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Thermal Resistance of an Insulation Product

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All tests reported herein have been undertaken at the BRANZ Ltd laboratories located in Judgeford, Porirua, New Zealand, unless stated otherwise.

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All tests reported herein have been performed in accordance with the laboratory's scope of accreditation.

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   iii. any defects in the Products the subject of the Services; or
   iv. any changes, modifications or alterations to the Products the subject of the Services.

Thermal Resistance of an Insulation Product

1. CLIENT

Expol Insulation, 105 Captain Springs Rd., Onehunga, Auckland, New Zealand

2. DESCRIPTION OF TEST EQUIPMENT

The test equipment used was a LaserComp Fox 600 heat flow meter. The specimen for testing is placed horizontally in the apparatus, with upwards heat flow. The hot and cold plates each have a 250 mm x 250 mm heat flux transducer embedded in their surface. The edges of the specimen are insulated from the room ambient temperature.

3. PROCEDURE

One product of EPS insulation (S grade) was supplied by the client. Three pieces of 40 mm thick and one piece of 60 mm thick samples were provided. The dimensions of the specimens were 600 x 600 mm. They were tested at their actual thicknesses, to the requirements of ASTM C518-04. The 60 mm piece was also tested at its actual thickness to the requirements of ASTM C518-04 to confirm linearity of the thermal conductivity.

4. RESULTS

Nominal Upper Plate Temperature	13 °C
Nominal Lower Plate Temperature	33 °C
Nominal Difference in Temperature	20 K
Nominal Mean Temperature	23 °C

Measured results of S grade

Calibration check	18-May-09, EPS 06				
BRANZ reference		D4408A	D4408B	D4408C	D4408D
Sample weight	gram	251	244	240	377
'grams per sq. metre'		697	678	667	1039
Test date		19-May	19-May	19-May	19-May
Test thickness	mm	40.3	40.0	40.2	59.8
Density	kg/m^3	17.3	17.0	16.6	17.4
Temperature difference	K	20.0	20.0	20.0	20.0
Mean temperature	°C	23.0	23.0	23.0	23.0
Heat-flux	W/m^2	19.26	19.44	19.35	13.24
Thermal resistance	m^2K/W	1.039	1.029	1.034	1.511
Thermal conductivity	W/mK	0.0388	0.0389	0.0389	0.0396
Difference between heat flux transducers	%	0.1	0.3	0.4	0.5

Results adjusted from a mean temperature of 23°C to a mean temperature of 15°C

See AS/NZS 4859.1 Section 2.3.3.3 Figure 2.1 Effect of mean temperature on R-value

assuming thermal conductivity sensitivity of 0.4%/K

$$\text{thermal conductivity @ 15°C} = \frac{\text{thermal conductivity @ 23°C}}{1.032}$$

thermal resistance @ 15°C = 1.032 x (thermal resistance @ 23°C)

BRANZ reference	D4408A	D4408B	D4408C	D4408D	
Estimated thermal conductivity of test sample	0.0376	0.0377	0.0377	0.0384	W/mK
Estimated thermal resistance of test sample	1.072	1.062	1.067	1.559	m^2K/W

These measurements comply with the requirements of ASTM C518. The uncertainty in the measurements of thermal conductivity and thermal resistance are estimated to be ± 3%.

5. REFERENCES

ASTM C518-04 *Standard Test Method for Steady-State Heat Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*.
American Society for Testing and Materials, Philadelphia, PA, 2004.