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REPORT ON

THERMAL CONDUCTIVITY TESTS

FOR

einsulation for einsulation.com, Inc.

FIBERGLASS PIPE INSULATION

WITH ALL SERVICE JACKET (ASJ)

DETERMINED IN ACCORD WITH

ASTM C 335

PREPARED FOR
Insultec Inc.
508 North Second Street
Fairfield, IA 52556

TUTCO SCIENTIFIC REPORT NO. 335\einsulationFG-335Report.105
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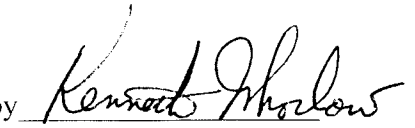
Reported by 
Kenneth Whorlow
President

Project: Determine the thermal conductivity of one sample of Fiberglass Pipe Insulation with All Service Jacket (ASJ) under testing contract with Insultec Inc. and ordered by Anand Verma per PO:USCO146/TUTCO/02, dated Dec. 14, 2004.

Samples: The samples were 3" x 2" Fiberglass Pipe Insulation with All Service Jacket (ASJ) identified as einsulation for einsulation.com, Inc.

Thermal Conductivity Data

Sample: einsulation for einsulation.com, Inc. Size: 3" x 2" x 36" long with attached ASJ
Material: Fiberglass Pipe Insulation / ASJ **Material Specification:** ASTM C547
Sample Data: Length(in) 36, Thk.(in)=2.00; Circum.(in)=23.25, Weight(g)= 1375, Density = 4.3 pcf (calculated using circum. and nominal pipe size)

Test Method: The thermal conductivity was determined on 3N2 pipe cover, using the ASTM C335 test apparatus at seven temperatures. The cold surface temperatures were taken on the outside of the ASJ. The k-value for the material was requested at close to 75°F, requiring a determination with a very cold ambient room temperature. The calculated Apparent Thermal Conductivity values were adjusted by the computer program as required using ASTM C1045 to compensate for large hot and cold surface temperature differentials.

Observed Data (temperatures in °F) - See Figure 1

Data Point	Hot Surf.	Cold Surf.	T Diff.	T Mean	Measured Cond.*
1	119.2	40.4	78.8	79.8	0.204 *** see note 1
2	138.2	71.4	66.7	104.7	0.236
3	337.5	87.4	250.1	212.5	0.292
4	510.1	102.8	407.4	306.4	0.357
5	671.3	122.9	548.4	397.1	0.437
6	723.2	130.9	592.3	427.1	0.473
7	853.4	151.3	702.1	502.3	0.562

Thermal Conductivity Calculated Using ASTM C1045 - See Figure 1

$k = 1.760E\text{-}01 + 4.5495E\text{-}04(mean) + 4.8330E\text{-}07(mean^2)$

Mean Temp.,F (C)	Apparent Cond.,* (**)	ASTM Maximum* (**)
100 (38)	0.226 (32.6)	0.25 (36)
200 (93)	0.286 (41.2)	0.31 (45)
300 (149)	0.356 (51.3)	0.40 (58)
400 (204)	0.435 (62.7)	0.51 (74)
500 (260)	0.524 (75.6)	0.64 (92)

* BTU • in/hr • ft^2 • °F ** mW/mK

*** Note 1- determination with a very cold ambient room temperature

Conclusion: The Fiberglass Pipe Insulation with ASJ identified as einsulation for einsulation.com met all the thermal conductivity requirement of ASTM C547-03 Type 1.

Figure-1
1-4-05

Thermal Conductivity (C335)

einsulation.com Fiberglass w/ASJ