LEGACY REPORT

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Legacy Report on the 2000 *International Building Code*© with 2002 Accumulative Supplement, the 2000 *International Residential Code*© *for One- and Two-Family Dwellings* with 2002 Accumulative Supplement, the *BOCA*® *National Building Code*/1999, the 1999 *Standard Building Code*©, the 1997 *Uniform Building Code*™, and the *International One and Two Family Dwelling Code*© 1998.

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Division 07 – Thermal and Moisture Protection
Section 07210 – Building Insulation

1.0 SUBJECT

The Icynene Insulation System®

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

2.1 Surface Burning Characteristics
2.2 Thermal Resistance
2.3 Fire Resistance Rated Wall Assemblies, see Section 4.4
2.4 Attic and Crawl Space Installation, see Section 4.3

3.0 DESCRIPTION

3.1 General

The Icynene Insulation System® is a low-density, plastic foam that has an open-cell structure. The material is a two component system, spray-in-place vapor permeable product used to insulate the building envelope and air-seal areas such as plumbing and wiring penetrations, rim joists areas, window frames, overhangs, porch and garage ceilings and exterior walls. Upon completion of expansion, the open cells contain only air. The chemical reaction that occurs while Icynene Insulation System® is being applied takes place in seconds, with less than five minute curing time needed. After curing, the air-seal remains flexible.

3.2 Surface Burning Characteristics

When tested in accordance with ASTM E 84, The Icynene Insulation System® has been shown to have a flame-spread index (FSI) of less than 25 and a smoke-development index (SDI) of less than 450, when installed at a maximum thickness of 5.5 inches (140 mm) and a nominal density of 0.5 pcf +/- 10% (8 kg/m3).

3.3 Thermal Resistance

The Icynene Insulation System® has a thermal resistance of 5.7 °F.ft2.hr/Btu when tested at a thickness of 1.6 inches (41 mm) in accordance with ASTM C 518 at a mean test temperature of 75 °F (24 °C).

4.0 INSTALLATION

4.1 General

The Icynene Inc. The Icynene Insulation System® Installers Manual, Copyright© 2000 and this report shall be strictly adhered to and a copy of these instructions and this evaluation report shall be available at all times on the job site during installation.

The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

4.2 Application

4.2.1 **General**: The Icynene Insulation System® is applied using spray equipment specified by the manufacturer at the construction site on vertical and horizontal substrates, and the underside of horizontal surfaces to fill gaps and cracks in building materials to create an air seal and to provide an insulating barrier. The Icynene Insulation System® shall not be used in areas which have a maximum service

temperature greater than 180° F (82° C). The foam shall not be used in electrical outlet or junction boxes or in contact with rain or water. The Icynene Insulation System® shall be protected from the weather after application.

4.2.2 **Maximum Thickness**: The Icynene Insulation System® shall not have a thickness exceeding 5.5 inches (140 mm) and shall have a nominal density of 0.5 pcf +/- 10% (8 kg/m3). A nominal thickness of 6 inches (152 mm) is permitted in attics and crawl spaces described in section 4.3 below.

4.2.3 **Licensed Dealers**: The Icynene Insulation System® shall only be installed by licensed dealers. Licensed Dealers have been previously certified by Icynene Inc. to install the Icynene Insulation System®. The installer shall provide the building official with a letter noting the installation was in accordance with the manufacturer's instruction and this evaluation report along with the date, address of installer, company's name, installer's name and certification number.

4.3 Thermal Barrier

The Icynene Insulation System® shall be separated from the interior of the building by an approved thermal barrier of 0.5 inch (12.7 mm) gypsum wallboard or equivalent 15 minute thermal barrier complying with the applicable Code, except within an attic or crawl space see section 4.3.1 through 4.3.5 below:

4.3.1 **Assembly No. 1, Attics and Crawl Spaces**: The Icynene Insulation System® installed within attics or crawl spaces on the underside of the top of the space is permitted to be installed exposed in an attic or crawl space without a thermal barrier or ignition barrier under the following conditions:

4.3.1.1 Entry to the attic or crawl space is limited to service of utilities;
4.3.1.2 There are no interconnected basement or attic areas;
4.3.1.3 Air in the attic or crawl space is not circulated to other parts of the building;
4.3.1.4 Ventilation of the attic or crawl space is provided in accordance with the applicable Code.
4.3.1.5 The insulation shall be limited to a maximum nominal thickness of 6 inches (152 mm) and is installed on the underside of the top of the space, roof deck and ceiling joists and floor deck and floor joists and shall not be installed on vertical surfaces.

4.3.2 **Assembly No. 2, Attics and Crawl Spaces**: The Icynene Insulation System® installed within attics or crawl spaces on the underside of the top space and on vertical wall surfaces and the insulation is covered with FireFree 88 is permitted to be installed exposed in an attic or crawl space without a thermal barrier or ignition barrier under the following conditions:

4.3.2.1 Entry to the attic or crawl space is limited to service of utilities;
4.3.2.2 There are no interconnected basement or attic areas;
4.3.2.3 Air in the attic or crawl space is not circulated to other parts of the building;
4.3.2.4 Ventilation of the attic or crawl space is provided in accordance with the applicable Code.
4.3.2.5 The insulation shall be limited to a maximum nominal thickness of 6 inches (152 mm) and is installed on the underside of the top space and on vertical wall surfaces and the insulation is covered with FireFree 88 at an application rate of 1 gallon per 100 ft2.

4.3.3 **Assembly No. 3, Attics and Crawl Spaces**: The Icynene Insulation System® is permitted to be installed within attics or crawl spaces, on the underside of the top of the space and on vertical wall surfaces with the insulation on the walls protected by an ignition barrier (see 4.3.5 below) and the insulation of the top space not covered, under the following conditions:

4.3.3.1 Entry to the attic or crawl space is limited to service of utilities;
4.3.3.2 There are no interconnected basement or attic areas;
4.3.3.3 Air in the attic or crawl space is not circulated to other parts of the building;
4.3.3.4 Ventilation of the attic or crawl space is provided in accordance with the applicable Code.
4.3.3.5 The insulation shall be limited to a maximum nominal thickness of 6 inches (152 mm).

4.3.4 **Assembly No. 4, Attics and Crawl Spaces**: The Icynene Insulation System® is permitted to be installed within attics or crawl spaces, on vertical wall surfaces with the insulation on the walls protected by Fire Free 88, and the top of the space is not insulated, under the following conditions:

4.3.4.1 Entry to the attic or crawl space is limited to service of utilities;
4.3.4.2 There are no interconnected basement or attic areas;
4.3.4.3 Air in the attic or crawl space is not circulated to other parts of the building;
4.3.4.4 Ventilation of the attic or crawl space is provided in accordance with the applicable Code.
4.3.4.5 The insulation shall be limited to a maximum nominal thickness of 6 inches (152 mm) and is covered with FireFree 88 at an application rate of 1 gallon per 100 ft2.

4.3.5 Assembly No. 5, Attics and Crawl Spaces: The Icynene Insulation System® installed within attics or crawl space where entry is made only for service of utilities an ignition barrier consisting of either a 1.5-inch-thick (38 mm) mineral fiber insulation, 0.25-inch-thick (6.4 mm) wood structural panel, particle board or hardboard, 0.375-inch-thick (9.5 mm) gypsum wallboard, corrosion-resistant steel having a base metal thickness of 0.016-inch (0.4 mm) or other approved material is installed in a manner that the foam plastic insulation is not exposed. The protection covering shall be consistent with the requirements for the type of construction required by the applicable Code.

4.4 Fire-Resistance Rated Wall Assemblies

4.4.1 One Hour Fire Resistance Rated Load Bearing Wood Stud Wall Assembly: Minimum 2x4 No. 2 Southern Pine (G = 0.55) spaced 16 inches (406.4 mm) on center with a base layer of ½ inch (12.7 mm) Wood fiber sound board on each face attached with 6d Box nails, 2 inches (50.8 mm) long spaced 24 inches (609.6 mm) o.c. along studs, second layer of 5/8 inch (15.88 mm) Type X Gypsum Wallboard on each face attached with 8d Box nails, 2-1/2 inches (63.5 mm) long spaced 7 inches (177.8 mm) o.c. along studs. The stud cavity is filled with 2 inches (50.8 mm) nominal thickness of Icynene Insulation. Allowable load of 1,805 pounds (8122.5 N) per stud, 78% design.

4.4.2 One Hour Fire Resistance Rated Load Bearing Wood Stud Wall Assembly: Minimum 2x4 No. 2 Southern Pine (G = 0.55) spaced 16 inches (406.4 mm) on center with two layer of ½ inch (12.7 mm) Type X Gypsum Wallboard on each face attached with 8d Box nails, 2-1/2 inches (63.5 mm) long spaced 7 inches (177.8 mm) o.c. along studs for face layer and 6d Cement Coated Box Nails, 2 inches 950.8 mm) long spaced 24 inches (609.6 mm) o.c. along studs, base layer. The stud cavity is filled with 2 inches (50.8 mm) nominal thickness of Icynene Insulation. Allowable load of 1,805 pounds (8122.5 N) per stud, 78% design.

4.4.3 One Hour Fire Resistance Rated Floor/Ceiling Assembly: Minimum 2x10 No.2 Douglas Fire wood joists spaced 24 inches (609.6 mm) on center, Bridging minimum 1x3 Spruce. Floor decking is minimum ½ inch (12.7 mm) thick exterior grade plywood installed perpendicular to joists and fastened with 2 inch ring shank nails 6 inches (152.4 mm) at the joints and 12 inches (304.8 mm) on center at the intermediate joists. Plywood joints shall occur over joists. Icynene Insulation is applied to the underside of the plywood deck and to sides of joists to a depth of 5 inches (127 mm). Two layers of minimum 5/8 inch thick type FSW gypsum wallboard is attached perpendicular to the joists on the ceiling side of the assembly. The first layer is attached with 1-1/4 inch (31.75 mm) Type W drywall screws, spaced 24 inches (609.6 mm) on center. The second layer is applied perpendicular to the joists, offset 24 inches (609.6 mm) from the base layer. The second layer is attached with 2 inch (50.8 mm) Type S drywall screws spaced 12 inches (304.8 mm) on center. Additional fasteners are installed along the butt joints of the second layer, securing the two layers together. The fasteners are 1-1/2 inch (38.1 mm) Type G drywall screws and were placed 2 inches (50.8 mm) back from each end of the butt joint and spaced 12 inches (304.8 mm) on center. The wallboard joints on the exposed side were treated with paper tape embedded in joint compound and topped with an added coat of compound. The fastener heads were coated with joint compound.

5.0 IDENTIFICATION

All packages and containers of The Icynene Insulation System® covered by this report shall be labeled with the manufacturer's name/and or trademark, address, the product name, the flames-spread index, the smoke-development index, the shelf life expiration date, the label of the quality control agency, Intertek Testing Services, NER-QA219 and this National Evaluation Service evaluation report number, NER-420.

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's descriptive literature, specifications, and installation instructions.

6.1.1 Icynene Inc. The Icynene Insulation System® Installer Manual, Copyright© 2000.

6.1.2 Product Specification Icynene - Pour Formula, 11/2/PSB.

6.1.3 Product Specification Icynene - Spray Formula, 11/2/PSA.

6.2 Test reports on surface burning characteristics under ASTM E 84, Warnock Hersey Professional Service Ltd., Report No. 7171, File NO. 03329-50296-C7-717700, July 1988, signed by Bob Davison, C.E.T Letter report on 5-1/2 inch thickness, February 21, 1989, signed by Bob Davison, C.E.T.

6.3 Test report on the Icynene Insulation System® for SwRI Procedure 99-02, Crawl Space Exposure Evaluation, Omega Point Laboratories, Inc., Project Nos. 16600-111778, -111779, -111780, 111781, -111861, -111862, August 1, 2002, signed by Majid Mehrafza and William E. Fitch, P.E.

6.4 Engineering evaluation, Assessment of SwRI Procedure 99-02 Test Results, Koffel

Associates, Inc., KAI 02190-004, August 16, 2002, signed by Eric N. Mayl, P.E. and William E. Koffel, P.E.

6.5 Test report on Icynene Insulation System for determination of thermal insulating characteristics under ASTM D 518, National Research Council of Canada, Report No. CR 5506-6, February 22, 1998.

6.6 Test reports on fire resistance rated wall assemblies under ASTM E 119, Inchcape Testing Services NA, Inc., signed by R. Joseph Pearson and R. Davison:

6.6.1 One hour wall, wood studs 2x4 at 16 inches o.c. with 1 layer of ½ inch sound board on each side and 1 layer of 5/8 inch Type X gypsum wallboard on each side, Report No. 295-1358-96-01, November 11 & 12, 1996.

6.6.2 One hour wall, wood studs 2x4 at 16 inches o.c. with 2 layers of ½ inch Type X gypsum wallboard on each side, Report No. 295-1358-96-02, November 21 1996.

6.7 Quality Assurance Program, Intertek Testing Services, March 05/01.

6.8 Test report on fire resistance rated floor/ceiling assembly under ASTM E 119, NGC Testing Services, Assignment K-743, Test NO. FC-559, December 17, 2001, signed by Richard A. Costolnick and Robert J. Menchetti.

7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for National Evaluation Service finds that The Icynene Insulation System® as described in this report complies with or is a suitable alternate to that specified in the 2000 International Building Code© with 2002 Accumulative Supplement, the 2000 International Residential Code© for One- and Two-Family Dwellings with 2002 Accumulative Supplement, the BOCA® National Building Code/1999, the 1999 Standard Building Code©, the 1997 Uniform Building Code™, and the International One and Two Family Dwelling Code 1998 subject to the following conditions:

7.1 This Evaluation Report and the installation instructions, when required by the code official, shall be submitted at the time of permit application.

7.2 The Icynene Insulation System® shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable Code.

7.3 The Icynene Insulation System® shall be separated from the interior of the building by an approved 15 minute thermal barrier see section 4.3 of this report.

Exception:
The Icynene Insulation System® installed in attics and crawl spaces may be exposed when installed in accordance with Section 4.3 above.

7.4 The Icynene Insulation System® shall not exceed the thickness and density noted in section 4.2.2 of this report.

7.5 The Icynene Insulation System® shall not be deemed to add to the structural strength of any wall assembly or used as a nailing base.

7.6 The Icynene Insulation System® has not been evaluated for use as a firestopping material or through-penetration system. Fire Resistance Rated Wall and Floor/Ceiling Assemblies are listed in Section 4.4 of this report.

7.7 The Icynene Insulation System® is required to be protected from the weather after application.

7.8 The Icynene Insulation System® shall be applied by contractors certified in accordance with section 4.2.3 of this report.

7.9 The Icynene Insulation System® shall not be installed on the exterior of foundation walls or below floor slabs on ground.

In jurisdictions that have adopted the Standard Building Code, the International One and Two Family Dwelling Code and the International Residential Code when the Icynene Insulation System® is installed in buildings of wood construction the insulation shall not be installed on the exterior of foundation walls or below floor slabs on ground or in contact with the ground. The Icynene Insulation System® shall have a clearance above grade and exposed earth of 6 inches (152 mm) or greater.

7.10 The Icynene Insulation System® has not been evaluated for use with exterior walls of buildings of noncombustible construction under 2603.5 International Building Code, 2603.6 Standard Building Code, 2603.6 BOCA National Building Code and 2602.5.2.2 Uniform Building Code.

7.11 This report is subject to periodic re-examination. For information on the current status of this report, consult the ICC-ES website.