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NOT to be distributed outside the FACTORY MUTUAL SYSTEM, except by CLIENT.

INSOL-TILE
EXPANDED POLYSTYRENE PANELS
FOR
SUSPENDED CEILINGS

from

INSULATION CORPORATION OF AMERICA
2571 MITCHELL AVENUE
ALLENTOWN, PA 18103

RECEIVED MAY 5 1983

J.I. OH9A1.AC
(CLASS 4651)

APRIL 12, 1983



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I INTRODUCTION

1.1 Insulation Corporation of America submitted their Insol-tile expanded polystyrene panels for possible Factory Mutual approval for use in suspended ceiling systems.

1.2 Fire tests were conducted on the material to determine the effect on the operation of automatic sprinklers installed above and its flame spread behavior.

1.3 Tests show the ceiling panels do not significantly interfere with normal sprinkler operation and are approved by Factory Mutual for use in suspended ceilings, subject to the limitations outlined in Section VII.

II PRODUCT DESCRIPTION

2.1 Insulation Corporation of America's Insol-tile panels are a nominal 2 ft (0.6 m) by 4 ft (1.2 m) by 1 in. (2.5 cm) thick maximum with a nominal density of 1 pcf (16.02 Kg/m³). The polystyrene panels are expanded from FM Approved modified grade polystyrene bead resins listed in the FM Approval Guide.

III PRIOR TESTING BY RESIN MANUFACTURERS

3.1 The manufacturer of each approved resin previously submitted typical samples expanded from his resin, and a series of fire tests was performed to observe (1) the ease of drop-out or melt-out, (2) the cooling effect of sprinkler water, and (3) the surface combustibility of the product.

IV FACILITIES & PROCEDURES AUDIT INSPECTION

4.1 An in-plant audit of the quality controls used in the manufacture of the polystyrene ceiling panels was conducted on February 10, 1983 at the facilities of Insulation Corporation of America. Verification of the use of approved polystyrene beads was also made at that time.

V TEST PROCEDURES

5.1 Three series of tests are performed to evaluate the ceiling panels.

5.1.1 Density

Density of the ceiling panels is determined by cutting specimens from the panels in a shape whose volume can be calculated and not less than 1 in.³ (16.4 cm³). Each specimen is weighed on a scale to an accuracy of $\pm 1\%$. The volume of the specimen is determined by measuring the dimensions using a dial gage, a sliding caliper gage or a steel tape. The density is then calculated using the formula:

$$D = (W/V) \times 3.81$$

where

D = density of specimen, lb/ft³

W = weight of specimen, g

V = volume of specimen, in.³

5.1.2 Melt-Out or Drop-Out Behavior

Tests are conducted to determine the effect of heat on the suspended ceiling panels before sprinkler operation and their ability to melt out quickly. For each test one 2 ft x 4 ft (0.6 x 1.2 m) ceiling panel is placed in a typical suspension frame located at the top of the 4 ft x 4 ft x 2 ft high (1.2 x 1.2 x 0.6 m) enclosure. The ceiling panel forms one half of the ceiling of the enclosure. The remaining half consists of 2 ft x 4 ft x 1/2 in. (0.6 m x 1.2 m x 1.27 cm) thick maronite board. The enclosure is raised off the floor 12 inches (.3 m). A radiant heat source is placed centrally under the maronite board and ignited. For performance to be considered satisfactory the ceiling panel must melt-out or drop-out at a temperature less than 550°F as measured by a thermocouple located 1 in. (12.7 mm) below the maronite board, 1 in. (12.7 mm) from the edge of the maronite board adjacent to the ceiling panel and centered along the 48 in. (1.2 m) dimension of the board.

5.1.3 Surface Flammability

Tests are performed to verify the presence of a fire retardant and to determine if the panels would contribute to a spreading fire over their surface. For each test, two 6 in. x 18 in. (152.4 x 457.2 mm) pieces of ceiling panels are positioned vertically 1/2 in. apart and a Bernz-o-matic propane torch is placed between the panels at their base and held for a 15 sec. period. The torch is then removed and observations are made to determine if the panels support combustion.

When the exposure is removed, the flame shall not spread to the top of the panels.

VI TEST RESULTS

6.1 Density (3 Tests)

The average density for the three specimens, each 3 in. x 3 in. x 1 in. (76.2 x 76.2 x 25.4 mm), was determined to be 1.02 lb/ft³ (16.34 Kg/m³).

6.2 Melt-Out or Drop-Out Behavior (3 Tests)

The panels distorted and dropped out prior to the temperature recorded by the thermocouple reaching 550°F.

6.3 Surface Flammability (3 Tests)

When the exposure fire was removed, there was no burning of the samples.

VII CONCLUSIONS

7.1 Test results showed a suspended ceiling composed of Insulation Corporation of America's Insol-tile suspended ceiling panels 2 ft (0.6 m) by 4 ft (1.2 m) by maximum 1 in. (25.4 mm) thick expanded from FM Approved modified grade polystyrene bead resins, installed in a metal suspension system, will not significantly affect the action of automatic sprinklers installed above and will not produce a spreading fire over its surface. The product, when assembled as described, does not require sprinkler protection of itself when installed in noncombustible buildings with occupancies not requiring sprinkler protection.

7.2 The audit inspection of the manufacturing quality controls in use was satisfactory, and it was noted that approved modified grade polystyrene beads were being used.

7.3 Dimensions of the panels must be maintained during manufacture to guarantee that they will not bind in a standard steel-suspension framework so that their drop-out performance would be adversely affected.

7.4 Clips, if used to prevent normal drafts from lifting the panels, should limit the upward motion only and permit the panels to drop from the suspension system without restraint.

7.5 Painting or coating of the panels is prohibited since this may insulate and therefore hinder the ease of drop-out.

7.6 Approval is effective when the Approval Agreement is signed and returned to Factory Mutual. Continuation of approval will depend upon satisfactory field experience.

7.7 This product meets Factory Mutual Standards and, when approved, will be listed in the Factory Mutual Approval Guide.

7.8 This product has been evaluated for fire hazard only and has not been evaluated for quantity or toxicity of products of combustion.

VIII MARKING

8.1 The packaging of approved polystyrene ceiling tiles shall bear the manufacturer's name, trademark, and Factory Mutual approval mark.

IX MANUFACTURER'S RESPONSIBILITIES

9.1 The manufacturer shall notify the Factory Mutual Research Corporation of any change in the manufacturing procedure of the panel prior to sale and distribution. NONCOMPLIANCE WITH THIS CONDITION IMMEDIATELY AND AUTOMATICALLY VOIDS FACTORY MUTUAL APPROVAL.

9.2 The manufacturer shall supply all necessary instructions to the installer or building owner as to the protection and installation requirements as outlined in the CONCLUSIONS.

9.3 The manufacturer agrees that use of the Factory Mutual name or certification mark is subject to the conditions and limitations of the Factory Mutual approval. Such conditions and limitations must be included in all references to Factory Mutual approval.

X QUALITY ASSURANCE FOLLOW-UP AND RE-EXAMINATION

10.1 Quality assurance follow-up inspections of the facilities of Insulation Corporation of America in Allentown, PA will be conducted frequently to determine that the quality and uniformity of the panels has been maintained and will provide the level of performance as originally approved.

10.2 A re-examination of the product may be required to assess any changes in field installation procedures or end-use limitations. The current Factory Mutual Approval Guide shall be consulted.

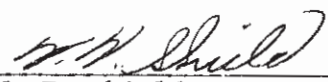
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TESTS AND REPORT BY:

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