

**HEAT FLOW METER THERMAL TRANSMISSION
TEST REPORT**

Report No.: E4438.01-116-25

Rendered to:

THE DRAGON GROUP
Hayden, Idaho 83835

PRODUCT TYPE: Pipe Insulation
SERIES / MODEL: Dragon Jacket

SPECIFICATION: ASTM C518-10, *Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

Test Completion Date: 01/27/15
Report Date: 01/28/15

1.0 Report Issued To: The Dragon Group
11680 North Tracy Road
Hayden, Idaho 83835

2.0 Test Laboratory: Architectural Testing, Inc.
130 Derry Court
York, PA 17406
717-764-7700

3.0 Project Summary:

- 3.1 Product Type:** Pipe Insulation
- 3.2 Series/Model:** Dragon Jacket
- 3.3 Compliance Statement:** Results obtained are tested values and were secured by using the designated test method. The testing conforms with all requirements of the referenced specification with the exception that results are reported in English units. Test specimen description and results are reported herein.
- 3.4 Test Date:** 01/26/15
- 3.5 Test Record Retention End Date:** All test records for this report will be retained until January 26, 2019.
- 3.6 Test Location:** Architectural Testing, Inc. test facility in York, Pennsylvania.
- 3.7 Test Sample Source:** The test specimen was provided by the client. Representative samples of the test specimen will be retained by Architectural Testing for a minimum of four years from the test completion date.

4.0 Test Method:

ASTM C518-10, *Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

5.0 Test Conditions:

- 5.1 Cold plate temperature:** 50 °F nominal
- Warm plate temperature:** 100 °F nominal
- Mean specimen temperature:** 75 °F nominal
- Average Temperature Gradient:** 50 °F/inch
- 5.2 Orientation of Heat Flow Meter Apparatus:** Vertical heat flow (Down)
- 5.3 Specimen Configuration:** Single horizontal specimen
- 5.3 Metering:** 4" x 4" heat flux transducer on warm side plate

6.0 Test Specimen Description:

- 6.1 Specimen Test Size:** 12 inches x 12 inches
Compressible Sample: No
- 6.2 Specimen Construction:** The test specimen was provided by the client as one sample approximately 2" x 12" x 12".

7.0 Test Results:

7.1 Product Results Pipe Insulation

	Dragon Jacket
Test Specimen ID	1
Test Duration (minutes)	50
Average heat flux (Btu/hr-ft²)	3.99
Average thermal conductance - C (Btu/hr-ft²·°F)	0.080
Average thermal resistance -R (hr-ft²·°F/ Btu)	12.53
Average thermal resistance - R_{si} (m²·K/W)	2.21
Average thermal resistivity -r (hr-ft²·°F/ Btu-in)	5.74
Apparent thermal conductivity - k (Btu-in/hr-ft²·°F)	0.174
Specimen Average Thickness (inches)	2.183
†Specimen Average Density (Lbs/Ft³)	5.7

Notes: †The density of the sample was determined by dividing the average weight of the sample by its volume. The weight was measured using a calibrated scale and the volume was determined by measuring the length, width and height of the sample.

7.2 Uncertainty: Less than 3%, per ANSI/NCSL Z540-2-1997 Type B.

8.0 Calibration:

8.1 Material Types Used: NIST Standard Reference Material (Glass Fiberboard) 1450c

Dated March 5, 1997, no expiration

Material Thermal Resistance: 4.355 hr·ft²·°F/ Btu

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is January 26, 2019.

Results obtained are tested values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

TESTED BY:

REVIEWED BY:

Benjamin W. Green
Technician I - Thermal

Kevin S. Louder
Project Engineer

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix A: Photos (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
.01R0	1/28/2015	All	Original Report Issue

Pictures of the samples tested are enclosed in this Appendix

Test Sample

