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The Subcommittee on Evaluation has reviewed the data submitted for compliance with the Standard Building Code®, the Standard Plumbing Code, the Standard Mechanical Code, the International Plumbing Code, the International Mechanical Code, and the International One and Two Family Dwelling Code and submits to the Building Official or other authority having jurisdiction the following report. The Subcommittee on Evaluation, ICC-ES and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report.

REPORT NO.: 2053

EXPIRES: See the current EVALUATION REPORT INDEX

CATEGORY: INSULATION

SUBMITTED BY:

PACTIV BUILDING PRODUCTS
2100 RIVEREDGE PARKWAY
SUITE 175
ATLANTA, GEORGIA 30328

1. PRODUCT TRADE NAME

- 1.1 ASTRO-FOIL®
1.2 ASTRO-E®

2. SCOPE OF EVALUATION

- 2.1 Surface Burning Characteristics
2.2 Thermal Resistance

3. USES

ASTRO-FOIL® and ASTRO-E® are used for thermal insulation in all areas of building of any type of construction.

4. DESCRIPTION

4.1 General

ASTRO-FOIL® is 5/16 inch (8 mm) thick reflective insulation made of a four layer component structure. It consists of two inner, clear polyethylene bubble layers sandwiched between aluminum foil facers on each side of the product.

ASTRO-E® is 3/16 inch (6 mm) thick reflective insulation made of a three layer component structure. It consists of one inner, clear polyethylene bubble layer sandwiched between aluminum foil facers on each side of the product.

ASTRO-FOIL® and ASTRO-E® are available in widths ranging from 12 to 72 inches (305 to 1829 mm) with lengths ranging from 50 to 250 feet (15 to 76 m).

4.2 Thermal Resistance Testing

ASTRO-FOIL® was tested as a component in wall assemblies for thermal performance in accordance with ASTM C 236 and ASTM C 1224. It was tested as a component in wall, floor, and ceiling assemblies in accordance with ASTM C 1224.

The wall, floor, and ceiling thermal performance results for ASTRO-E® were calculated based on testing of ASTRO-FOIL® with corrections made for the change in reflective air space.

The R-values for specific assemblies are described in Section 5 (INSTALLATION) of this report.

4.3 Surface Burning Characteristics

ASTRO-FOIL® and ASTRO-E® were tested for surface burning characteristics in accordance with ASTM E 84. They demonstrated a flame spread index (FSI) of less than 25 and a smoke developed index (SDI) of less than 50.

5. INSTALLATION

5.1 General

The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these instructions shall be available at all times on the job site during installation.

5.2 Thermal Resistance Assemblies

Assembly No. 1
Floor Joist Assembly
(heat flow downward)

ASTRO-FOIL® Thermal Resistance R-12.9 (h.ft². °F/Btu)
ASTRO-E® Thermal Resistance R-12.7 (h.ft². °F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed at the midpoint of 2 x 6 wood joists spaced 24 inches (610 mm) on center.

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Assembly No. 2
Floor/Ceiling Assembly
(heat flow upward)

ASTRO-FOIL® Thermal Resistance R-5.1 (h.ft².°F/Btu)
ASTRO-E® Thermal Resistance R-4.7 (h.ft².°F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed at the midpoint of 2 x 4 wood joists spaced 16 inches (406 mm) on center.

Assembly No. 3
Floor/Ceiling Assembly
(heat flow downward)

ASTRO-FOIL® Thermal Resistance R-10.6 (h.ft².°F/Btu)
ASTRO-E® Thermal Resistance R-10.5 (h.ft².°F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed at the midpoint of 2 x 4 wood joists spaced 16 inches (406 mm) on center.

Assembly No. 4
Wood Framed Wall Assembly
(horizontal heat flow)

ASTRO-FOIL® Thermal Resistance R-6.4 (h.ft².°F/Btu)
ASTRO-E® Thermal Resistance R-6.0 (h.ft².°F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed at the midpoint of 2 x 6 wood studs spaced 24 inches (610 mm) on center.

Assembly No. 5
Wood Framed Wall Assembly
(horizontal heat flow)

ASTRO-FOIL® Thermal Resistance R-6.7 (h.ft².°F/Btu)
ASTRO-E® Thermal Resistance R-6.2 (h.ft².°F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed at the midpoint of 2 x 4 wood studs spaced 16 inches (406 mm) on center.

Assembly No. 6
Insulated Concrete Wall Assembly
(horizontal heat flow)

ASTRO-FOIL® Thermal Resistance R-3.4 (h.ft².°F/Btu)
ASTRO-E® Thermal Resistance R-2.6 (h.ft².°F/Btu)

ASTRO-FOIL® or ASTRO-E® is installed on 1 x 2 wood furring strips spaced 16 inches (406 mm) on center on a concrete block wall. Minimum ½ inch (13 mm) thick gypsum wallboard is installed over the ASTRO-FOIL® or ASTRO-E®.

5.3 Air Duct and Piping

ASTRO-FOIL® and ASTRO-E® may be used to insulate air ducts and piping. ASTRO-FOIL® and ASTRO-E® are installed with a 1 inch (25 mm) overlap and attached with reflective foil tape.

6. SUBSTANTIATING DATA

- 6.1 Manufacturer's specifications, drawings, and installation instructions.
- 6.2 Test report on Thermal Performance of ASTRO-FOIL Wall Assembly in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258481B, dated June 17, 1998, signed by Russell W. Woltemar and Stanley D. Gatland II.

- 6.3 Test report on Thermal Performance of ASTRO-FOIL Floor/Ceiling Assembly in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258218C-3, dated December 11, 1997, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.4 Test report on Thermal Performance of ASTRO-FOIL Floor/Ceiling Assembly in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258218C-4, dated December 11, 1997, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.5 Test report on Thermal Performance of ASTRO-FOIL Wall Assembly in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258218C-2, dated December 11, 1997, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.6 Test report on Thermal Performance of ASTRO-FOIL Simulated Concrete Block Wall Assembly in accordance with ASTM C 236, prepared by Celotex Corporation Testing Services, Job No. 258218C-1, dated December 17, 1997, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.7 Test report on Emissivity of ASTRO-FOIL in accordance with ASTM C 1371, prepared by Celotex Corporation Testing Services, Job No. 258218G, dated December 19, 1997, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.8 Test report on Water Vapor Transmission of ASTRO-FOIL in accordance with ASTM E 96, prepared by Celotex Corporation Testing Services, Job No. 258248-H, dated January 27, 1998, signed by Scott T. Ryan and W.A. Jackson.
- 6.9 Test report on Corrosivity of ASTRO-FOIL in accordance with ASTM D 3310, prepared by Celotex Corporation Testing Services, Job No. 258218E, dated December 17, 1997, signed by Stanley D. Gatland II.
- 6.10 Test report on Adhesive Performance in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258218A, dated December 18, 1997, signed by Deborah J. Lorezca and Stanley D. Gatland II.
- 6.11 Test report on Adhesive Performance in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258218B, dated December 17, 1997, signed by Deborah J. Lorezca and Stanley D. Gatland II.
- 6.12 Test report on Fungus Resistance of ASTRO-FOIL in accordance with Mil-STD-810D, prepared by Celotex Corporation Testing Services, Job No. 258248-I, dated January 27, 1998, signed by Stanley D. Gatland II.
- 6.13 Test report on Rate of Burning in accordance with ASTM D 635, prepared by Celotex Corporation Testing Services, Job No. 258218F, dated December 17, 1997, signed by William M. Gwynn and Stanley D. Gatland II.
- 6.14 Test report on Thermal Performance of ASTRO-FOIL Floor Assembly in accordance with ASTM C 1224, prepared by Celotex Corporation Testing Services, Job No. 258481A, dated June 17, 1998, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.15 Test report on Surface Burning Characteristics of ASTRO-FOIL in accordance with ASTM E 84, prepared by Omega Point Laboratories, Report No. 15498-102260, dated November 11, 1997, signed by Ernst L. Schmidt Jr. and William E. Fitch, P.E.
- 6.16 Engineering evaluation of thermal resistance performance of ASTRO-E, prepared by R&D Services, Inc., RDS-Tech Report 99137, dated April 8, 1999, signed and sealed by David W. Yarbrough, P.E.
- 6.17 Test report on ASTRO-E in accordance with ASTM C 518, prepared by Celotex Corporation Testing Services,

Job No. 520203, dated March 17, 1999, signed by Russell W. Woltemar and Stanley D. Gatland II.

- 6.18 Test report on ASTRO-FOIL in accordance with ASTM C 1371, prepared by Celotex Corporation Testing Services, Job No. 520213, dated March 17, 1999, signed by Russell W. Woltemar and Stanley D. Gatland II.
- 6.19 Engineering evaluation of thermal resistance performance of ASTRO-FOIL and ASTRO-E used to insulate concrete block walls, prepared by R & D Services, Inc., dated October 3, 2000, signed and sealed by David W. Yarbrough, P.E.

7. CODE REFERENCES

Standard Building Code - 1999 Edition

Section 103.7	Alternate Materials and Methods
Section 708.1	General - Thermal Insulating Materials
Section 708.2	Concealed Insulation
Section 708.6	Duct Insulation
Appendix E	Energy Conservation

Standard Mechanical Code - 1997 Edition

Section 103.7	Alternate Materials and Methods
Section 308	Piping Insulation
Section 606	Insulation

Standard Plumbing Code - 1997 Edition

Section 105.2	Alternate Materials, Methods, and Equipment
Section 305.6	Freezing - Protection of Pipes

Standard Plumbing Code - 1994 Edition with 1995/1996/1997 Revisions

Section 103.7	Alternate Materials and Methods
Section 304.4	Freezing - Protection of Pipes

International Mechanical Code - 2000 Edition

Section 105.2	Alternate Materials, Methods, Equipment, and Appliances
Section 604	Insulation
Section 1204	Piping Insulation

International Plumbing Code - 2000 Edition

Section 105.2	Alternate Materials, Methods, and Equipment
Section 305.6	Freezing - Protection of Pipes

International One and Two Family Dwelling Code - 1998 Edition

Section 108	Alternate Materials and Systems
Section 319	Insulation
Section 1901.2.1	Duct Insulation Materials
Section 2401.4	Insulation of Refrigerant Piping
Section 2902.3	Insulation of Piping
Section 3103.6	Freezing - Piping Protection

8. COMMITTEE FINDINGS

The Subcommittee on Evaluation in review of the data submitted finds that, in their opinion, the ASTRO-FOIL® and ASTRO-E® as described in this report conform with or are suitable alternates to that specified in the *Standard Building Code*, the *Standard Mechanical Code*, the *Standard Plumbing Code*, the International Mechanical Code, the International Plumbing Code, and the International One and Two Family Dwelling Code or Supplements thereto.

9. LIMITATIONS

- 9.1 R-values listed in Section 5.2 are for the air cavities and ASTRO-FOIL or ASTRO-E.
- 9.2 Use of ASTRO-FOIL® and ASTRO-E® in fire rated assemblies is outside the scope of this report.

10. IDENTIFICATION

Each package or roll of ASTRO-FOIL® and ASTRO-E® insulation covered by this report shall be labeled with the manufacturer's name and/or trademark, the SBCCI Public Safety Testing and Evaluation Services Inc. initials (SBCCI PST & ESI) or seal, and the number of this report for field identification.

11. PERIOD OF ISSUANCE

SEE THE CURRENT EVALUATION REPORT INDEX FOR STATUS OF THIS LEGACY EVALUATION REPORT.

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