

04502203

PLAINTIFF'S  
EXHIBIT  
IWKG-87

# ZONOLITE

## Fireproofing

GRACE

CEMENTITIOUS (PLASTER)

10 X 13 NEWS

04502204

**MONO-KOTE**

Mono-Kote is the trade name for a fire protection material developed by Construction Products 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-mix material requiring only the addition of water at the job. It applied directly to steel, concrete and other surfaces requiring fire protection.

## SPRAY-ON FIREPROOFING

### TECHNICAL DATA

14PS. HELVETICA MED.

**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. Mono-Kote has been tested for other properties such as corrosion resistance, deflection, bond-impact, surface hardness. These tests comply with G.S.A. requirements and are available upon request.

**FIRE HAZARD:** Tested and reported in accordance with ASTM E-84 by Underwriters' Laboratories, Inc. Flame Spread-10, Fuel Contributed-5, Smoke Developed-0.

**DRY DENSITY:** Approximately 22 p.c.f. U. L., Inc. lists 18 p.c.f. minimum average density.

**BOND STRENGTH TO STEEL OR CONCRETE:** More than 500 lb. per sq. ft. when set and dry.

**COMPRESSIVE STRENGTH (2 in. cubes):** More than 70 psi.

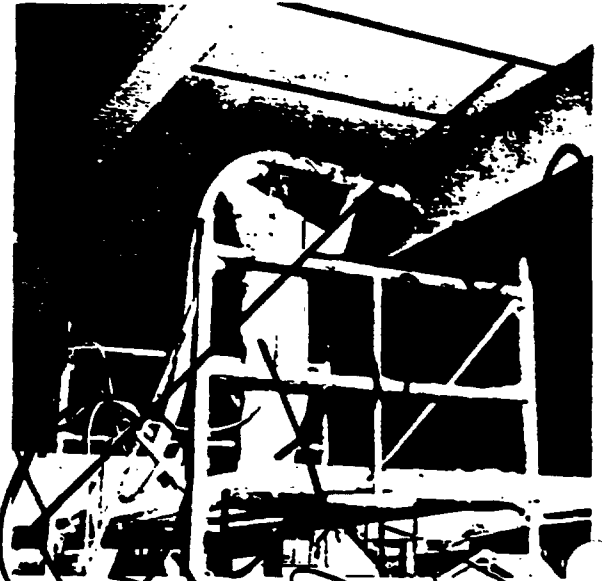
**RESISTANCE TO AIR EROSION:** Independent laboratory test subjected standard, machine-applied Mono-Kote surface to winds exceeding hurricane velocity . . . over 100 M.P.H. for 87 hours . . . with no erosion. Copies of test description available.

**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.

**SPECIFICATION (SHORT FORM):** Sprayed fireproofing material shall be Mono-Kote as manufactured by Zonolite, Construction Products Division, W. R. Grace & Co. or its processing distributor. It shall be applied by machine to the thickness required by local codes and in the areas shown on the drawings. The method of mixing and application shall comply with the manufacturers recommendations.



Greenway Plaza Development, Houston, Tex  
Zonolite Mono-Kote plays a prominent role in fireproofing this \$100 million project. Lloyd, Morgan, and Jones, architects.



Direct application of Mono-Kote to beams and floors put fire proofing out of the way of mechanical installations.



Machine-applied cementitious Mono-Kote withstands air erosion, prevents "dusting" in air-conditioning and ventilating systems.

NEW

80.  
CAB

Note:  
    

Revision of thickness to comply with new criteria of ASTM E-119  
and Underwriters' Laboratories, Inc. 263, effective January 1, 1971,  
has been completed but not approved in time for this publication.  
This will list restrained and unrestrained floor and beam assemblies  
under a 1100°-1300° limit.

04502205

Please contact any of the Zonolite, Construction Products Division  
offices shown on the back page for these new listings or any other  
data.

9  
8 X 38  
NEWS  
BOLD

PLASTER AND FIREPROOFING  
ZONOLITE PRODUCES OTHER PRODUCTS...  
WRITE FOR THESE DATA SHEETS  
PA-97R Zonolite Vermiculite Plaster Aggregate  
PA-96R Zonolite Perlite Plaster Aggregate

10 PT.  
NEWS

(2)

2 LINES

Write to Jim  
at [unclear]  
[unclear]

POLLUTION AND HEALTH: Mono-Kote is wet mixed, pumped and sprayed,  
thus the small amount of asbestos is "locked in" the wet mix during  
application and is hardened cementitious mass when in place.

Tests conducted at job sites during application and in plenum  
areas of completed buildings show fiber counts well below the  
occupational threshold limit values proposed by the American  
Conference of Governmental Industrial Hygienists. Copies of the  
test results can be made available and discussion of this matter  
is welcomed.

# ZONOLITE<sup>®</sup> MONO-KOTE CEMENTITIOUS FIREPROOFING

04502206

## Application Instructions for Steel and Concrete Bases

### MATERIALS

a. Fire resistive material shall be Mono-Kote as manufactured by the Construction Products Division, W. R. Grace & Co., or its licensees.

b. Water shall be clean, fresh, suitable for domestic consumption, and free from such amounts of mineral or organic substance as would affect the set of the fire resistive material.

Water containing alum or other salts, or water in which tools have been washed, accelerates the set. Water from stagnant pools and wells frequently contain organic or vegetable matter which may retard the set.

### DELIVERY AND STORAGE

a. All manufactured material shall be delivered in packages bearing the name of the manufacturer and the brand.

b. Mono-Kote shall be kept dry until ready for use. It shall be kept off the ground, under cover and away from sweating walls and other damp surfaces.

### MIXING

Mono-Kote shall be mixed by machine and the mixer shall be clean and free of particles of previously used materials. While the mixer is in continuous operation, water shall be placed in the mixer and Mono-Kote shall then be added. The mixing time shall be approximately 3 minutes.

The wet density of Mono-Kote as it comes from the mechanical mixer should be not less than 44 nor more than 52 lb. per cu. ft. Measurement for wet density may be made by filling and weighing a 10 qt. bucket which contains  $\frac{1}{3}$  cu. ft. of fire resistive material. Density can best be controlled by using approximately 11 U.S. gal. of water per 50 lb. bag of Mono-Kote. The quantity of water can best be determined by existing conditions at job site. Temperature, length of hose and type of hose all will affect water content.

### APPLICATION TO STEEL AND CONCRETE BASE

a. Mono-Kote shall be applied to the thickness necessary to provide the fire resistance ratings. It shall not be applied to surfaces on which there is dirt, dust, oil, loose paint, and other materials which would impair adhesion.

Special caution should be taken when precast concrete slabs are to be protected with Mono-Kote. Curing compounds and form coatings used in the manufacture of concrete slabs may effect the adhesion of Mono-Kote to the concrete. The coumarone-indene resins are known to be incompatible with Mono-Kote. A test application covering a small area is suggested when any such materials may be present.

Special caution should also be taken when form release agents are used in poured-in-place applications. Surfaces must be closely inspected prior to application.

(1) The material shall be applied by machine. The wet density of Mono-Kote as it comes from the nozzle of the hose shall be not less than 55 nor more than 65 lb. per cu. ft.

(2) Application of the material can be made in the following sequence:

2a) For thicknesses of approx.  $\frac{1}{2}$  in. or less apply in one operation.

2b) For thicknesses of approx.  $\frac{1}{2}$  in. or greater make second application after first coat has set.

2c) If a smooth finish is desired trowel or darby the surface of the material immediately after application.

b. Material that has partially set shall not be used. Frozen, caked or lumpy materials shall not be used. Each batch shall be mixed separately.

### 6 TEMPERATURE AND VENTILATION

When the prevailing outdoor temperature at the building site is less than 40°F, an interior temperature of 40°F shall be maintained for 24 hours before and 24 hours after application of Mono-Kote.

Special caution should be taken when Mono-Kote is applied at lower temperatures to freshly stripped pan-joists. Fall off could occur due to improper drying of the pan-joists as a result of the short duration of time between stripping the pan-joist and applying the Mono-Kote. The correct drying time can be determined by applying Mono-Kote to a small practice area.

The plastering contractor shall provide natural ventilation to properly dry the Mono-Kote during and subsequent to its application. In glazed buildings, this shall be accomplished by keeping windows open approximately 2" top and bottom (or side pivoted windows approximately 4") to provide air circulation; and in enclosed areas or buildings lacking openings for natural ventilation, by circulating exterior air and exhausting it to the outside by use of temporary circulators, exhaust fans or the air-conditioning system.



# SPECIFICATIONS

## 1. SCOPE

- a) Work Included  
Provide all labor, materials and equipment required for complete installation of all sprayed fireproofing and related work as shown on the drawings or specified herein, and in accordance with all applicable requirements of the Contract Documents.

- b) Work Not Included  
1. Structural Steel encased in Concrete.  
2. Trowelled plaster fireproofing in specified under appropriate section.  
3. The cleaning of the surfaces to receive sprayed fireproofing.

- c) Codes and Regulations  
This specification shall be supplemented by the applicable requirements of the Building Codes and all authorities having jurisdiction. Conflicts and/or discrepancies between Contract Documents, ordinances, etc., noted by the subcontractor shall be immediately brought to the architect's attention.

## 2. MATERIALS

- a) The sprayed fireproofing shall be cementitious setting-type, and shall be Mono-Kote as manufactured by Construction Products 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.

## 3. ACCEPTANCE AND PERFORMANCE CRITERIA

- a) The sprayed fireproofing shall have been tested by Underwriters' Laboratories, Inc. in accordance with the procedures of ASTM E-119. 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

- 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 ASTM E-119, 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) Material shall not crack or delaminate when the structural element is subjected to downward deflection of 1/120 of the span.

- f) ~~Minimum bond strength between the fireproofing material and the structural steel or galvanized decking shall be 400 p.s.f.~~

- 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.

## 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. 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) 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 attachments can be anticipated in advance.

- e) 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.

- f) ~~Temperature and moisture conditions shall be as specified by the materials manufacturer.~~

- g) 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.

- h) The contractor shall cooperate in the coordination and scheduling of the work of this section to avoid delays in the job progress.

## 7. CLEAN-UP

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

## ZONOLITE SALES OFFICES

ARIZONA, Phoenix 45031  
P.O. Box 14212  
ARKANSAS, North Little Rock 72114  
P.O. Box 294  
CALIFORNIA  
Los Angeles 90041  
P.O. Box 41077  
Los Angeles 90039  
5440 San Fernando Road West  
Newark 34560  
P.O. Box 217  
South Gate 90280  
9430 Rayo Avenue  
COLORADO, Denver 80223  
111 South Navajo Street  
FLORIDA  
Boca Raton 33432  
P.O. Box 67  
Boca Raton 33432  
1555 N.W. First Avenue  
Hialeah 33010  
1050 S.E. 5th Street  
Jacksonville 32202  
1530 East Adams Street  
Tampa 33605  
P.O. Box 5047 Ybor Station  
GEORGIA, Atlanta 30306  
P.O. Box 8127 Station F  
HAWAII, Honolulu 96819  
842-A Mapunapuna Street  
ILLINOIS, Chicago 60643  
12300 South Ashland Avenue  
KANSAS, Wichita 67214  
616 Pennsylvania

KENTUCKY  
Wilders, Newport 41071  
112 North Street  
LOUISIANA, New Orleans 70121  
P.O. Box 10262  
MARYLAND, Beltsville 20705  
P.O. Box 347  
MASSACHUSETTS  
Easthampton 01027  
P.O. Box 112  
MICHIGAN, Dearborn 48121  
P.O. Box 547  
MINNESOTA  
Minneapolis 55422  
4725 Olson Highway  
Minneapolis 55413  
1720 Madison Street, N.E.  
MISSOURI, St. Louis 63110  
1705 Sulphur Avenue  
MONTANA  
Great Falls 49401  
P.O. Box 1419  
Libby 59923  
P.O. Box 603  
NEBRASKA, Omaha 68107  
3520 "I" Street  
NEW JERSEY, Trenton 08619  
P.O. Box 2124  
NEW MEXICO, Albuquerque 87107  
P.O. Box 6302  
NEW YORK, Weedsport 13166  
P.O. Box 310  
NORTH CAROLINA  
High Point 27260  
P.O. Box 1308

NORTH DAKOTA, Minot 58702  
P.O. Box 1782  
OHIO, Cleveland 44113  
1125 West 11th Street  
OKLAHOMA, Oklahoma City 73111  
P.O. Box 41402  
OREGON, Portland 97227  
2303 North Harding Street  
PENNSYLVANIA, New Castle 16102  
202 East Cherry Street  
SOUTH CAROLINA  
Travelers Rest 29690  
P.O. Box 517  
TENNESSEE, Nashville 37204  
4061 Powell Avenue  
TEXAS  
Dallas 75222  
P.O. Box 6306  
Houston 77008  
P.O. Box 7327  
Houston 77008  
P.O. Box 7253 Heights Station  
Lubbock 79408  
P.O. Box 191-B  
San Antonio 78204  
P.O. Box 9114  
UTAH, Salt Lake City 84110  
P.O. Box 2398  
WASHINGTON  
Auburn 98002  
P.O. Box A  
Spokane 99201  
North 1318 Maple Street  
WISCONSIN, Milwaukee 53208  
930 North 43rd Street

CANADA  
Alberta  
Calgary 9  
P.O. Box 5069,  
Postal Station A  
Edmonton  
P.O. Box 174  
Lethbridge  
P.O. Box 1104  
British Columbia  
Prince George  
1039 Eastern Avenue  
Vancouver 16  
P.O. Box 6762, Station S  
Vancouver 5  
1075 Melville Street  
Victoria  
P.O. Box 336  
Maritoba  
Winnipeg 10  
760 Wall Street  
Ontario  
Toronto  
349A Bloor Street West  
Quebec  
Montreal 11  
1515 Mazurette Street, Suite 6  
Montreal 9  
140 Deslauriers  
Saskatchewan  
Regina  
P.O. Box 1213  
Saskatoon  
Yorkton  
P.O. Box 638  
P.O. Box 1040

W. R. GRACE & CO.



ZONOLITE

CONSTRUCTION PRODUCTS DIVISION

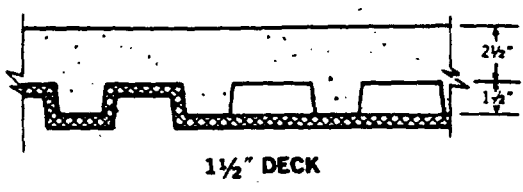
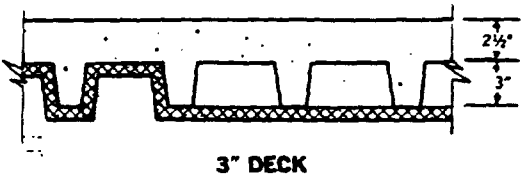
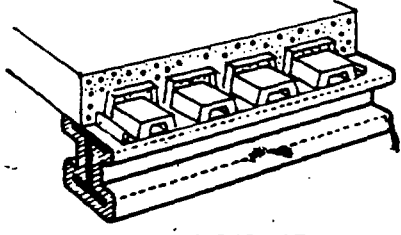
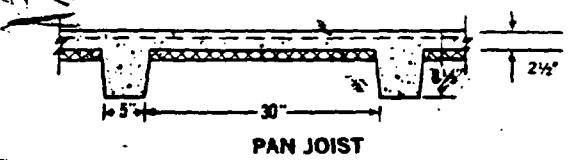
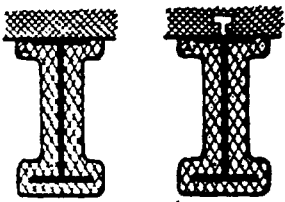
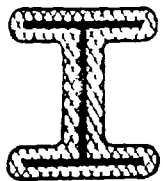
62 WHITTEMORE AVE.  
CAMBRIDGE, MASS. 02140  
Phone: (617) 876-1400

12 PT. HELVETICA MED.  
04502207

10 PT. NEV  
CAP.

# ZONOLITE MONO-KOTE FIRE RESISTANCE RATINGS

(PARTIAL SUMMARY) 6 PT. C

| SYSTEM                                                                                                         | DESCRIPTION                                                                                                                          | RATING                     | Underwriters' Laboratories, Inc. Number | Retardant Report             |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------|------------------------------|
|  <p>1 1/2" DECK</p>           | 12 PT. C<br>2 1/2" Concrete Fill-Mono-Kote 7/8" Thick Following Contour.                                                             | 3 hrs.                     | 21-3                                    | 4374                         |
|                                                                                                                | 2 1/2" Concrete Fill Mono-Kote 3/8" Thick Following Contour.                                                                         | 2 hrs.                     | 294-2                                   | 4374-31                      |
|  <p>3" DECK</p>               | 2 1/2" Concrete Fill Mono-Kote 1/4" in flute and 1/4" on flat plate.                                                                 | 3 hrs.                     | 52-3                                    | 4374-18                      |
|                                                                                                                | <del>2 1/2" Concrete Fill Mono-Kote 1/4" in flute and 1/4" on flat plate.</del>                                                      | <del>2 hrs.</del>          | <del>228-2</del>                        | <del>4374-18</del>           |
|  <p>COMPOSITE FLOOR-BEAM</p> | 2 1/2" Concrete Fill-Mono-Kote 1" in flute and 3/4" on flat plate.                                                                   | 3 hrs.                     | 205-3                                   | 4374-26                      |
|                                                                                                                | 2 1/2" Concrete Fill-Mono-Kote 1/2" in flute and 3/8" on flat plate.                                                                 | 2 hrs.                     | 257-2                                   | 4374-25                      |
|  <p>PAN JOIST</p>           | 2 1/2" Concrete Slab Mono-Kote 7/8" Thick under slab.                                                                                | 2 hrs.                     | 99-2                                    | 4374-9                       |
|  <p>BEAMS</p>               | 1/2" Mono-Kote following contour of the member.                                                                                      | 4 hrs.                     | 40-4                                    | 4374-24                      |
|                                                                                                                | Composite beam (shear strap on stud).<br>3/4" .....<br>1/2" .....                                                                    | 4 hrs.<br>3 hrs.           | 257-2<br>216-3                          | 4374-25<br>4339              |
|  <p>COLUMNS</p>             | Mono-Kote following contour of the Column — Min 14WF228<br>1 1/4" .....<br>7/8" .....                                                | 4 hrs.<br>3 hrs.           | 37-4<br>32-3                            | 4374-21-23<br>4374-21-23     |
|                                                                                                                | All Columns<br>2 1/2" .....<br>1 7/8" .....<br>1 1/2" .....                                                                          | 4 hrs.<br>3 hrs.<br>2 hrs. | 15-4<br>17-3<br>7-2                     | 4374-8<br>4374-13<br>4374-13 |
|                                                                                                                | Minimum Column 14WF228 — Mono-Kote with 7/8" U. L., Inc. approved board on one flange.<br>1 1/2" .....<br>1 1/8" .....<br>3/4" ..... | 4 hrs.<br>3 hrs.<br>2 hrs. | 46-4<br>37-3<br>22-2                    | 4374<br>4374-30<br>4374-30   |
|                                                                                                                |                                                                                                                                      |                            |                                         |                              |