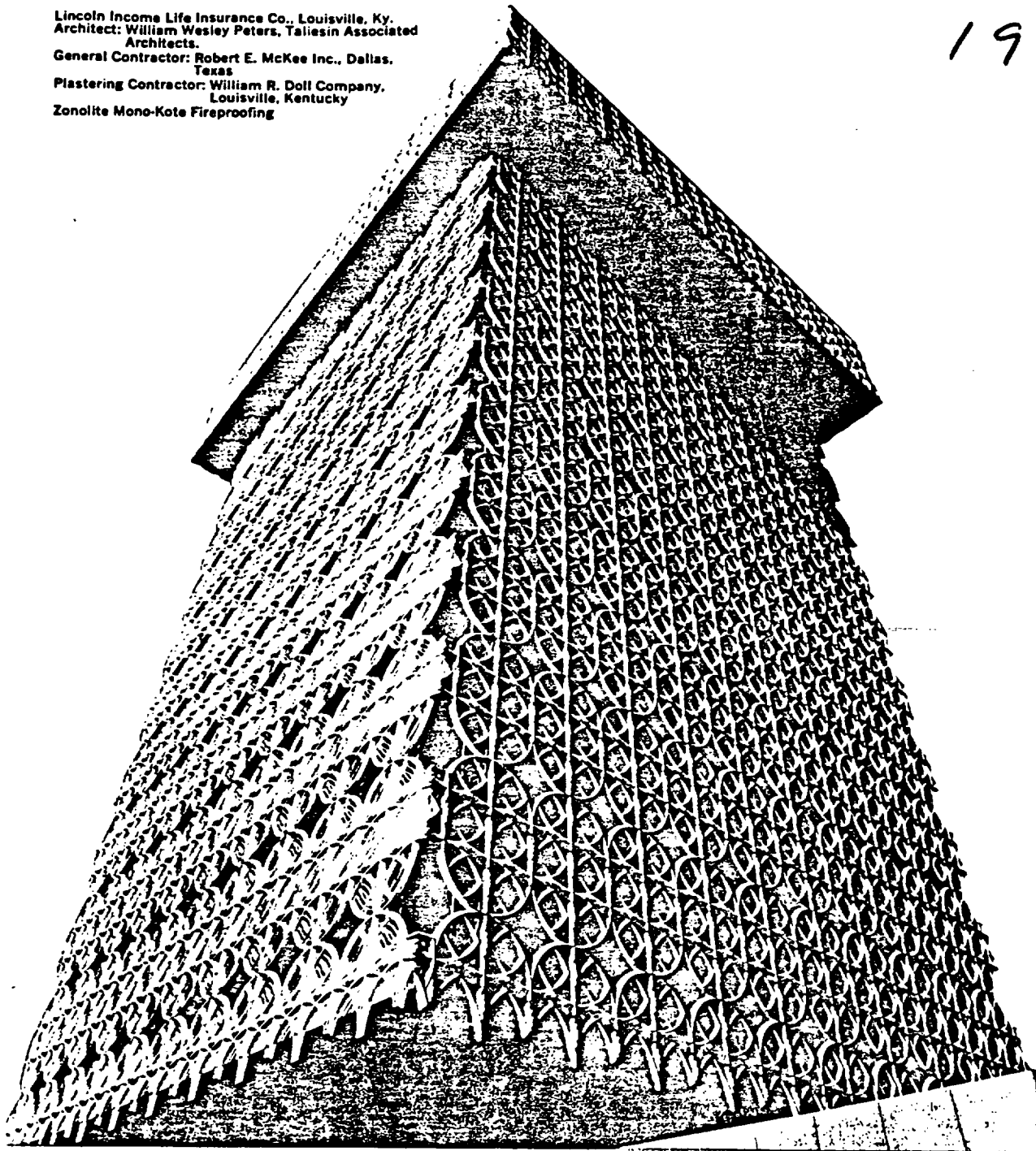


1967

Lincoln Income Life Insurance Co., Louisville, Ky.
Architect: William Wesley Peters, Taliesin Associated
Architects.
General Contractor: Robert E. McKee Inc., Dallas,
Texas
Plastering Contractor: William R. Doll Company,
Louisville, Kentucky
Zonolite Mono-Kote Fireproofing

A.I.A. No. 21-A-5



A.I.A. No. 21-A-5

ZONOLITE

VERMICULITE PLASTER AGGREGATE AND SPRAY-ON FIREPROOFING

ZONOLITE DIVISION, W. R. GRACE & CO.



ZONOLITE® MONO-KOTE®

DEFINITION

Mono-Kote is the trade name for a fire protection material developed by Zonolite Division, W. R. Grace & Co. specifically for fast application, high fire resistance, and low cost. The material is spray applied by any one of several plastering machines. Mono-Kote is a cementitious, mill-mixed material requiring only the addition of water at the job. It is applied directly to steel, concrete and other surfaces requiring fire protection.

TECHNICAL DATA

APPLIED DRY DENSITY:

1.5 lbs. per bd. ft. ($\pm 15\%$).

BOND STRENGTH TO STEEL:

More than 500 lb. per sq. ft. when set and dry.

BOND STRENGTH TO CONCRETE:

More than 500 lb. per sq. ft. when set and dry.

SOUND ATTENUATION:

The combination of beams and ceiling when fireproofed with Mono-Kote gives sound absorption of .50 to .85 depending upon the ratio of beam area to flat area. This is of value to the designer in accomplishing attenuation objectives, especially when the fireproofed area is part of a plenum above a finished ceiling.

COMPRESSIVE STRENGTH:

(2 in. cubes): More than 70 psi.

AIR EROSION RESISTANCE:

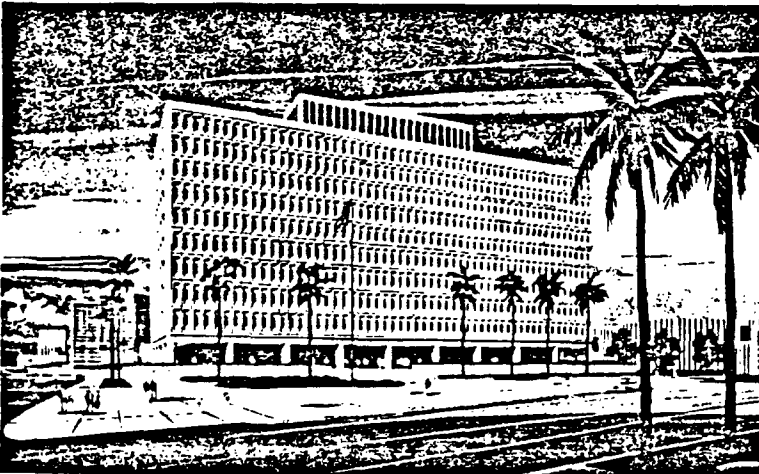
Independent laboratory test subjected standard, machine-applied Mono-Kote surface to winds exceeding hurricane velocity . . . over 100 M.P.H. for 87 hours . . . with no erosion. Copies of test description available.

FIRE RESISTANCE:

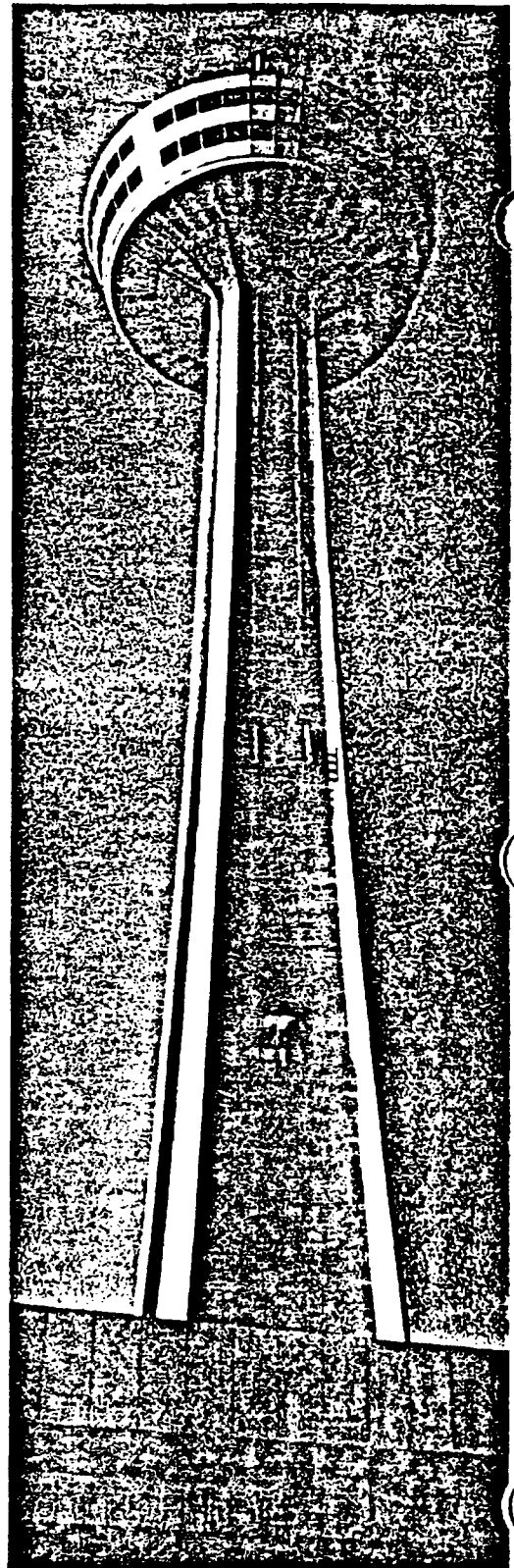
Mono-Kote has been tested and rated according to ASTM E-119 by the Underwriters' Laboratories, Inc. The material bears the U.L. label under a quality control inspection program. Fire resistance ratings and details for varied structural systems are available on request. To insure that architects and engineers have the benefit of the most recent ratings, it is suggested that they contact the local Zonolite office. Up to five hour ratings are available for steel beams. Ratings are also available on cellular, flat, or fluted, or blended steel floor systems and columns.

SPECIFICATION: (SHORT FORM)

Fire protection material shall be Mono-Kote as manufactured by the Zonolite Division, W. R. Grace & Co. or its processing Distributors, applied by machine to the thickness and in the areas shown on the drawings. The method of mixing and application shall conform to the manufacturer's recommendation. See page 3 for Long Form Specification.



Federal Office Building, Jacksonville, Florida
Architects and Engineers: Reynolds, Smith and Hills,
Jacksonville, Florida
General Contractor: Warrior Construction Co.,
Houston, Texas
Plastering Contractor: E. L. Thompson Plastering Co.,
Jacksonville, Florida
Zonolite Mono-Kote fireproofing



Niagara International Center and Skylon
Architects: Bregman and Hamann, Toronto, Ontario
Consulting Engineers: Farkas, Barron, Jablonsky,
Toronto, Ont.
General Contractor: Pigott Construction Co., Ltd.,
Hamilton, Ont.
Fireproofing Applicator: George Hannaford & Son, Ltd.
Hamilton, Ontario
Zonolite Mono-Kote fireproofing.

SPRAY-ON FIREPROOFING

SPECIFICATIONS

1. GENERAL CONDITIONS

All applicable revisions of the General Conditions and Special Conditions shall form a part of this Specification Section, except as may be modified herein.

2. SCOPE

- a) Work included — The work required under this section consists of furnishing all labor, materials and equipment necessary for sprayed fireproofing of structural steel members and metal decking, as indicated in the drawings and as specified herein, and clean-up subsequent to that application.
- b) Work not included —
 - 1) Structural steel encased in concrete.
 - 2) Trowelled plaster fireproofing is specified under the Plastering Section.
 - 3) The cleaning of the surfaces to receive sprayed fireproofing.
 - 4) In the event of sprayed fireproofing application in cold weather, the supply of temporary heat shall be by others, as defined in Section _____ of the specifications.

3. EXAMINATION & COORDINATION

- a) The contractor shall study the contract drawings and specifications with respect to the work, as shown and specified hereinafter, to assure its completeness. Supplementary items necessary to complete the work, though not definitely shown or specified, shall be brought to the architect's attention, and shall be included. The contractor's attention is directed to the drawings and specifications for both structural steel and metal decking, so that he may properly determine the exact scope of the work required.
- b) The contractor shall examine all surfaces to which the sprayed fireproofing is to be applied, and shall notify the General Contractor, in writing, if any conditions exist which would be detrimental to the proper and expeditious installation of the work. Starting of work, within an area, will be construed as acceptance of the conditions of that area.
- c) All clips, hangers, supports, sleeves and other attachments to the fireproofing bases, as covered under other sections of the specifications, are to be placed by others prior to the application of the fireproofing material, where these materials can be anticipated in advance.
- d) Ducts, piping (suit or other suspended equipment that could interfere with the uniform application of the fireproofing material are to be positioned after the application of the sprayed fireproofing.
- e) The contractor shall cooperate in the coordination and scheduling of the work of this section to avoid delays in the job progress.

4. SAMPLES

Samples of sprayed fireproofing shall be submitted for approval in accordance with the applicable provisions of the Special Conditions. These samples shall be representative of the material as applied in accordance with Acceptance & Performance Criteria as stated below.

5. ACCEPTANCE & PERFORMANCE CRITERIA

- a) The sprayed fireproofing shall have been tested by Underwriters' Laboratories, Inc. in accordance with the procedures of A. S. T. M. E119. The structural steel members shall be protected with adequate fireproofing thicknesses and densities to provide the following fire resistance ratings:

Steel Columns -Hours
Primary steel members (Girders) -Hours
Secondary steel members (Beams) -Hours

(Note: Secondary steel members are those which support only the floor system, and are spaced at $\frac{1}{2}$ the column spacing or less.)

- b) The sprayed fireproofing beneath the deck assembly together with adequately proportioned concrete fill above the metal decking, shall provide a _____

-Hour fire resistant deck assembly as substantiated by a fire test in accordance with the procedures of A. S. T. M. E119, and performed by Underwriters' Laboratories, Inc.

- c) Minimum bond strength between the fireproofing material and the structural steel or galvanized decking shall be _____ P. S. F.
- d) The fireproofing material shall not be subject to losses from the finished application by sifting, flaking or dusting. This performance shall be measured by the results of a test for erosion resistance when subjected to high velocity air flow across the surface of dried samples. The samples thus tested must be representative of machine applied material similar to that which can be expected on the project. The air velocity shall be not less than _____ feet per minute, and the duration of the test shall be at least _____ hours.
- e) Documentation of the above performance shall be submitted with the bid, in order that all parties will fully understand the intention of application performance at that time.

6. MATERIALS

- a) The sprayed fireproofing shall be cementitious setting-type, and shall be Mono-Kote as manufactured by Zonolite Division — W. R. Grace & Co., or its processing distributors.

All manufactured materials shall be mill-mixed and shall be delivered in original, unopened packages bearing the name of the product, the manufacturer's name and the Underwriters' Laboratories, Inc. Label. The materials shall be stored off the ground, under cover, and away from damp surfaces. Materials shall be kept dry until ready for use. Materials that have been exposed to water before actual use shall be discarded.

- b) Water shall be clean, fresh and free from organic and mineral impurities which would be harmful to the sprayed fireproofing materials.

7. INSTALLATION

- a) Application of sprayed fireproofing shall be in accordance with the printed instructions of the material manufacturer and the fire test report information.
- b) Only experienced applicators, approved by the materials manufacturer and Architect shall be allowed to place the materials. Upon request a qualified manufacturer's representative can be present for initial application to guide and assist applicator's personnel.
- c) All surfaces to which sprayed fireproofing will be applied shall be thoroughly cleaned of oil, grease, dirt, loose paint, mill scale or any other matter which would impair bond.
- d) Temperatures and enclosure conditions shall be as specified by the materials manufacturer.
- e) All patching and repairing of sprayed fireproofing, due to cutting by other trades, shall be performed under this section and paid for by the trade(s) that performed the cutting.

8. CLEAN-UP

After completion of fireproofing work, equipment shall be removed and all wall and floor areas cleaned of deposits of sprayed fireproofing materials.

9. BID INFORMATION

Each bidder shall submit with his bid:

- a) Full report(s) of Underwriters' Laboratories, Inc. fire tests including written material and detailed drawings of the tested assembly.
- b) Materials manufacturer's printed instructions for methods and procedures of application.
- c) Bond test data for uncoated, coated and galvanized steel applications.
- d) Results of tests of material performance when subjected to high velocity air flow.

ZONOLITE DIVISION, W. R. GRACE & CO

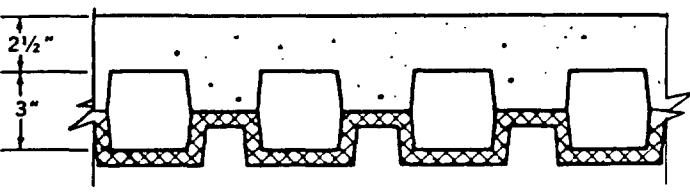
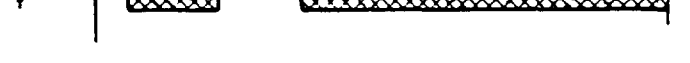
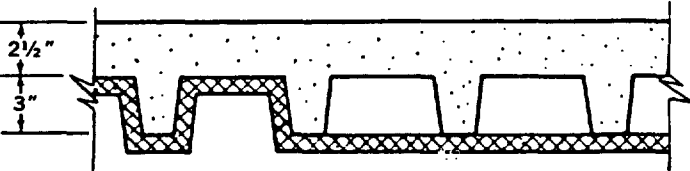
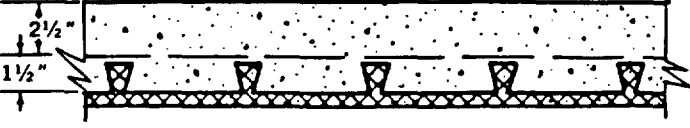
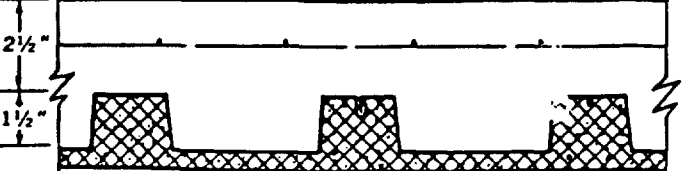
ZONOLITE® MONO-KOTE®

DESCRIPTION FIRE-RESISTANCE RATINGS

MONO-KOTE is the trade name for a fire protection material developed by Zonolite Division, W. R. Grace & Co. specifically for fast application, high fire resistance, and low cost. The material is spray applied by any one of several plastering machines. MONO-KOTE is a cementitious, mill-mixed material requiring only the addition of water at the job. It is applied directly to steel, concrete and other surfaces requiring fire protection.

MONO-KOTE has been tested and rated according to ASTM

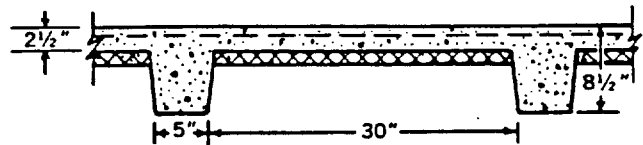
E-119 by the Underwriters' Laboratories, Inc. The material bears the U.L. label under a quality control inspection program. Fire resistance ratings and details for varied structural systems are available on request. To insure that architects and engineers have the benefits of the most recent ratings, it is suggested that they contact the local Zonolite office. Five hour ratings are available for steel beams. Ratings are also available on cellular, flat, or fluted, or blended steel floor systems and columns. (All ratings Underwriters' Laboratories, Inc.)

DESCRIPTION	RATING	SYSTEM
2½" sand-concrete fill, ¼" ZONOLITE MONO-KOTE following contour of underside of deck with an additional ¼" across top of flute.	3 hrs.	
2½" sand-concrete fill, ¼" ZONOLITE MONO-KOTE following contour of underside of deck with an additional ¼" across top of flute.	2 hrs.	
2½" sand-concrete fill, ZONOLITE MONO-KOTE ¼" thick applied to underside of steel floor as shown.	3 hrs.	
2½" sand-concrete fill, ZONOLITE MONO-KOTE ¼" thick applied to underside of steel floor with ½" on top and sides of flute.	2 hrs.	
Note: 1½" deep steel floor section.		
2½" sand-gravel concrete, ZONOLITE MONO-KOTE ¼" thick applied to underside of steel deck as shown, with additional ¼" at top and sides of flutes, 1½" under trench header ducts.	3 hrs.	
2½" sand-concrete fill, ZONOLITE MONO-KOTE applied directly to underside of steel floor with ¼" under flat plate, add ¼" at top and sides of flutes and 1" under filled flutes under 36" trench header duct.	2 hrs.	
Note: 3" deep steel floor section. Trench header duct not shown.		
3¼" sand-concrete fill, ZONOLITE MONO-KOTE applied directly to underside of steel floor ½" below corrugations.	4 hrs.	
2½" sand-concrete fill, ZONOLITE MONO-KOTE ¼" thick applied directly to underside of steel floor as shown.	3 hrs.	
2½" sand-concrete fill, ZONOLITE MONO-KOTE ¼" below filled flutes to underside of steel floor as shown.	2 hrs.	

SPRAY-ON FIREPROOFING

2½" sand-gravel concrete slab. ZONOLITE MONO-KOTE ⅝" thick applied directly under slab as shown.

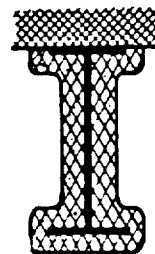
2 hrs.



ZONOLITE MONO-KOTE applied direct to structural steel beams and girders.

½"	
½"	
½"	

4 hrs.
3 hrs.
2 hrs.

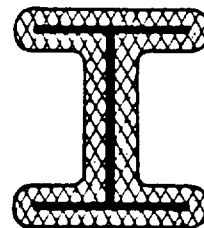


ZONOLITE MONO-KOTE applied directly to structural steel columns.

1¼"	 4 hrs.	2¼"	
¾"	 3 hrs.	1¾"	
Minimum column		1½"	
14 WF 228.		All Columns.	

(Additional ratings on other side)

4 hrs.
3 hrs.
2 hrs.

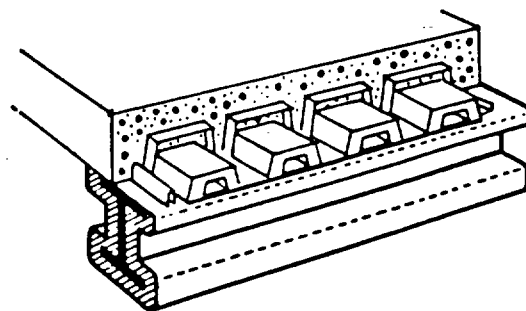


2½" sand-gravel concrete. ZONOLITE MONO-KOTE composite floor — beam design applied ⅝" on underside of blended, fluted and cellular 1½" steel floor. ½" of MONO-KOTE on top and sides of flute.

2 hrs.

Composite beam — ¾" following contour. (Shear strap in composite system may be replaced by shear lugs.)

4 hrs.



ZONOLITE® VERMICULITE

DESCRIPTION

Zonolite Plaster Aggregate is a specially graded vermiculite produced under rigid quality controls in more than 45 Zonolite plants in the United States and Canada.

When used with gypsum in plaster, it results in a lightweight, insulating, fire-resistant plaster for either hand or machine application.

ZONOLITE PLASTER AGGREGATE BASECOAT PROPORTIONS

Base	MIXES		Thickness including Finish Coat*
	100 lbs. Gypsum	Cu. ft. Zonolite	
Gypsum Lath	1	2	½" min.
Metal Lath	1	2	¾" min.
Masonry	1	3	¾" min.
Monolithic Concrete** Ceilings	1	3	¾" min.
Walls	1	3	¾" min.

*Greater thickness may be required for fire retardant ratings. See Vermiculite Institute "Fire Resistance Ratings."

**If monolithic concrete ceiling or wall surfaces require more than ¾" or ¾", respectively, of plaster to produce desired lines or surfaces, metal lath or wire lath shall be attached thereto. In extreme cases, metal furring may be required.

TECHNICAL DATA

Weight: Approximately 1½ lbs. per sq. ft. at ½ in. thickness.

Gradation:

Conforms to ASTM C35. Listed and inspected under Re-examination Service of Underwriters' Laboratories, Inc.

Fire Resistance:

See partial list of fire resistance ratings below. Consult your local Zonolite office for the most recent rating.

K Factor: 0.95 (Sand Plaster, 3.0).

Notes:

(1) Zonolite Plaster Aggregate should be used with gypsum plaster that has been especially formulated for lightweight aggregates.

(2) If Zonolite plaster is applied directly to exterior masonry walls, wall design should insure impermeability to wind-driven rain, and an interior surface above the dew point.

FIRE RESISTANCE RATINGS

1¼" ZONOLITE PLASTER over the face of self-furring metal lath wrapped around column.

4 hrs.

Same as above except 1¾" ZONOLITE PLASTER over face of self-furring metal lath.

3 hrs.

1½" ZONOLITE PLASTER over the face of metal lath. Lath spaced 1¼" from column flanges. Space behind lath on flange faces filled with plaster, as shown.

4 hrs.

Same as above except 1" ZONOLITE PLASTER over face of metal lath.

3 hrs.

2" ZONOLITE-portland cement PLASTER over paper-backed wire fabric wrapped around column with an additional wire fabric (no paper) over scratch coat.

4 hrs.

Column protected with 1½" ZONOLITE PLASTER applied over two layers of ½" thick long length plain gypsum lath wrapped with one layer of hexagonal mesh poultry netting.

4 hrs.

Same protection as above except 1" ZONOLITE PLASTER applied over gypsum lath.

3½ hrs.

Column protected with 1" ZONOLITE PLASTER applied over one layer of ¾" thick perforated gypsum lath.

2 hrs.

2½" sand-concrete fill. 1" ZONOLITE PLASTER on metal lath or 2½" sand-concrete fill on formed steel floor. ¾" furring channels with ¾" ZONOLITE PLASTER on metal lath.

4 hrs.

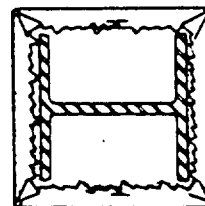
2½" sand-concrete fill. ¾" ZONOLITE PLASTER on metal lath.

3 hrs.

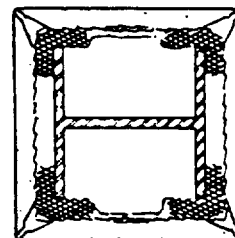
2" sand-concrete fill. ¾" ZONOLITE PLASTER on metal lath.

2½-hrs.

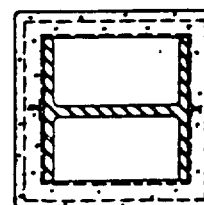
COLUMNS



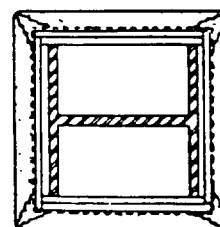
Metal Lath



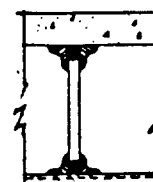
Paper-Backed
Wire Fabric



Gypsum Lath



Steel Joists or
Light Steel
Construction



PLASTER AGGREGATE

SPECIFICATIONS

MATERIALS —

Gypsum plasters shall conform to ASTM C28. Zonolite vermiculite shall conform to ASTM C35. Metal shall be protected against rusting.

SURFACE PREPARATION —

All surfaces to receive plaster shall be carefully inspected and in proper condition prior to plastering. Angles shall be straight and true.

THICKNESS —

Proper grounds shall provide for minimum thickness of plaster (see table below).

MIXING —

Zonolite vermiculite plaster may be mixed by hand or machine. When machine mixed, use following sequence:

- (1) Charge mixer with water.
- (2) Add aggregate.
- (3) Add plaster.
- (4) Mix to desired consistency, adding water as required.
 - a. Setting Time—Zonolite vermiculite plaster shall set in 2-4 hours.

1" of ZONOLITE PLASTER over the face of metal lath. At least 2½" air space between structural members and back of metal lath.

¾" of ZONOLITE PLASTER plus ½" of ZONOLITE ACOUSTICAL PLASTIC over the face of metal lath. At least 2½" air space between structural members and back of metal lath.

¾" of ZONOLITE PLASTER over the face of metal lath. Ceiling openings for two duct outlets as shown and for two electrical outlet boxes; aggregate area of openings not to exceed 100 sq. in. in each 100 sq. ft. of ceiling area. Duct openings protected by dampers.

1" of ZONOLITE PLASTER on metal lath furred or in contact with the lower flange of supporting primary beams

¾" of ZONOLITE PLASTER on metal lath furred or in contact with the lower flange of supporting primary beams.

ZONOLITE PLASTER on metal lath — supported on wire or channel hangers. ¾" plaster.

1" of ZONOLITE PLASTER applied to each face of ½" thick long length plain gypsum lath. No studs. Overall thickness of partition 2½".

¾" of ZONOLITE PLASTER applied to each face of ½" thick long length plain gypsum lath. No studs. Overall thickness of partition 2".

ZONOLITE PLASTER applied on metal lath fastened to incombustible studs spaced 16" on centers. Overall thickness of partition 2½".

ZONOLITE PLASTER applied on metal lath fastened to incombustible studs spaced 16" on centers. Overall thickness of partition 2".

- b. Machine application: Use unfibred gypsum plaster, designated "for Machine Application" by the gypsum manufacturer.

APPLICATION OF BASE COATS —

Use two or three coat work depending on plaster base. For detailed directions on solid plaster partitions, hollow stud partitions and other bases, consult Manufacturer or refer to ASA or Vermiculite Institute Standard Specifications.

APPLICATION OF FINISH COATS —

Gypsum-sand float finish, Keene's Cement-lime-sand-float finish, machine-applied gypsum vermiculite texture finish, or mill-mixed acoustical plasters (Zonolite Acoustical Plastic) shall be applied following ASA or Vermiculite Institute Standard Specifications. Gypsum-lime putty trowel finishes shall include approximately ½ cu. ft. (50 lbs.) fine silica sand per 100 lbs. gauging plaster.

ZONOLITE FINISH COAT —

Finish Coats are available for application to acoustical plasters or may be applied directly to concrete as a texture coat. When applied to a thickness of ¼" over acoustical plasters, Zonolite Finish Coat will not adversely affect sound absorption. Zonolite Finish Coat is mill-mixed, requiring only the addition of water at the job. It is applied by any one of several pump type plaster machines or air-spray texture guns. It has a light reflectivity of 65%.

BEAMS, GIRDERS & TRUSSES

4 hrs.

4 hrs.

3 hrs.

4 hrs.

3 hrs.

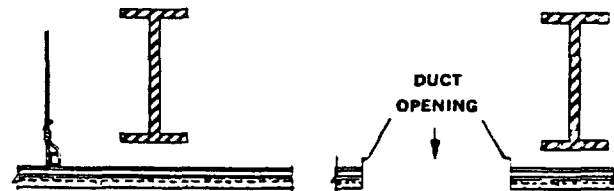
4 hrs.

2 hrs.

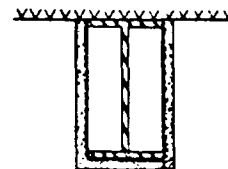
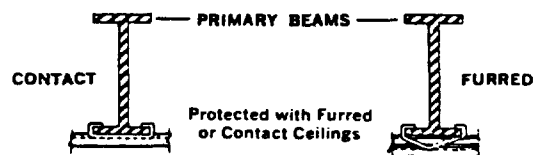
1 hr.

2 hrs.

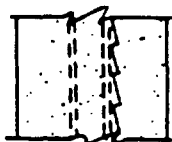
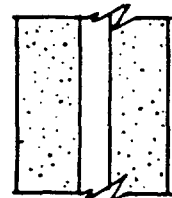
1 hr.



Protected with
Suspended Ceilings



SOLID PLASTER PARTITIONS



ZONOLITE DIVISION, W. R. GRACE & CO.

OTHER ZONOLITE PRODUCTS

ZONOLITE Vermiculite CONCRETE AGGREGATE

For insulating concrete roof deck applications over vented galvanized steel, formboard, structural and pre-cast concrete. For current catalog, send for CA-140.

ZONOLITE Vermiculite MASONRY FILL INSULATION

Water-repellent insulation for cores and cavities in masonry construction. Doubles thermal insulation in most systems. Full details in catalog MF-83.

ZONOLITE DYFOAM® EXPANDED POLYSTYRENE

In roll or board form, for perimeter insulation, cold storage, flotation, innumerable uses. Send for catalog DF-26.

ZONOLITE DYFOAM® NOISE CONTROL BOARD

Specially-laminated polystyrene for sound-deadening in wall and ceiling systems. Full details and test data in SC-101.

ZONOLITE Vermiculite ATTIC INSULATION

Free-flowing, permanent, mineral granules for insulation of horizontal spaces. Can be applied directly over existing inadequate insulation. Ask for brochure HI-203.

ZONOLITE Glass Fiber INSULATION

Full range of widths, thicknesses for any R-factor requirement. Foil-faced, kraft-faced or plain. Details in brochure HI-203.

ZONOLITE SALES OFFICES

ZONOLITE DIVISION W. R. GRACE & CO.

ALABAMA, Birmingham 35205
2800 Fifth Ave., South

ARIZONA, Phoenix 85031
4220 West Glenrosa

ARKANSAS, North Little Rock
72114
P. O. Box 294

CALIFORNIA
Los Angeles 90041
758 Colorado Blvd
Los Angeles 90041
P. O. Box 41077

Modesto 95351
416 Hosmer Street
P. O. Box 862
Newark 94560
6851 Smith Avenue
P. O. Box 217

COLORADO, Denver
111 S. Navajo Street

FLORIDA
Boca Raton 33432
P. O. Box 67

Boca Raton
1555 N.W. First Avenue

Hialeah
1050 S.E. 5th Street
Jacksonville 32202
1530 East Adams St.

Tampa, 35th St. & 3rd Ave.
P. O. Box 5047, Ybor Station

GEORGIA, Atlanta 30306
1167 Zonolite Place, N.E.
P. O. Box 8127, Station F

GEORGIA, Atlanta
520 Permalume Place N.W.

ILLINOIS, Chicago 60643
12300 South Ashland Avenue

KANSAS, Wichita 67214
1463 Barwise Avenue

KENTUCKY, Wilder, Newport 41070
112 North Street

LOUISIANA, New Orleans 70121
4729 River Road
P. O. Box 10262

MARYLAND, Beltsville, 20705
P. O. Box 347

Polystyrene
Perlite

MASSACHUSETTS, Easthampton
01027
P. O. Box 112

MICHIGAN, Dearborn 48120
14300 Henn Avenue

MINNESOTA, Minneapolis 55422
4725 Olson Hwy.

MISSOURI, Kansas City 64105
515 Madison Street

MISSOURI, St. Louis 63110
1705 Sulphur Avenue

MONTANA, Libby 59923
P. O. Box 607

NEBRASKA, Omaha
36th and 1 Street

NEW JERSEY, Trenton 08607
336 Whitehead Road
P. O. Box 2124

NEW YORK, Weedsport 13166
P. O. Box 310

NORTH CAROLINA, High Point
27260
1701 Prospect Street, Extension
P. O. Box 1308

OHIO, Cincinnati
1250 N. Street
Cincinnati 45227
2303 N. Harding Avenue

PENNSYLVANIA, Ellwood City
16117
12th and Factory Streets

PENNSYLVANIA, New Castle
15607
202 East Cherry Street
Box 1207

PUERTO RICO, Cupey Bajo.
Kn. 0.5
Insular Highway 845

SOUTH CAROLINA, Travelers Rest
29690
P. O. Box 517

TEXAS, Houston 77008
611 West 22nd Street

WASHINGTON, Auburn 98002
P. O. Box A

WASHINGTON, Spokane, 99201
1318 N. Maple Street

WISCONSIN, Milwaukee
900 North 43rd St.

PROCESSING DISTRIBUTORS

HAWAII, Honolulu (17)
Vermiculite Of Hawaii
842-A Mapunapuna Street

MONTANA, Great Falls 59401
Robinson Insulation Co.
1226 North River Drive
P. O. Box 1419

NEW MEXICO, Albuquerque 87107
Southwest Vermiculite Co.
5119 Edith Boulevard, N.E.
P. O. Box 6302

NORTH DAKOTA, Minot 58702
Robinson Insulation Co.
P. O. Box 1782

OKLAHOMA, Oklahoma City 73111
Texas Vermiculite Co.
201 North Eastern
P. O. Box 11402

TENNESSEE, Nashville 37204
Tennessee Zonolite Co.
4061 Powell Avenue

TEXAS

Dallas 75222
Texas Vermiculite Co.
2651 Manila Road
P. O. Box 6306

Houston 77008
Vermiculite Products, Inc.
P. O. Box 7327

Lubbock
Southwest Vermiculite Co.
Route 3, Box 1918

San Antonio
Texas Vermiculite Co.
P. O. Box 9114

UTAH, Salt Lake City 84110
Vermiculite-Intermountain, Inc.
333 W. First South
P. O. Box 2398

CANADA

ALBERTA
Calgary
Grant Industries
A Division of Eddy Match
Company, Limited
4030 8th St., S. E.
Box 69, Postal Station "A"

Edmonton
Grant Industries
A Division of Eddy Match
Company, Limited
8602-106A Avenue
P. O. Box 174

Lethbridge
Grant Industries
A Division of Eddy Match
Company, Limited
3003 Leaside Avenue
P. O. Box 1104

BRITISH COLUMBIA
Vancouver (4)
Grant Industries
A Division of Eddy Match
Company, Limited
476 Industrial Avenue
Vancouver (5)
Grant Industries
A Division of Eddy Match
Company, Limited
1075 Melville Street

MANITOBA
Winnipeg (10)
Grant Industries
A Division of Eddy Match
Company, Limited
760 Wall Street

ONTARIO

St. Thomas
F. Hyde & Company, Ltd.
94 Woodward Avenue
Toronto (18)
F. Hyde & Company, Ltd.
3349A Bloor Street, West
Toronto (9)
F. Hyde & Company, Ltd.
3540 Dundas Street, West
P.Q., Montreal (9)
F. Hyde & Company, Ltd.
2315 Cote de Liesse Road

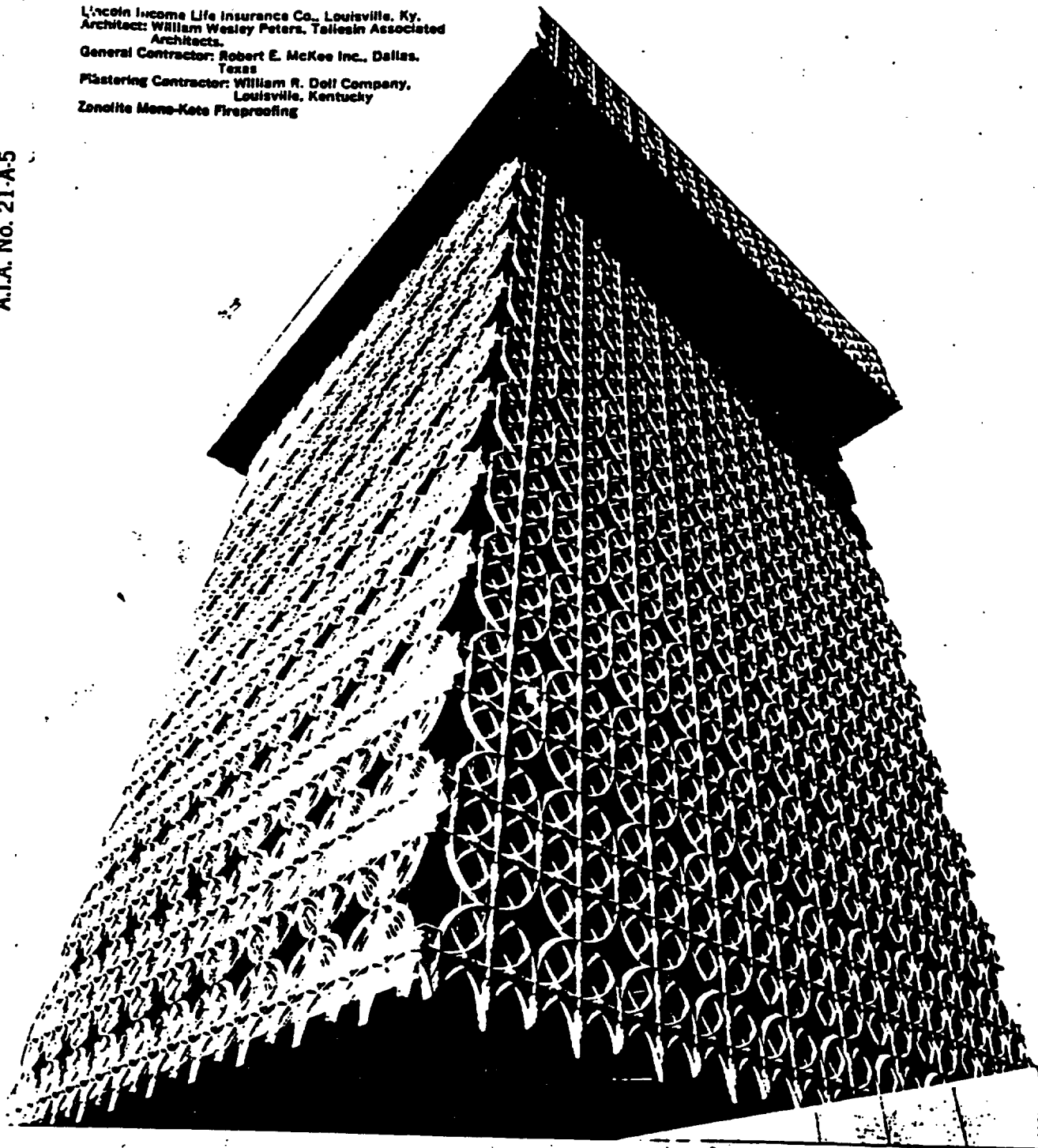
SASK., Regina
Grant Industries
A Division of Eddy Match
Company, Limited
1035 Angus Street
P. O. Box 1213

SASK., Saskatoon
Grant Industries
A Division of Eddy Match
Company, Limited
733-1st Ave. North
P. O. Box 1040

GRACE

Lincoln Income Life Insurance Co., Louisville, Ky.
Architect: William Wesley Peters, Talliesin Associated
Architects.
General Contractor: Robert E. McKee Inc., Dallas,
Texas
Plastering Contractor: William R. Doll Company,
Louisville, Kentucky
Zonolite Mono-Kote Fireproofing

A.I.A. No. 21-A-5



A.I.A. No. 21-A-5X

VERMICULITE PLASTER AGGREGATE AND SPRAY-ON FIREPROOFING
ZONOLITE DIVISION, W. R. GRACE & CO.



ZONOLITE® MONO-KOTE®

DEFINITION

Mono-Kote is the trade name for a fire protection material developed by Zonolite Division, W. R. Grace & Co. specifically for fast application, high fire resistance, and low cost. The material is spray applied by any one of several plastering machines. Mono-Kote is a cementitious, mill-mixed material requiring only the addition of water at the job. It is applied directly to steel, concrete and other surfaces requiring fire protection.

TECHNICAL DATA

APPLIED DRY DENSITY:

1.5 lbs. per bd. ft. ($\pm 15\%$).

BOND STRENGTH TO STEEL:

More than 500 lb. per sq. ft. when set and dry.

BOND STRENGTH TO CONCRETE:

More than 500 lb. per sq. ft. when set and dry.

SOUND ATTENUATION:

The combination of beams and ceiling when fireproofed with Mono-Kote gives sound absorption of .50 to .85 depending upon the ratio of beam area to flat area. This is of value to the designer in accomplishing attenuation objectives, especially when the fireproofed area is part of a plenum above a finished ceiling.

COMPRESSIVE STRENGTH:

(2 in. cubes): More than 70 psi.

AIR EROSION RESISTANCE:

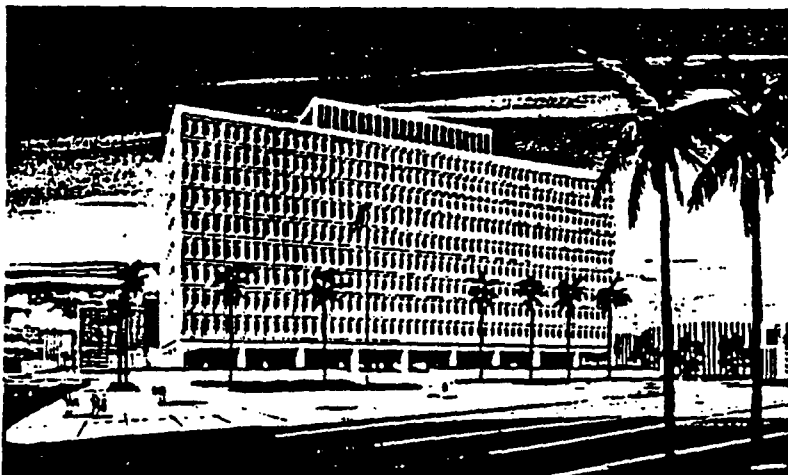
Independent laboratory test subjected standard, machine-applied Mono-Kote surface to winds exceeding hurricane velocity . . . over 100 M.P.H. for 87 hours . . . with no erosion. Copies of test description available.

FIRE RESISTANCE:

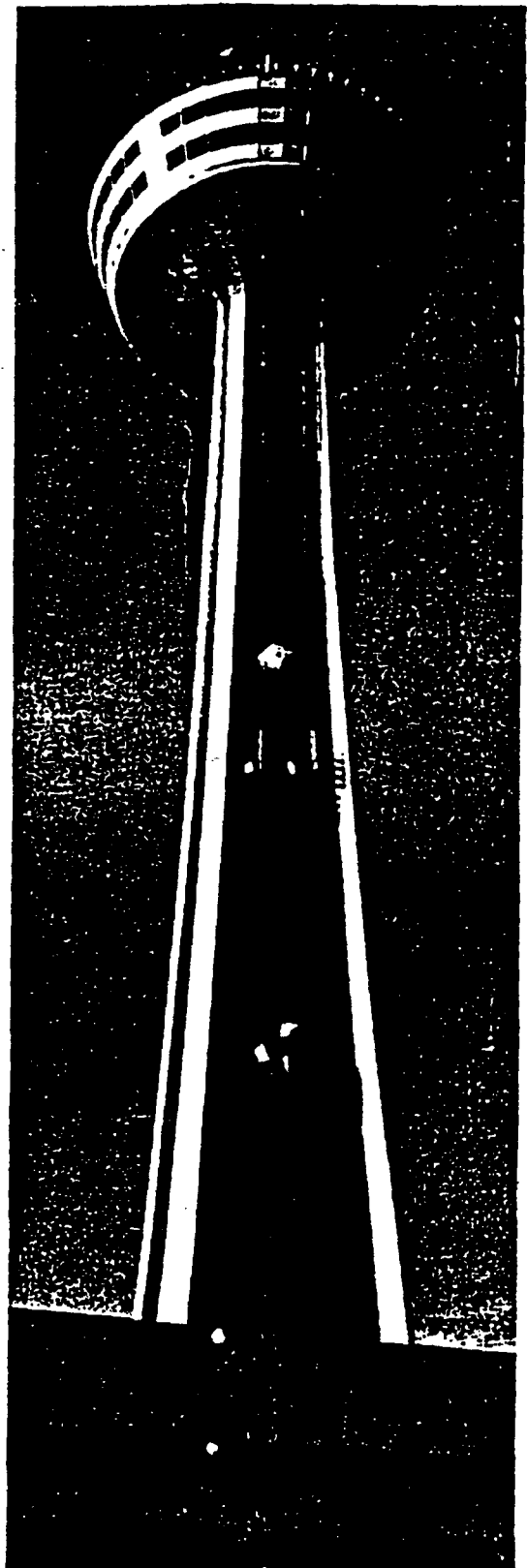
Mono-Kote has been tested and rated according to ASTM E-119 by the Underwriters' Laboratories, Inc. The material bears the U.L. label under a quality control inspection program. Fire resistance ratings and details for varied structural systems are available on request. To insure that architects and engineers have the benefit of the most recent ratings, it is suggested that they contact the local Zonolite office. Up to five hour ratings are available for steel beams. Ratings are also available on cellular, flat, or fluted, or blended steel floor systems and columns.

SPECIFICATION: (SHORT FORM)

Fire protection material shall be Mono-Kote as manufactured by the Zonolite Division, W. R. Grace & Co. or its processing Distributors, applied by machine to the thickness and in the areas shown on the drawings. The method of mixing and application shall conform to the manufacturer's recommendation. See page 3 for Long Form Specification.



Federal Office Building, Jacksonville, Florida
Architects and Engineers: Reynolds, Smith and Hills,
Jacksonville, Florida
General Contractor: Warrior Construction Co.,
Houston, Texas
Plastering Contractor: E. L. Thompson Plastering Co.,
Jacksonville, Florida
Zonolite Mono-Kote fireproofing



Niagara International Center and Skyline
Architects: Bregman and Hamann, Toronto, Ontario
Consulting Engineers: Farkas, Barron, Jablonsky,
Toronto, Ont.
General Contractor: Pigott Construction Co., Ltd.,
Hamilton, Ont.
Fireproofing Applicator: George Hannaferd & Son, Ltd.
Hamilton, Ontario
Zonolite Mono-Kote fireproofing.

SPRAY-ON FIREPROOFING

SPECIFICATIONS

1. GENERAL CONDITIONS

All applicable revisions of the General Conditions and Special Conditions shall form a part of this Specification Section, except as may be modified herein.

2. SCOPE

- a) Work included — The work required under this section consists of furnishing all labor, materials and equipment necessary for sprayed fireproofing of structural steel members and metal decking, as indicated in the drawings and as specified herein, and clean-up subsequent to that application.
- b) Work not included —
 - 1) Structural steel encased in concrete.
 - 2) Trowelled plaster fireproofing is specified under the Plastering Section.
 - 3) The cleaning of the surfaces to receive sprayed fireproofing.
 - 4) In the event of sprayed fireproofing application in cold weather, the supply of temporary heat shall be by others, as defined in Section _____ of the specifications.

3. EXAMINATION & COORDINATION

- a) The contractor shall study the contract drawings and specifications with respect to the work, as shown and specified hereinafter, to assure its completeness. Supplementary items necessary to complete the work, though not definitely shown or specified, shall be brought to the architect's attention, and shall be included. The contractor's attention is directed to the drawings and specifications for both structural steel and metal decking, so that he may properly determine the exact scope of the work required.
- b) The contractor shall examine all surfaces to which the sprayed fireproofing is to be applied, and shall notify the General Contractor, in writing, if any conditions exist which would be detrimental to the proper and expeditious installation of the work. Starting of work, within an area, will be construed as acceptance of the conditions of that area.
- c) All clips, hangers, supports, sleeves and other attachments to the fireproofing bases, as covered under other sections of the specifications, are to be placed by others prior to the application of the fireproofing material, where these materials can be anticipated in advance.
- d) Ducts, piping or conduit or other suspended equipment that could interfere with the uniform application of the fireproofing material are to be positioned after the application of the sprayed fireproofing.
- e) The contractor shall cooperate in the coordination and scheduling of the work of this section to avoid delays in the job progress.

4. SAMPLES

Samples of sprayed fireproofing shall be submitted for approval in accordance with the applicable provisions of the Special Conditions. These samples shall be representative of the material as applied in accordance with Acceptance & Performance Criteria as stated below.

5. ACCEPTANCE & PERFORMANCE CRITERIA

- a) The sprayed fireproofing shall have been tested by Underwriters' Laboratories, Inc. in accordance with the procedures of A. S. T. M. E119. The structural steel members shall be protected with adequate fireproofing thicknesses and densities to provide the following fire resistance ratings:

Steel Columns _____ Hours
Primary steel members (Girders) _____ Hours
Secondary steel members (Beams) _____ Hours

(Note: Secondary steel members are those which support only the floor system, and are spaced at $\frac{1}{2}$ the column spacing or less.)

- b) The sprayed fireproofing beneath the deck assembly together with adequately proportioned concrete fill above the metal decking, shall provide a _____

Hour fire resistant deck assembly as substantiated by a fire test in accordance with the procedures of A. S. T. M. E119, and performed by Underwriters' Laboratories, Inc.

- c) Minimum bond strength between the fireproofing material and the structural steel or galvanized decking shall be _____ P. S. F.
- d) The fireproofing material shall not be subject to losses from the finished application by sifting, flaking or dusting. This performance shall be measured by the results of a test for erosion resistance when subjected to high velocity air flow across the surface of dried samples. The samples thus tested must be representative of machine applied material similar to that which can be expected on the project. The air velocity shall be not less than _____ feet per minute, and the duration of the test shall be at least _____ hours.
- e) Documentation of the above performance shall be submitted with the bid, in order that all parties will fully understand the intention of application performance at that time.

6. MATERIALS

- a) The sprayed fireproofing shall be cementitious setting-type, and shall be Mono-Kote as manufactured by Zonolite Division — W. R. Grace & Co., or its processing distributors.

All manufactured materials shall be mill-mixed and shall be delivered in original, unopened packages bearing the name of the product, the manufacturer's name and the Underwriters' Laboratories, Inc. Label. The materials shall be stored off the ground, under cover, and away from damp surfaces. Materials shall be kept dry until ready for use. Materials that have been exposed to water before actual use shall be discarded.

- b) Water shall be clean, fresh and free from organic and mineral impurities which would be harmful to the sprayed fireproofing materials.

7. INSTALLATION

- a) Application of sprayed fireproofing shall be in accordance with the printed instructions of the material manufacturer and the fire test report information.
- b) Only experienced applicators, approved by the materials manufacturer and Architect shall be allowed to place the materials. Upon request a qualified manufacturer's representative can be present for initial application to guide and assist applicator's personnel.
- c) All surfaces to which sprayed fireproofing will be applied shall be thoroughly cleaned of oil, grease, dirt, loose paint, mill scale or any other matter which would impair bond.
- d) Temperatures and enclosure conditions shall be as specified by the materials manufacturer.
- e) All patching and repairing of sprayed fireproofing, due to cutting by other trades, shall be performed under this section and paid for by the trade(s) that performed the cutting.

8. CLEAN-UP

After completion of fireproofing work, equipment shall be removed and all wall and floor areas cleaned of deposits of sprayed fireproofing materials.

9. BID INFORMATION

Each bidder shall submit with his bid:

- a) Full report(s) of Underwriters' Laboratories, Inc. fire tests including written material and detailed drawings of the tested assembly.
- b) Materials manufacturer's printed instructions for methods and procedures of application.
- c) Bond test data for uncoated, coated and galvanized steel applications.
- d) Results of tests of material performance when subjected to high velocity air flow.

ZONOLITE DIVISION, W. R. GRACE & CO

PRE-REGISTER RATINGS

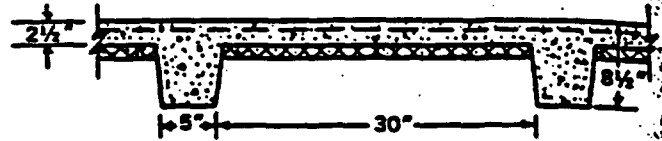
Under the Federal Highway Administration's Federal-Aid Highway Act, a quantity discount is available on the purchase of steel beams and steel joists. The systems are available on request to all steel fabricating engineers. However, the benefits of the discount are not available if the engineer suggested that they contact the local distributor. The discount is available for steel beams. Ratings are not available for steel joists. Ratings are available for built-up I-beams, flat or curved, or blended steel joists. For more information, contact Underwriters Laboratories, Inc.

4

SPRAY-ON FIREPROOFING

2½" sand-gravel concrete slab. ZONOLITE MONO-KOTE ¾" thick applied directly under slab as shown.

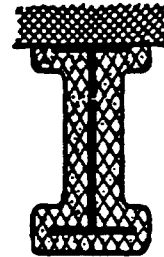
2 hrs.



ZONOLITE MONO-KOTE applied direct to structural steel beams and girders.

½"	
½"	
½"	

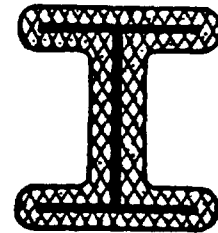
4 hrs.
3 hrs.
2 hrs.



ZONOLITE MONO-KOTE applied directly to structural steel columns.

1¼".....	4 hrs.	2¼".....	4 hrs.
¾".....	3 hrs.	1¾".....	3 hrs.
Minimum column		1½".....	2 hrs.
14 WF 228.		All Columns.	

(Additional ratings on other side)

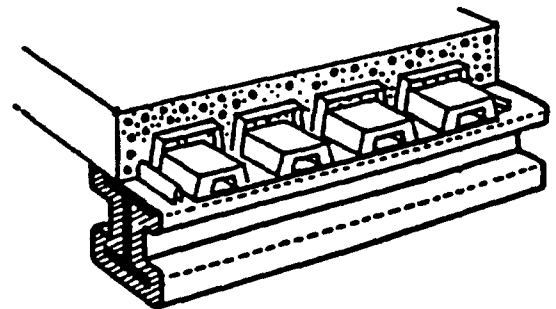


2½" sand-gravel concrete. ZONOLITE MONO-KOTE composite floor — beam design applied ¾" on underside of blended, fluted and cellular 1½" steel floor. ½" of MONO-KOTE on top and sides of flute.

2 hrs.

Composite beam — ¾" following contour. (Shear strap in composite system may be replaced by shear lugs.)

4 hrs.



ZONOLITE VERMICULITE

DESCRIPTION

Zonolite Plaster Aggregate is a specially graded vermiculite processed under rigid quality controls in more than 45 Zonolite plants in the United States and Canada.

When used with gypsum in plaster, it results in a lightweight, resisting fire-resistant plaster for either hand or machine application.

ZONOLITE PLASTER AGGREGATE BASECOAT PROPORTIONS

Base	MOLES		Thickness including Finish Coat*
	100 lbs. Gypsum	Cu. ft. Zonolite	
Gypsum Lath	1	3	1/2" min.
Steel Lath	1	2	5/8" min.
Masonry	1	3	5/8" min.
Monolithic Concrete** Ceilings Walls	1 1	3 3	5/8" min. 5/8" min.

*Greater thickness may be required for fire retardant ratings. See Vermiculite Institute "Fire Resistance Ratings."

**Monolithic concrete ceiling or wall surfaces require more than 5/8" or 1/2" respectively, of plaster to produce desired lines or surfaces, metal lath or wire lath shall be attached thereto. In extreme cases, metal furring may be required.

TECHNICAL DATA

Weight: Approximately 1 1/2 lbs. per sq. ft.

Grades:

Conforms to ASTM C35. Listed and inspected by the examination Service of Underwriters' Laboratories.

Fire Resistance:

See partial list of fire resistance ratings below. Consult your local Zonolite office for the most recent rating.

K Factor: 0.95 (Sand Plaster, 3.0).

Notes:

(1) Zonolite Plaster Aggregate should be used with gypsum plaster that has been especially formulated for lightweight aggregates.

(2) If Zonolite plaster is applied directly to exterior masonry walls, wall design should insure impermeability to wind-driven rain, and an interior surface above the dew point.

FIRE RESISTANCE RATINGS

1 1/2" ZONOLITE PLASTER over the face of self-furring metal lath wrapped around column.

4 hrs.

Same as above except 1 1/2" ZONOLITE PLASTER over face of self-furring metal lath.

3 hrs.

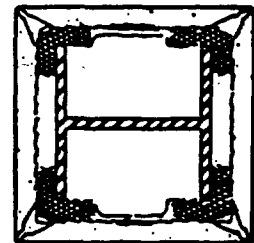
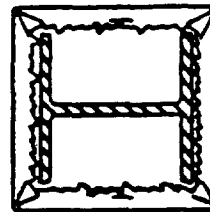
1 1/2" ZONOLITE PLASTER over the face of metal lath. Lath spaced 1 1/4" from column flanges. Space behind lath on flange faces filled with plaster, as shown.

4 hrs.

Same as above except 1" ZONOLITE PLASTER over face of metal lath.

3 hrs.

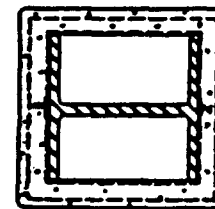
COLUMNS



Metal Lath

2" ZONOLITE-portland cement PLASTER over paper-backed wire fabric wrapped around column with an additional wire fabric (no paper) over scratch coat.

4 hrs.



Paper-Backed Wire Fabric

Column protected with 1 1/2" ZONOLITE PLASTER applied over two layers of 1/2" thick long length plain gypsum lath wrapped with one layer of hexagonal mesh poultry netting.

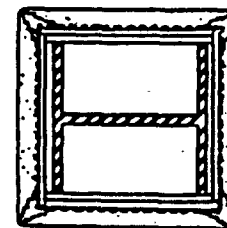
4 hrs.

Same protection as above except 1" ZONOLITE PLASTER applied over gypsum lath.

3 1/2 hrs.

Column protected with 1" ZONOLITE PLASTER applied over one layer of 3/4" thick perforated gypsum lath.

2 hrs.



Gypsum Lath

2 1/2" sand-concrete fill. 1" ZONOLITE PLASTER on metal lath or 2 1/2" sand-concrete fill on formed steel floor. 3/4" furring channels with 3/4" ZONOLITE PLASTER on metal lath.

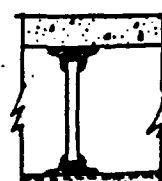
4 hrs.

2 1/2" sand-concrete fill. 3/4" ZONOLITE PLASTER on metal lath.

3 hrs.

2" sand-concrete fill. 3/4" ZONOLITE PLASTER on metal lath.

2 1/2 hrs.



Steel Joists or Light Steel Construction

PLASTER AGGREGATE

SPECIFICATIONS

MATERIALS

Gypsum plaster shall conform to ASTM C28. Zonolite vermiculite plaster shall conform to ASTM C35. Metal shall be protected against rusting.

SURFACE PREPARATION

All surfaces to receive plaster shall be carefully inspected and in proper condition prior to plastering. Angles shall be straight and true.

THICKNESS

Proper grounds shall provide for minimum thickness of plaster (see table below).

MIXING

Zonolite vermiculite plaster may be mixed by hand or machine. When machine mixed, use following sequence:

- (1) Charge mixer with water.
- (2) Add aggregate.
- (3) Add plaster.
- (4) Mix to desired consistency, adding water as required.

Setting Time—Zonolite vermiculite plaster shall set in 2-4 hours.

b. Machine application: Use unfibred gypsum plaster designated "for Machine Application" by the gypsum manufacturer.

APPLICATION OF BASE COATS

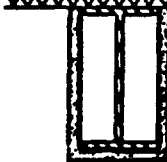
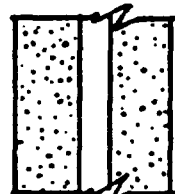
Use two or three coat work depending on plaster base. For detailed directions on solid plaster partitions, hollow partitions and other bases, consult Manufacturer or refer to ASA or Vermiculite Institute Standard Specifications.

APPLICATION OF FINISH COATS

Gypsum-sand float finish, Keene's Cement-lime-sand float finish, machine-applied gypsum vermiculite texture finish, or mill-mixed acoustical plasters (Zonolite Acoustical Plaster) shall be applied following ASA or Vermiculite Institute Standard Specifications. Gypsum-lime putty trowel finishes shall include approximately 1/4 cu. ft. (50 lbs.) fine silica sand per 100 lbs. gauging plaster.

ZONOLITE FINISH COAT

Finish Coats are available for application to acoustical plasters or may be applied directly to concrete as a texture coat. When applied to a thickness of 1/4" over acoustical plasters, Zonolite Finish Coat will not adversely affect sound absorption. Zonolite Finish Coat is mill-mixed, requiring only the addition of water at the job. It is applied by any one of several pump type plaster machines or air-spray texture guns. It has a light reflectivity of 65%.

1" of ZONOLITE PLASTER over the face of metal lath. At least 2 1/2" air space between structural members and back of metal lath.	4 hrs.	BEAMS, GIRDERS & TRUSSES	
3/4" of ZONOLITE PLASTER plus 1/2" of ZONOLITE ACOUSTICAL PLASTER over the face of metal lath. At least 2 1/2" air space between structural members and back of metal lath.	4 hrs.		
3/4" of ZONOLITE PLASTER over the face of metal lath. Ceiling openings for two duct outlets as shown and for two electrical outlet boxes; aggregate area of openings not to exceed 100 sq. in. in each 100 sq. ft. of ceiling area. Duct openings protected by dampers.	3 hrs.		
1" of ZONOLITE PLASTER on metal lath furred or in contact with the lower flange of supporting primary beams.	4 hrs.	 CONTACT PRIMARY BEAMS FURRED Protected with Furred or Contact Ceilings	
3/4" of ZONOLITE PLASTER on metal lath furred or in contact with the lower flange of supporting primary beams.	3 hrs.		
ZONOLITE PLASTER on metal lath—supported on wire or channel hangers. 3/4" plaster.	4 hrs.	 Individually Protected	
1" of ZONOLITE PLASTER applied to each face of 1/2" thick long length plain gypsum lath. No studs. Overall thickness of partition 2 1/2".	2 hrs.	SOLID PLASTER PARTITIONS	
3/4" of ZONOLITE PLASTER applied to each face of 1/2" thick long length plain gypsum lath. No studs. Overall thickness of partition 2".	1 hr.		
ZONOLITE PLASTER applied on metal lath fastened to incombustible studs spaced 16" on centers. Overall thickness of partition 2 1/2".	2 hrs.	 Gypsum Lath	
ZONOLITE PLASTER applied on metal lath fastened to incombustible studs spaced 16" on centers. Overall thickness of partition 2".	1 hr.	 Metal Lath	

ZONOLITE DIVISION, W. R. GRACE & C

OTHER ZONOLITE PRODUCTS

ZONOLITE Vermiculite CONCRETE AGGREGATE

For insulating concrete roof deck applications over vented galvanized steel, formboard, structural and pre-cast concrete. For current catalog, send for CA-140.

ZONOLITE Vermiculite MASONRY FILL INSULATION

Water-repellent insulation for cores and cavities in masonry construction. Doubles thermal insulation in most systems. Full details in catalog MF-83.

ZONOLITE DYFOAM® EXPANDED POLYSTYRENE

In roll or board form, for perimeter insulation, cold storage, flotation, innumerable uses. Send for catalog DF-26.

ZONOLITE DYFOAM® NOISE CONTROL BOARD

Specially-laminated polystyrene for sound-deadening in wall and ceiling systems. Full details and test data in SC-101.

ZONOLITE Vermiculite ATTIC INSULATION

Free-flowing, permanent, mineral granules for insulation of horizontal spaces. Can be applied directly over existing inadequate insulation. Ask for brochure HI-203.

ZONOLITE Glass Fiber INSULATION

Full range of widths, thicknesses for any R-factor requirement. Foil-faced, kraft-faced or plain. Details in brochure HI-203.

ZONOLITE SALES OFFICES

ZONOLITE DIVISION W. R. GRACE & CO.

ALABAMA, Birmingham 35205
2800 Fifth Ave., South
ARIZONA, Phoenix 85031
4220 West Glenrosa
ARKANSAS, North Little Rock
72114
P. O. Box 294
CALIFORNIA
Los Angeles 90041
758 Colorado Blvd.
Los Angeles 90041
P. O. Box 41077
Modesto 95351
416 Hoarmer Street
P. O. Box 862
Newark 94560
6851 Smith Avenue
P. O. Box 217
COLORADO, Denver
111 S. Navajo Street
FLORIDA
Boca Raton 33432
P. O. Box 67
Boca Raton
1555 N.W. First Avenue
Hialeah
1050 S.E. 5th Street
Jacksonville 32202
1530 East Adams St.
Tampa, 35th St. & 3rd Ave.
P. O. Box 5047, Ybor Station
GEORGIA, Atlanta 30306
1167 Zonolite Place, N.E.
P. O. Box 6127, Station F
GEORGIA, Atlanta
520 Perimeter Place N.W.
ILLINOIS, Chicago 60643
12300 South Ashland Avenue
KANSAS, Wichita 67214
1463 Barwise Avenue
KENTUCKY, Wilder, Newport 41070
112 North Street
LOUISIANA, New Orleans 70121
4729 River Road
P. O. Box 10262
MARYLAND, Beltsville, 20705
P. O. Box 347

*Polystyrene
**Perlite

MASSACHUSETTS, Easthampton
01027
P. O. Box 112

MICHIGAN, Dearborn 48120
14300 Mann Avenue

MINNESOTA, Minneapolis 55422
4725 Olson Hwy.

MISSOURI, Kansas City 64109
815 Madison Street

MISSOURI, St. Louis 63110
1705 Sulphur Avenue

MONTANA, Libby 59923
P. O. Box 607

NEBRASKA, Omaha
36th and I Street

NEW JERSEY, Trenton 08607
336 Whithead Road
P. O. Box 2124

NEW YORK, Weedsport 13166
P. O. Box 310

NORTH CAROLINA, High Point
27260
1701 Prospect Street, Extensor
P. O. Box 1308

OHIO, Cleveland
1125 W. 11th Street

OREGON, Portland 97227
2303 N. Harding Avenue

PENNSYLVANIA, Ellwood City
16117
12th and Factory Streets

PENNSYLVANIA, New Castle
202 East Cherry Street
Box 1207

PUERTO RICO, Cupey Bajo,
Kn. 0.5
Insular Highway 845

SOUTH CAROLINA, Travelers Rest
29690
P. O. Box 517

TEXAS, Houston 77008
611 West 22nd Street

WASHINGTON, Auburn 98022
P. O. Box A

WASHINGTON, Spokane, 99201
1318 N. Maple Street

WISCONSIN, Milwaukee
900 North 43rd St.

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842-A Mapunapuna Street
MONTANA, Great Falls 59401
Robinson Insulation Co.
1226 North River Drive
P. O. Box 1419

NEW MEXICO, Albuquerque 87107
Southwest Vermiculite Co.
3119 Edith Boulevard, N.E.
P. O. Box 6302

NORTH DAKOTA, Minot 58702
Robinson Insulation Co.
P. O. Box 1782

OKLAHOMA, Oklahoma City 73111
Texas Vermiculite Co.
201 North Eastern
P. O. Box 11402

TENNESSEE, Nashville 37204
Tennessee Zonolite Co.
4061 Powell Avenue

TEXAS

Dallas 75222
Texas Vermiculite Co.
2651 Manila Road
P. O. Box 6306

Houston 77008
Vermiculite Products, Inc.
P. O. Box 7327

Lubbock
Southwest Vermiculite Co.
Route 3, Box 1918

San Antonio
Texas Vermiculite Co.
P. O. Box 9114

UTAH, Salt Lake City 84110
Vermiculite-Intermountain, Inc.
333 W. First South
P. O. Box 2398

CANADA

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Calgary
Grant Industries
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4030 8th St. S. E.
Box 69, Postal Station "A"

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Company, Limited
8602-106A Avenue
P. O. Box 174

Lethbridge
Grant Industries
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Company, Limited
3003 Leaside Avenue
P. O. Box 1104

BRITISH COLUMBIA
Vancouver (4)
Grant Industries
A Division of Eddy Match
Company, Limited
476 Industrial Avenue
Vancouver (5)
Grant Industries
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Company, Limited
1075 Melville Street

MANITOBA
Winnipeg (10)
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St. Thomas
F. Hyde & Company, Ltd.
94 Woodward Avenue

Toronto (18)
F. Hyde & Company, Ltd.
1349A Bloor Street, West

Toronto (3)
F. Hyde & Company, Ltd.
3540 Dundas Street, West

P.Q., Montreal (9)
F. Hyde & Company, Ltd.
2315 Cote de Liesse Road

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SASK., Saskatoon
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