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APPROVAL REPORT

CLASS 0 ARMAFLEX THERMAL PIPE INSULATIONS

Prepared for:

**ARMACELL UK LIMITED
MARS STREET
OLDHAM, LANCASTER OL9 6LY
ENGLAND**

Project ID: 3020953

Class: 4924

Date of Approval:

November 19, 2008

Authorized by:

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THERMAL PIPE INSULATIONS**

from

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I INTRODUCTION

- 1.1 This report details the results of a test conducted on Class 0 Armaflex Tubular Thermal Insulation material.
- 1.2 Testing has previously been performed on a similar material, and the data was released and used as the basis for this report. See JI 3017090 dated May 28, 2004 for additional information. The test description and the results are repeated here for informational purposes.
- 1.3 This Report may be reproduced only in its entirety and without modification.
- 1.4 **Standard:**

Title	Class Number	Date
Approval Standard for Pipe Insulation	4924	March 1973

- 1.5 **Listing:** The products will appear in the Approval Guide as follows:

Building Materials, Chap. 12, Pipe Insulation

Armacell UK Limited Mars Street Oldham Lancaster OL9 6LY England

Class 0 Armaflex thermal insulation, a black flexible, elastomeric thermal insulation product.

Class 0 Armaflex pipe insulation is supplied in wall thicknesses from 9-50 mm (3/8-2 in.) in a tubular shape for application over pipes up to a 6 in. (150 mm) dia.

Class 0 Armaflex sheet insulation is supplied in thicknesses from 9-32 mm (3/8-1¼ in.) as flat sheet for application over large dia. piping and over ducts.

- 1.6 The test results indicate that Class 0 Armaflex thermal insulations manufactured by Armacell UK Ltd. meet the Approval requirements of the Standard referenced in 1.4 above for use as a thermal insulation over piping and ducts.
- 1.7 An FM Approvals Pipe Chase Test was conducted by FM Approvals in West Gloucester, R.I. See JI 3017090 dated May 28, 2004 for additional information. Thermal Conductivity, Thermal Resistance and Water Vapor Transmission Testing were waived due to satisfactory performance in a previous test program. See JI 3002274 dated October 20, 1999 for additional information.

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II DESCRIPTION

- 2.1 The material tested was designated by the Client as Class 0 Armaflex Thermal Insulation.
 - 2.1.1 Class 0 Armaflex Tubular Thermal Insulation is a flexible elastomeric foam containing rubber, PVC and other ingredients and is black in color. Class 0 Armaflex is designed to retard heat gain/loss and control condensation drip from piping and related equipment. The material is manufactured in two forms: Class 0 Armaflex Tubular Thermal Insulation and Class 0 Armaflex Sheet and Roll Insulation.
 - 2.1.2 Class 0 Armaflex Tubular Thermal Insulation is supplied in wall thicknesses from 9-50 mm (3/8-2 in.) in a tubular shape for application over pipes up to a 6 in. (150 mm) dia.
 - 2.1.3 Class 0 Armaflex Thermal Insulation sheet material is supplied in thicknesses from 9-32 mm (3/8-1¼ in.) in a flat sheet for application over large dia. piping and over ducts.
- 2.2 The test samples were randomly selected by a representative of FM Approvals from an Armacell LLC manufacturing facility. Formulation and physical specifications of the product are on file at FM Approvals.
- 2.3 The FM Approvals Pipe Chase testing was performed using 50 mm (2 in.) thickness Class 0 Armaflex Tubular Thermal Insulation.

III EXAMINATION, TEST & RESULT

- 3.1 FM Approvals Pipe Chase Test – (From JI 3017090 dated May 28, 2004)
 - 3.1.1 The full scale fire test is conducted as a mock-up of a pipe chase containing three 2 in. (51 mm) NPS pipes covered with the insulation in the desired wall thickness. Appendix 1 shows the three sided simulated chase with one vertical side removed to expose the pipes to the viewer. As the picture indicates, it is a box with the bottom removed. The apparatus is 24 ft (7.2 m) long, 2 ft (0.6 m) wide, with vertical sides 2 ft (0.6 m) deep. The three pipes are spaced to maintain an air gap of at least ½ but not more than 1 in. (13 -25 mm) between insulating surfaces in the horizontal plane with their central axis 6 in. (152 mm) below the ceiling of the chase and extend the full length of the apparatus. These are hung with 12 ga. Renza hooks spaced every 6 ft (1.8 m). The exhaust end of the chase is open while the other end is closed with a vertical panel extending to the floor. Two 1 ft (0.3 m) side panels extend from this vertical piece to shield the fire exposure from spurious drafts. The fire exposure is a 1 ft (0.3 m) square by 7.5 in. (191 mm) deep pan containing 4 in. (102 mm) of heptane fuel. The exposure yields 10,000 BTU/min. Three insulated vertical pipes hang from the horizontal pipes down to within 1 in. (25 mm) of the top of the fuel pan.
 - 3.1.2 If, in this test, fire does not spread horizontally 24 ft (7.2 m) in 10 minutes, the material is considered acceptable.
- 3.2 The flame spread during the simulated pipe chase test run on April 23, 2004 did not propagate to the 24 ft (7.2 m) length. The max observed flame spread was 18 ft (5.4 m) at 10:00 into the test.
- 3.3 Video tape and photographs of the test are on file at FM Approvals.

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IV MARKING

- 4.1 The following information shall appear on the packaging or containers of thermal insulation identified in Section 2.1 that meet Approval requirements:
- Manufacturer's name.
 - Product trade name.
 - The FM Approvals mark of Approval.
 - The words, "Subject to the conditions of Approval as a Pipe Insulation when installed as described in the current edition of the FM Approval Guide".
- 4.2 Markings denoting FM Approval shall be applied by the manufacturer only within and on the premises of manufacturing locations that are under FM Approval's Facilities and Procedures Audit Program.
- 4.3 The manufacturer agrees that the use of the FM Approvals name and certification mark is subject to the conditions and limitations of the FM Approval.

V FACILITIES AND PROCEDURES AUDITS

- 5.1 The Armacell UK Limited manufacturing sites in Oldham, Lancaster England and in Münster, Germany is subject to follow-up audit inspections. The facilities and quality control procedures in place have been found to be satisfactory to manufacture product identical to that examined and tested as described in this report.
- 5.2 Continued Approval is contingent upon satisfactory field performance, production of products in accordance with this report and acceptable quality control procedures as determined by follow-up Facilities and Procedures Audits.
- 5.3 Unsatisfactory results of Facilities and Procedures Audits may result in additional Facilities and Procedures Audits as deemed necessary by FM Approvals or forfeiture of Approval recognition.
- 5.4 A re-examination may be required to confirm that any changes in the composition or specified properties of the product do not affect the Approval.

VI MANUFACTURER'S RESPONSIBILITIES

- 6.1 FM Approval is based upon the manufacturing of the Class 0 Armaflex Thermal Insulations in accordance with this Approval Report, satisfactory field experience, and continued use of acceptable quality control procedures as determined by Facilities and Procedures Audits.
- 6.2 The manufacturer shall be responsible for the continuous high quality of all products and shall notify FM Approvals of intended changes in any raw material or formulation used to manufacture any product listed in this report.
- 6.3 All requests for changes shall be made and agreed to in writing utilizing FM Approvals Form 797, Approved Product-Revision Report, prior to manufacturing and/or distribution for sale.

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- 6.4 The manufacturer shall supply all the necessary instructions and other assistance to the installer to ensure a proper installation and maintenance.
- 6.5 The manufacturer shall establish and adhere to sufficient quality controls to ensure that the marking denoting FM Approval shall only be applied to products conforming to that set forth in this Approval report.

VII DOCUMENTATION

The following document describes the Approved Class 0 Armaflex Thermal Insulations and is filed under J.I. 3020953.

Document	Issue or Revision	Description
Facilities and Procedures Audit Manual	Date: July 16, 2004	Specifications, Formulations, Quality Control Procedures

VIII CONCLUSIONS

- 8.1 This test program indicates that Class 0 Armaflex Thermal Pipe and Roll Insulation manufactured by Armacell UK Limited at a maximum 32 mm (1-1/4 in.) thickness (flat sheet for application over large diameter piping and ducts) and at a maximum 50 mm (2 in.) wall thickness (tubular pipe insulation for application over pipes up to 150 mm (6 in.) in diameter), with a nominal 4 pcf (64 kg/m³) density, is a low fire hazard product, suitable for use as insulation for HVAC piping and equipment when arranged in single or multiple arrays.
- 8.2 Class 0 Armaflex Thermal Pipe and Roll Insulation meets the FM Approvals criteria of limited surface flame spread for pipe insulation and is not expected to contribute significantly to an interior fire when installed per the Manufacturer's installation specifications.
- 8.3 Since a duly signed Master Agreement is on file for this customer, Approval is effective as of the date of this report.
- 8.4 Continued Approval will depend upon satisfactory field experience and periodic Facilities and Procedures Audits.

TESTING SUPERVISED BY:

M. D. Tyrol

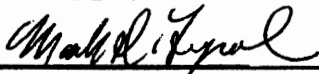
PROJECT DATA RECORD:

J.I. Number 3020953

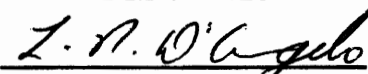
ORIGINAL TEST DATA:

PDR for J.I. 3017090

REPORT BY:


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Senior Engineer
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REPORT REVIEWED BY:


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