

William J. Bourke
Zonolite Architectural Representative
Construction Products Division

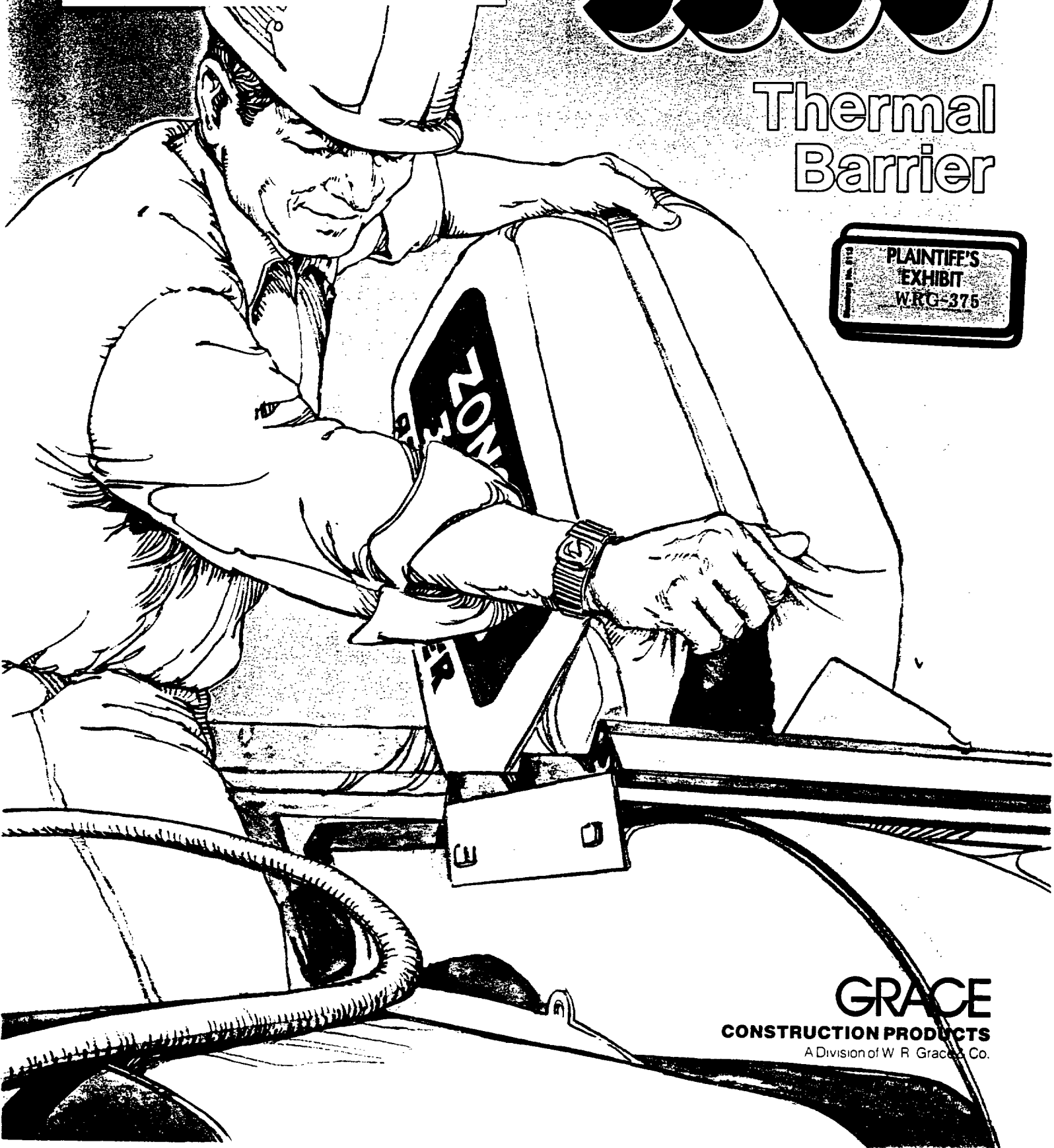
GRACE

W.R. Grace & Co.
W. Chicago, IL 60185
(312) 231-8660

Zonolite®

3300

Thermal
Barrier



GRACE
CONSTRUCTION PRODUCTS
A Division of W. R. Grace & Co.

Zonolite®

3300

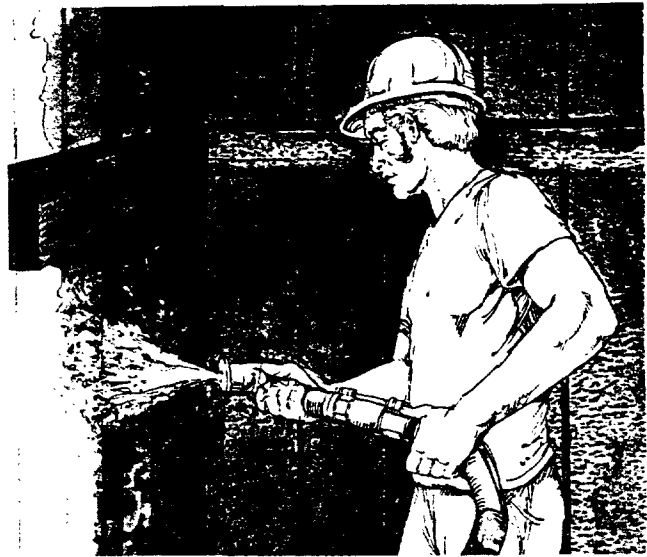
Thermal Barrier

ZONOLITE® 3300 Thermal Barrier is a cementitious fire protection coating specifically formulated for application over foam plastics. Spray-applied to interior foam plastics on wall and ceiling surfaces, ZONOLITE 3300 forms a hard, durable, monolithic thermal barrier against heat and fire.

Its effectiveness is the result of a formulation consisting of a blend of lightweight aggregate portland cement and other proprietary ingredients — which adheres firmly to foam plastics. Tested bond strengths are several hundred times the per square foot weight of the coating itself.

ZONOLITE 3300 is a single component, mill-mixed product. With just the addition of water, ZONOLITE 3300 is both quick and easy to apply, building to required thicknesses in a single pass. ZONOLITE 3300 is the most efficient, low-cost method of meeting tough building codes and insurance requirements.

In developing ZONOLITE 3300 Thermal Barrier, W. R. Grace & Co. has utilized its experience and technology as the producer of MONOKOTE® Fireproofing — the most widely used structural steel fireproofing in North America. Sales and technical personnel located throughout the United States and Canada provide close technical support to contractors, owners and specifiers.



Benefits

While specific requirements differ from locality to locality, the use of foam plastics for most building occupancies is permitted only when foam plastics are fully protected by an approved thermal barrier.

ZONOLITE 3300 has been successfully fire-tested and approved by Factory Mutual and Underwriters Laboratories. ZONOLITE 3300 has a proven field and laboratory record of performance reliability, ease of application and low in-place cost.

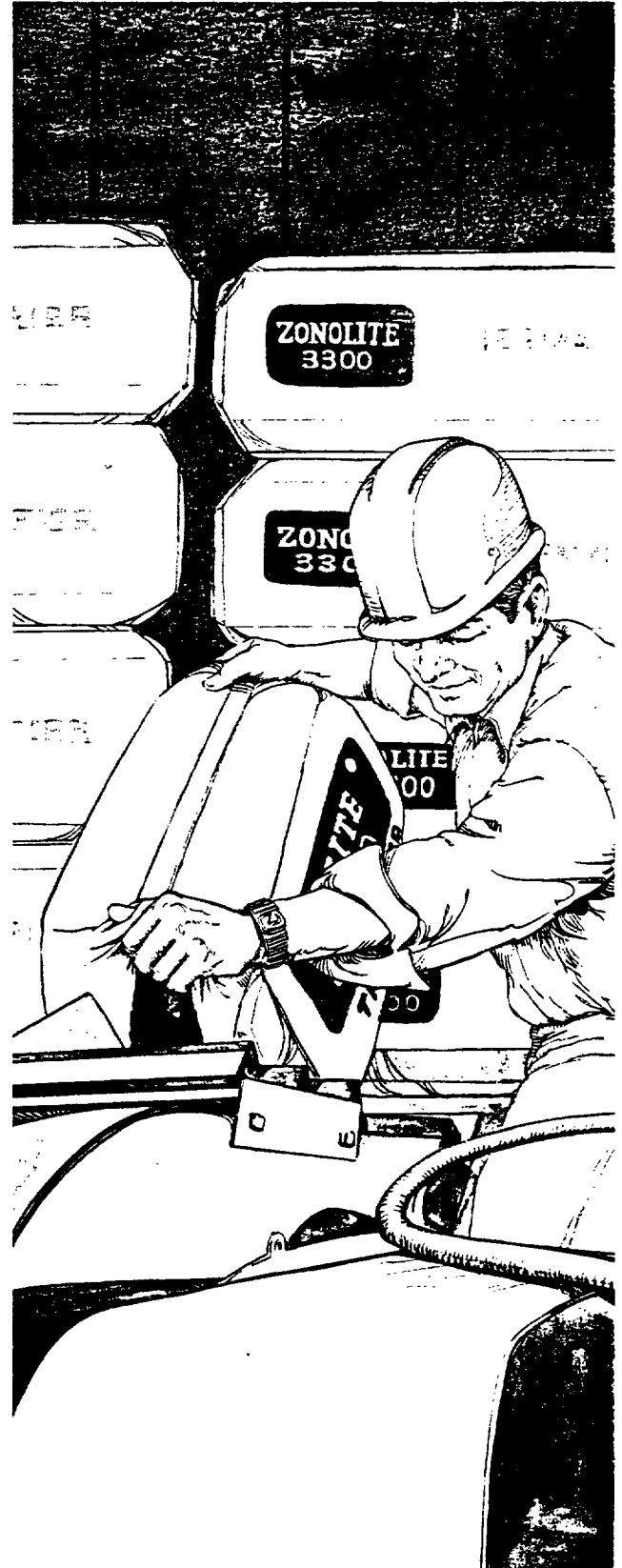
Installation

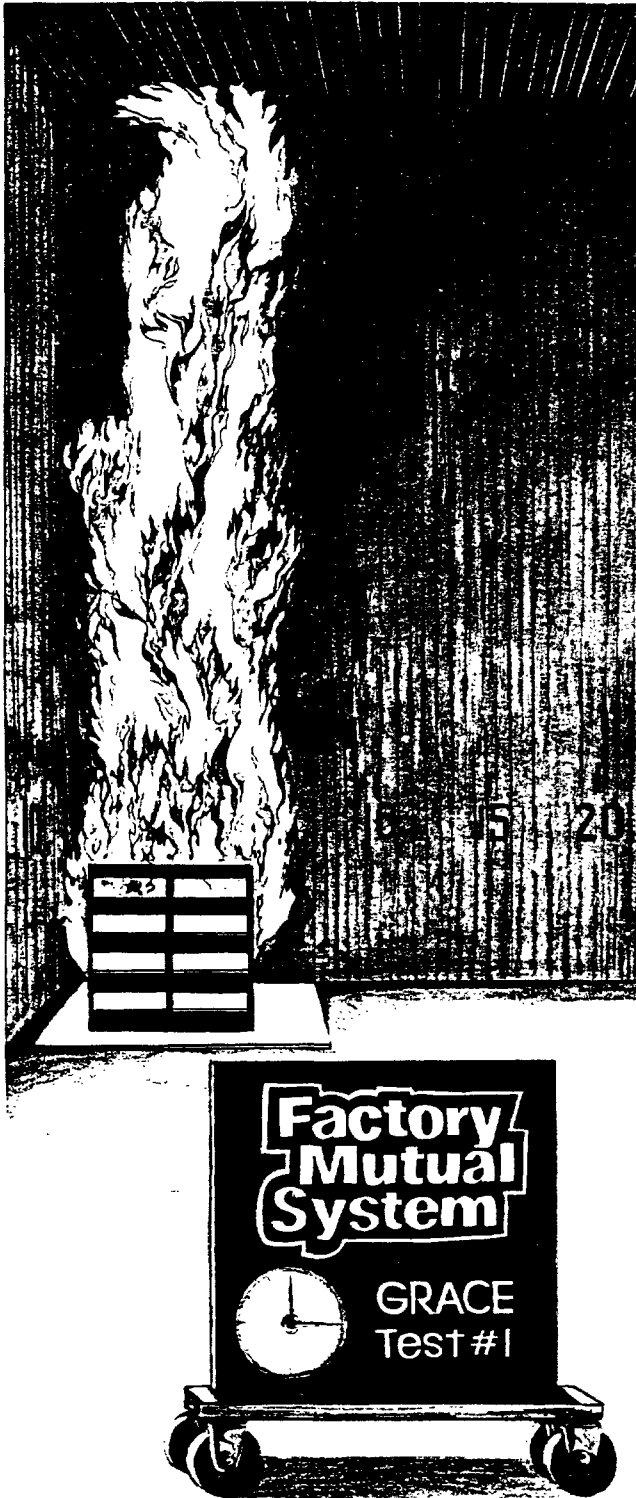
W. R. Grace & Co. has prepared and has available a detailed application manual on the mixing, pumping and spraying of ZONOLITE 3300 Thermal Barrier. In brief, ZONOLITE 3300 Thermal Barrier is supplied in bags that yield 25 board feet (50 square feet at one-half inch) when applied according to manufacturers' directions. Bag contents are mixed with water in a wide variety of plaster mixers to form a consistent, cohesive slurry. This slurry is spray-applied, again using widely available standard plastering equipment. A nominally skilled crew with good equipment and where job conditions permit, can be expected to achieve application rates in excess of 10,000 sq. ft./day.

After spraying, ZONOLITE 3300 can be readily trowelled to a wide range of surface textures. When trowelled, ZONOLITE 3300 can be painted to form a washable surface which can be easily kept clean.

Product Summary

1. Fire test performance — proven under severe Factory Mutual and Underwriters Laboratories fire test conditions. ZONOLITE 3300 has successfully passed the large-scale FM Corner Test and is listed in the UL Building Materials Directory and the Factory Mutual Approval Guide.
2. Economical — fast, easy to apply, low-cost product that achieves overall savings.
3. Simple — single component mill-mixed product; ready to use; just add water, mix and spray.
4. Conveniently packaged — strong poly-lined bags packed for easy handling to provide theoretical yield of 25 board feet (50 square at one-half inch) per bag.
5. Consistent and uniform — sprayed as a wet slurry which firmly adheres to foam, resulting in a monolithic fire protective barrier.
6. Workable — may be trowelled to obtain smooth or decorative surface.
7. Hard, durable — once applied, resists damage and provides continuous protection; should damage occur, it can be easily repaired by spraying or trowelling.
8. Stable under the high humidity conditions of food storage and coolers; resistant to sweating often experienced in storing potatoes and other fresh vegetables.
9. Inexpensive primer required only on ceiling areas where repeated condensation may occur.
10. Water-resistant — will withstand repeated exposure to water.
11. Washable — when trowelled and painted, ZONOLITE 3300 forms a washable surface that can be easily cleaned.
12. USDA and FDA approved — ZONOLITE 3300 is chemically approved for use in federally inspected meat and poultry facilities.





Fire Test Results

Factory Mutual Approved

ZONOLITE 3300 Thermal Barrier has passed the large FM Building Corner Fire Test. The structure was 25 feet high, consisting of a corner wall configuration with ceiling. Both wall and ceiling surfaces were sprayed with urethane foam and protected with one-half inch of ZONOLITE 3300 Thermal Barrier. No sprinklers were used. There was no horizontal or lateral flame propagation on either the walls or ceiling. Only minor fissures developed in the thermal barrier coating and foam damage was limited to the immediate corner area. The conclusions of the report are that "ZONOLITE 3300 Thermal Barrier Coating when installed according to the recommendations of W. R. Grace & Co. and used as a protective nominal one-half inch (12.7 mm) thick coating meets Factory Mutual requirements and is approved for building interior use as a protective coating to delay the ignition and reduce the surface burning rate of low melting, combustible rigid spray-on urethane foams."

Underwriters Laboratories Listed

ZONOLITE 3300 Thermal Barrier has been tested and classified by UL over high flame spread urethane foam. Tests included the UL enclosed corner test, small-scale furnace (E-119 finish rating), and the E-84 tunnel test.

Zonolite
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- b. All surfaces to which sprayed thermal barrier will be applied shall be free of oil, grease, dirt, loose paint, decomposed foam or any other matter which would impair adhesion.
- c. A bonding agent recommended by the Construction Products Division of W. R. Grace & Co. for thermal barrier application shall be applied to horizontal surfaces where free water is expected to condense (i.e., ceilings of very high humidity, potato storage facilities).
- d. Whenever a previously untested or questionable foam substrate is encountered, sufficient bond tests shall be run to determine if any special surface preparation is necessary. It is again anticipated that this would be limited to the application of a recommended bonding agent. Note: ZONOLITE 3300 has shown excellent adhesion to all foamed substrates tested to date. W. R. Grace & Co., however, has no control over the many foam manufacturers formulas and when they might change.
- e. Where the roof may be flexible all roof construction and finishing must be complete and there must be no roof traffic after ZONOLITE 3300 Thermal Barrier application and until the coating has dried and full bond strength is attained. Note: Drying time will vary according to relative humidity and temperature. With good ventilation and fan-forced circulation, drying is usually complete in 10-14 days.
- f. All clips, hangers, supports, sleeves and other attachments to the foam substrates are to be placed prior to the application of the thermal barrier material.
- g. All patching and repairing of sprayed thermal barrier due to cutting by other trades, shall be performed under this section and paid for by the trade(s) that performed the cutting.

5. Temperature and Ventilation

- a. When the outdoor temperature at the building site is less than 40°F, an air and substrate temperature of 40°F shall be maintained for 24 hours before application and until the thermal barrier is completely dry.
- b. After application of ZONOLITE 3300 Thermal Barrier, sufficient air circulation and ventilation shall be provided to dry the material. Note: ZONOLITE 3300 Thermal Barrier

shall be considered dry when its free moisture content is below 15% or when a representative sample placed in a fan-forced oven at 120°F for 24 hours experiences a weight loss of less than 15% of its original weight.

- c. Coolers — Cooling shall not begin until ZONOLITE 3300 Thermal Barrier is dry. Cooling shall be accomplished at a rate not to exceed 1F°/hour until a minimum temperature of 35°F is obtained. Doors shall be opened sufficiently during pull-down to relieve internal vacuum caused by cooling of the air.
- d. Freezers — Cooling to 35°F shall be accomplished as detailed for coolers (above). The room shall then be held at 35°F until the residual moisture has been removed and all components are in equilibrium condition. This period shall be no less than 7 days. The temperatures may then be dropped to operating temperatures as low as -20°F at a rate not to exceed 1F°/2 hours. Total daily drop shall not exceed 10F°/day. After working temperature is reached, temperature fluctuations within the room shall be controlled so as not to exceed 1F°/2 hrs. or 10F°/day. Note: The concrete slab will contract during pull-down, causing openings at the slab-to-wall joints and at contraction joints. If any caulking is necessary, it should be done prior to temperatures being dropped below 35°F.

6. Cleanup

After completion of the thermal barrier installation, equipment shall be removed and all areas cleaned of deposits of sprayed thermal barrier materials.

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Zonolite Sales Offices

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Underwriters Laboratories Tests

UL ENCLOSED CORNER

Enclosed Corner Test — a full-scale enclosed room measuring 8 ft. by 12 ft. with an 8 ft. high ceiling and an open doorway. An ignition source consisting of 30 lbs. of interlaced lumber is placed in one corner of the room. The enclosed geometry and the size of the ignition source constitute a severe fire exposure situation, providing flame coverage over the entire height of the corner.

Results from the UL-conducted Enclosed Corner Test indicated that the use of $\frac{3}{4}$ inch of ZONOLITE 3300 Thermal Barrier prevented flashover and involvement of the urethane foam. Foam damage was limited to the immediate corner area.

FINISH RATING (ASTM E-119)

Thermal Barrier Performance:

Integrity — 15 min., minimum.

Temperature Transmission Time — 13 min., $\frac{1}{2}$ inch thick application.

Temperature Transmission Time — 15 min., $\frac{3}{4}$ inch thick application.

Temperature Transmission Time — 26 min., 1 inch thick application.

TUNNEL TEST* (ASTM E-84)

Fire Hazard Classification

	Type Z-3300 TB Applied To Asbestos-Cement Board In A Maximum Thickness of 1 In.	Type Z-3300 TB Applied Over 2 In. Thick Foamed Plastic In a Minimum Thickness Of $\frac{1}{2}$ In. +
Flame Spread	5	10
Fuel Contributed	0	0
Smoke Developed	0	0

+ Foamed plastic formed by the simultaneous spraying of two liquid components (CPR-485, Component "A" and CPR-485, Component "B") as manufactured by The Upjohn Company, CPR Division and having Fire-Hazard Classification values of over 200 for flame spread, 15 for fuel contributed and over 500 for smoke developed.

* The above numerical flame spread ratings are not intended to reflect hazards presented by this or any other material under actual fire conditions.

DEFINITIONS

Thermal Barrier — Fire Barrier: Both terms are being commonly used to describe a coating which has passed any fire test. In general, these terms describe a coating which prevents a foam substrate from coming in direct contact with a fire for a specified period, usually 10-15 minutes. When used, these terms must be evaluated with respect to the type, degree and size of fire exposure in the test.

Finish Rating: The time duration occurring during exposure to standard time temperature conditions (ASTM E-119) for the temperature at the interface (foam plastic—thermal barrier) to reach an average temperature rise of 250F* above ambient. This term is valid only when the fire exposure is controlled to match that defined by the ASTM E-119 time-temperature curve.

Specification (Short Form)

Sprayed thermal barrier shall be ZONOLITE 3300 Thermal Barrier as manufactured by the Construction Products Division of W. R. Grace & Co. or its processing distributor. It shall be spray-applied by machine to the thickness required by local code specifications and as indicated on all drawings. The method of mixing and application shall comply with the manufacturers recommendations as set forth in the current literature. In specified areas, bonding agents shall be those recommended by W. R. Grace & Co. in current literature.

Recommended Specifications

1. Scope

The applicator shall provide all labor materials and equipment required for

- a. Complete installation of the thermal barrier.
- b. Application of a bonding agent where specified as necessary by W. R. Grace & Co. in its current literature.
- c. Protection of adjacent surfaces from overspray.
- d. Removal of all dirt, oil and other foreign substances from the foam plastic surface which would impair proper thermal barrier adhesion.
- e. Removal of all decomposed foam which might impair thermal barrier adhesion.

2. Material

- a. The sprayed material shall be ZONOLITE 3300 Thermal Barrier as manufactured by the Construction Products Division of W. R. Grace & Co. or its processing distributor. All manufactured material shall be delivered in original unopened packages bearing the name of the manufacturer, the brand, and both the Factory Mutual and UL label verifying compliance with the continued Quality Control inspection programs conducted by these agencies. Materials shall be kept dry until ready for use. The packages of material shall be kept off the ground, under cover and away from sweating walls and other damp surfaces. Material that has been exposed to water before actual use shall be discarded. Stock is to

be rotated and used before its stamped expiration date, unless specific written extension of that date is given by W. R. Grace & Co.

- b. Bonding agents, where necessary, are only to be those recommended by W. R. Grace & Co. in its current literature, specifically for ZONOLITE 3300 Thermal Barrier application.
- c. Water shall be clean and suitable for domestic consumption. It shall be free from such amounts of any substances as would affect the set or bond of the thermal barrier material.

3. Acceptance and Performance Criteria

- a. The sprayed thermal barrier shall have been tested by Factory Mutual in full-scale corner test and/or by Underwriters Laboratories in the enclosed corner test. The thermal barrier shall have remained in-place without fall-off for a minimum of 15 minutes fire exposure.
- b. The thermal barrier shall have a minimum in-place bond strength of 500 psf over the protected substrate. The bond strength shall be determined by the following procedure:
 - i) Glue a 3-inch diameter dish with center hook to the surface of the thermal barrier.
 - ii) Cut around the dish to the foam substrate.
 - iii) Attach a scale with a 0-50 lb. range to the hook. Exert a force perpendicular to the surface of the thermal barrier. The scale reading can be converted to pounds per square foot with the following formula:

$$\text{Bond Strength (psf)} = \frac{\text{Scale Reading (lbs.)} \times 144}{\pi \times (\text{Disk Radius})^2}$$

For 3" Disk

$$\text{Bond Strength (psf)} = \text{Scale Reading} \times 20.37$$

- c. The thermal barrier material shall not be subject to losses from the finished application by sifting, flaking or dusting.
- d. The thermal barrier shall have chemical approval from the USDA for use in government-inspected meat and poultry facilities.

4. Installation

- a. Application of sprayed thermal barrier shall be in accordance with the printed instructions of the material manufacturer and the fire test report information.