath.



**1 1/2 HOURS**  
N.B.S. 252

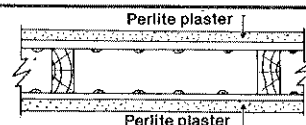
Non load-bearing partition of 2 in. x 4 in. (51 mm x 102 mm) wood studs, 16 in. (406 mm) on center, protected on both sides with 3/8 in. (10 mm) perforated gypsum lath covered with 1/2 in. (13 mm) of perlite-gypsum plaster.





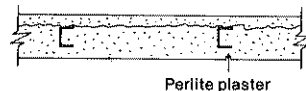
**1 1/4 HOURS**  
N.B.S. 251

Load-bearing partition. Construction the same as above Test No. 252.



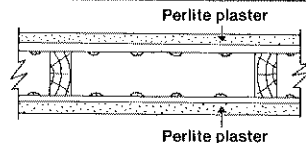
**1 HOUR**  
O.S.U.  
T-147

1-1/2 in. (38 mm) solid partition of perlite-gypsum plaster<sup>2</sup> applied over expanded metal lath on 3/4 in. (19 mm) steel channels.



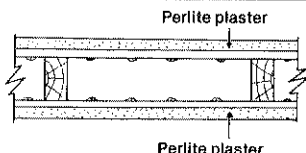
**1 HOUR**  
O.S.U.  
T-118

Hollow partition of 2 in. x 4 in. (51 mm x 102 mm) wood studs, 16 in. (406 mm) on center, protected on both sides by 1/2 in. (13 mm) of perlite-gypsum plaster<sup>2</sup> over perforated gypsum lath supported by special resilient clips.



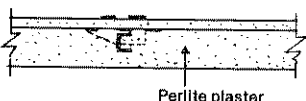
**1 HOUR**  
U.L. DESIGN  
No. U316

Hollow load-bearing partition of 2 in. x 4 in. (51 mm x 102 mm) wood studs, 16 in. (406 mm) on center, protected on both sides with 1/2 in. (13 mm) thick perlite-gypsum plaster<sup>2</sup> over 3/8 in. (10 mm) perforated gypsum lath.



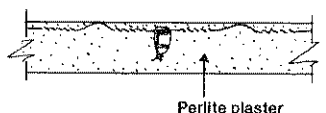
**1 HOUR**  
ICBO  
Research Report  
No. 2531

2 in. (51 mm) solid plaster nonbearing partition of 1-5/8 in. (41 mm) perlite-gypsum plaster applied on 3/8 in. (10 mm) type X gypsum lath.



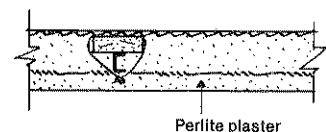
**1 HOUR**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2 in. (51 mm) perlite-gypsum plaster applied to self-furred paperbacked, welded or woven wire fabric lath attached to 3/4 in. (19 mm) metal channel studs, 16 in. (406 mm) on center.



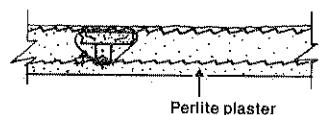
**1 HOUR**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2 in. (51 mm) perlite-gypsum plaster applied to welded or woven wire fabric lath wire tied to front side of 3/4 in. (19 mm) metal channel studs with 1/2 in. (13 mm) thick gypsum strips attached to back side of studs.



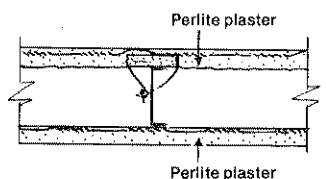
**1 HOUR**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2 in. (51 mm) perlite-gypsum plaster applied to metal lath or welded or woven wire fabric wire tied or nailed to 3/4 in. (19 mm) metal available channel studs with min. 1/2 in. (13 mm) thick gypsum strips attached to back side of studs.



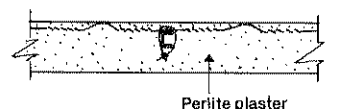
**1 HOUR**  
ICBO  
Research Report  
No. 2531

4 in. (102 mm) hollow nonbearing partition of 3/4 in. (19 mm) perlite-gypsum plaster applied over metal reinforcement attached to the back side of the assembly over 1/2 in. (13 mm) gypsum strips and wire tied to 2-1/2 in. (64 mm) metal studs. 3/4 in. (19 mm) perlite-gypsum plaster applied over paperbacked, welded or woven wire lath or metal lath wire tied to the front side of the assembly.



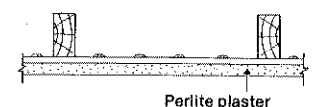
**1 HOUR**  
ICBO  
Research Report  
No. 2531

Solid plaster nonbearing partition of 2 in. (51 mm) perlite-portland cement plaster applied over self-furred paperbacked welded or woven wire fabric lath wire tied to back side of 3/4 in. (19 mm) metal channel studs.



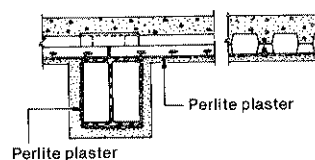
**1/2 HOUR**  
U.L. DESIGN  
No. U316

Interior finish on one face of wood studs in partitions or walls protected on one side with 1/2 in. (13 mm) perlite-gypsum plaster<sup>2</sup> on 3/8 in. (10 mm) perforated gypsum lath.



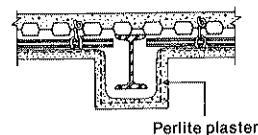
**5 HOURS**  
U.L. DESIGN  
No. A406

Ceiling of 1 in. (26 mm) perlite-gypsum plaster<sup>2</sup> on face of 3/8 in. (10 mm) rib metal lath specially tied direct to underside of steel floor units topped with 3-1/4 in. (83 mm) concrete. Beams wrapped with 3/8 in. (10 mm) rib metal lath and plastered 1-1/2 in. (38 mm) thick over face of lath with same mix. (Beam: 4-hour).



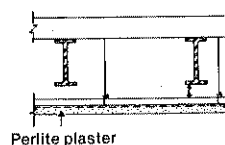
**4 HOURS**  
U.L. DESIGN  
No. A401

Floor and beam construction consisting of steel floor units mounted on steel members with 2 in. (51 mm) perlite concrete top flooring. Metal lath suspended ceiling spaced at least 3 in. (76 mm) from the steel members and covered with perlite-gypsum plaster<sup>3</sup> 1 in. (26 mm) thick over face of lath.



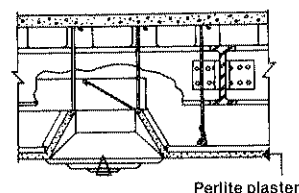
**4 HOURS**  
U.L. 2993-S

Suspended ceiling of 1 in. (26 mm) thick perlite-gypsum plaster<sup>3</sup> on face of metal lath spaced at least 3 in. (76 mm) from non-combustible structural members without a finished floor above. (NOTE: This rating applies to suspended ceilings beneath poured or precast concrete roofs, gypsum roofs, auditorium ceilings, etc.)



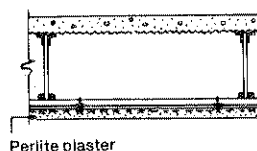
**4 HOURS**  
U.L. DESIGN  
No. A405

Floor and beam construction consisting of cellular steel floor units mounted on steel members with 2 in. (51 mm) conventional concrete top flooring. Metal lath ceiling suspended beneath beams and ducts, and covered with perlite-gypsum plaster 7/8 in. (22 mm) thick<sup>1</sup> on face of the lath. Duct openings not to exceed 70 in.<sup>2</sup> (452 cm<sup>2</sup>) per 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of ceiling; no more than one electrical outlet per 90 ft.<sup>2</sup> (8.4 m<sup>2</sup>) of ceiling.



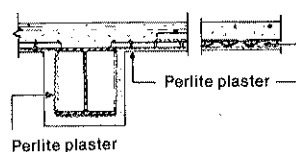
**4 HOURS**  
N.B.S.  
BMS-141

Ceiling of 1 in. (26 mm) perlite-gypsum plaster<sup>1</sup> on 3/8 in. (10 mm) perforated gypsum lath attached to 3/4 in. (19 mm) furring channels with interlocking wire clips. Plaster reinforced with 20 ga. wire mesh attached to furring channels. Floor slab: 2 in. (51 mm) concrete on metal lath.



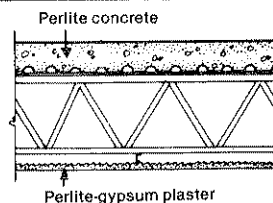
**4 HOURS**  
U.L. DESIGN  
No. D403

Ceiling of 3/8 (10 mm) perlite-gypsum plaster<sup>5</sup> measured from face of metal lath attached directly to underside of corrugated steel floor units topped with 4-1/2 in. (114 mm) of lightweight concrete; sufficient plaster pushed through lath to fill corrugations in the floor units. Beams wrapped with self-furring metal lath and plastered 1-1/2 in. (38 mm) thick over face of lath with same mix.



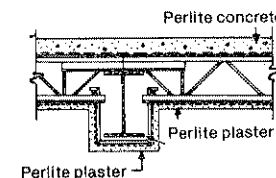
**3 HOURS**  
U.L. DESIGN  
No. P405

Roof deck of 2 in. (51 mm) minimum thickness perlite concrete on 28 gauge galvanized steel form units supported by steel joists 4 ft. (1.2 m) on center. Ceiling of 7/8 in. (22 mm) perlite-gypsum plaster<sup>5</sup> on expanded metal lath attached to 3/4 in. (19 mm) furring channels wire-tied to lower chord of joists.



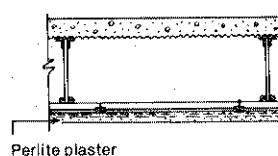
**3 HOURS**  
U.L. DESIGN  
No. P406

Roof deck of 2 1/2 in. (64 mm) perlite concrete on paper-backed welded wire mesh. Ceiling: 3/4 in. (19 mm) perlite-gypsum plaster<sup>1</sup> on face of high ribbed metal lath attached to lower chord of steel joists. (Beam 2-1/2 hours).



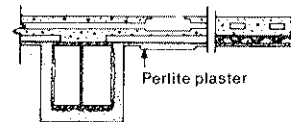
**3 HOURS**  
N.B.S.  
BMS-141

Ceiling of 5/8 in. (16 mm) perlite-gypsum plaster<sup>1</sup> on 3/8 in. (10 mm) perforated gypsum lath attached to 3/4 in. (19 mm) furring channels with interlocking wire clips. Plaster reinforced with 14 ga. galvanized wire attached to the clips. Floor slab: 2 in. (51 mm) concrete on metal lath.



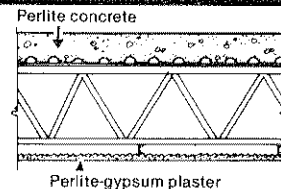
**3 HOURS**  
U.L. DESIGN  
No. D404

Same as 4-hour U. L. Design No. D 403, but with electrical raceways and junction boxes incorporated in floor slab: 1 in. (26 mm) plaster thickness on face of lath in 3 ft.<sup>2</sup> (.28m<sup>2</sup>) area centered below junction boxes; not more than one junction box per 80 ft.<sup>2</sup> (7.4 m<sup>2</sup>) of floor.



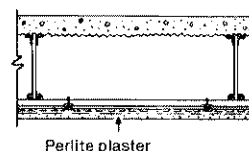
**2 HOURS**  
U.L. DESIGN  
No. P407

Roof deck of 2 in. (51 mm) minimum thickness perlite concrete on 28 gauge galvanized steel form units supported by steel joists 4 ft. (1.2 m) on center. Ceiling of 3/4 in. (19 mm) perlite-gypsum plaster<sup>5</sup> on expanded metal lath attached to 3/4 in. (19 mm) furring channels wire-tied to lower chord of joists.



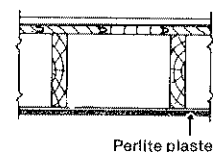
**2 HOURS**  
N.B.S.  
BMS-141

Ceiling of 1/2 in. (13 mm) perlite-gypsum plaster<sup>2</sup> on 3/8 in. (10 mm) perforated gypsum lath secured to furring channels with wire clips; 14 ga. galvanized wire secured diagonally below the lath and fastened to the wire clips. Floor slab: 2 in. (51 mm) concrete on metal lath.



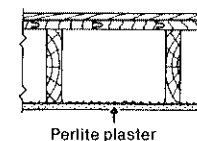
**1 3/4 HOURS**  
N.B.S. 256

Wood joists supporting wood floor protected on underside by 3/8 in. (10 mm) plain gypsum lath and 1 in. (26 mm) wire mesh nailed to joist and covered with 1/2 in. (13 mm) perlite-gypsum plaster<sup>2</sup>.



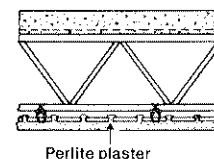
**1 1/2 HOURS**  
N.B.S. 281

Wood joists supporting wood floor protected on underside by expanded metal lath nailed to joists and covered with 5/8 in. (16 mm) perlite-gypsum plaster<sup>1</sup> measured from face of lath.



**1 1/2 HOURS**  
N.B.S.  
BMS-141

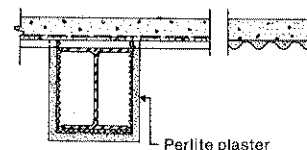
Open type steel joists with 2 in. (51 mm) reinforced concrete slab protected on the underside by 3/8 in. (10 mm) perforated gypsum lath attached to 3/4 in. (19 mm) furring channels with interlocking wire clips, plastered with 1 in. (26 mm) perlite-gypsum plaster<sup>1</sup>.



**1 HOUR**  
U.L. DESIGN  
No. P903

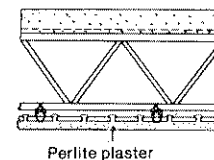
Galvanized corrugated steel deck units topped with 3-1/2 in. (89 mm)\*\* perlite concrete reinforced with 48-1214 wire mesh; no ceiling protection. Beams wrapped with metal lath and plastered with 7/8 in. (22 mm) perlite-gypsum plaster<sup>1</sup>.

\*\* (measured from bottom of corrugation; average perlite concrete thickness 2-5/8 in. (67 mm).



**1 HOUR**  
N.B.S.  
BMS-141

Steel joists 24 in. (610 mm) on center supporting 2 in. (51 mm) concrete floor protected on underside by 3/8 in. (10 mm) perforated gypsum lath and 5/8 in. (16 mm) thick perlite-gypsum plaster<sup>2</sup> supported by 3/4 in. (19 mm) furring channels and special metal clips.



**1 HOUR**  
N.B.S. 258

Wood joists supporting wood floors protected on underside by 3/8 in. (10 mm) perforated gypsum lath nailed on and covered with 1/2 in. (13 mm) perlite-gypsum plaster<sup>2</sup>.

