

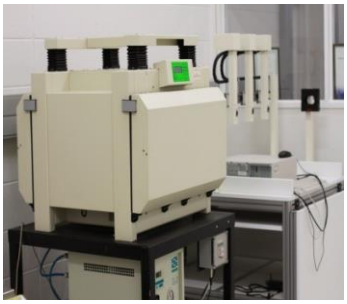

TEST REPORT

TP11781-17

THERMAL TESTING OF FOUR INSULATION SAMPLES

CLIENT
Terra Lana Products Limited
55 Francella Street
Bromley
Christchurch 8062
New Zealand

All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

NATA

IANZ

TO WHOM IT MAY CONCERN

Both NATA (National Association of Testing Authorities, Australia) and IANZ (International Accreditation New Zealand) are signatories to the ILAC Mutual Recognition Arrangement. Under the terms of this arrangement, each signatory:

(i) recognises within its scope of recognition of this Arrangement the accreditation of an organisation by other signatories as being equivalent to an accreditation by its own organisation,

(ii) accepts, for its own purposes, endorsed* certificates or reports issued by organisations accredited by other signatories on the same basis as it accepts endorsed* certificates or reports issued by its own accredited organisations,

(iii) recommends and promotes the acceptance by users in its economy of endorsed* certificates and reports,

* *The word "endorsed" means a certificate or report bearing an Arrangement signatory's accreditation symbol (or mark) preferably combined with the ILAC-MRA Mark.*

Signed:

Jennifer Evans
NATA CEO

Date: 24 March 2014

Dr Llewellyn Richards
IANZ CEO

Date: 24th March 2014

LIMITATION

The results reported here relate only to the item/s tested.

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.

SIGNATORIES

Author

Sheng-Huei Huang
Senior Technician
Authorised to author this report

Reviewed by

Roger Stanford
Senior Technician
Authorised to review this report

Authorised by

Sheng-Huei Huang
Senior Technician
Authorised to release this report to client

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	DESCRIPTION
01	25/10/2022	Initial Issue

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

1. TEST SPONSOR

Terra Lana Products Limited
55 Francella Street, Bromley, Christchurch 8062, New Zealand

2. TEST SAMPLES

The specimens were supplied by the client and consisted of four pieces of grey wool blend insulation segment. The dimensions of the samples were approximately 600 mm x 600 mm.

Table 1: Sample identification and traceability information

BRANZ Sample No.	Client Reference	Traceability Information
D6675	24.90.560 R2.4 Wall Insulation	Batch 4671 Date 20/09/22
D6676	36.140.560 R3.6 Wall Insulation	Batch 4671 Date 20/09/22
D6677	36.180.870 R3.6 Ceiling Insulation	Batch 4671 Date 20/09/22
D6678	64.240.570D R6.4 Ceiling Insulation	Batch 4671 Date 20/09/22

3. TEST EQUIPMENT

All tests reported have been undertaken at BRANZ Ltd laboratories located at Judgeford, unless stated otherwise. The ASTM C518 compliant test equipment used was a LaserComp FOX60, FOX801 heat flow meter and Wintherm software. 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.

Table 2: Test condition set-points

Nominal Upper Plate Temperature	10.0	°C
Nominal Lower Plate Temperature	36.0	°C
Nominal Difference in Temperature	26.0	K
Nominal Mean Temperature	23.0	°C

4. PROCEDURE

The specimens were tested at the lesser of nominal thickness and actual measured thickness, to the requirements of ASTM C518.

5. CONDITIONING

The sample segments were conditioned for at least 24 hours at 23°C ± 3°C, prior to the thermal performance measurements. The thickness and the weight of the specimens were recorded both before and after conditioning. Only the relevant results are included in this test report.

6. UNCERTAINTY

The estimated overall uncertainty of measurement is 2.0%.

7. RESULTS

Table 3: Measured test temperature

Temperature Difference	26.0	± 0.1	K
Mean Test Temperature	23.0	± 0.1	°C

Table 4: Measured results of D6675

Calibration check	17/10/22 SR09			
BRANZ reference		D6675-1		
Client reference		24.90.560 R2.4 Wall Insulation		
Sample weight	gram	972		
'grams per sq. metre'	g/m^2	2657.8		
Test date		18/10/22		
Test apparatus		FOX600		
Measured thickness	mm	100.7		
Test thickness	mm	90	80	70
Density	kg/m^3	10.93	11.97	13.35
Heat-flux	W/m^2	10.93	11.97	13.35
Thermal resistance	m^2K/W	2.38	2.17	1.95
Thermal conductivity	W/mK	0.0378	0.0368	0.0359
Difference between heat flux transducers	%	4.0	4.3	3.3
Results adjusted from test temperature of 23°C to declared temperature of 15°C for New Zealand product *(according to AS/NZS 4859.1 Part 2 Section 5.2)*				
Thermal resistance	m^2K/W	2.46	2.24	2.01
Thermal conductivity	W/mK	0.0366	0.0357	0.0348

* Thermal conductance can be calculated by dividing the thermal conductivity by the thickness of the specimen
* Average temperature gradient in the specimen during test can be calculated by dividing the temperature difference by the thickness of the specimen
* The minimum duration of the measurement portion of the test once steady state (0.2% / 12 mins) is achieved is 6 minutes

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

Table 5: Measured results of D6676

Calibration check	17/10/22 SR09			
BRANZ reference		D6676-1		D6676-2
Client reference		36.140.560 R3.6 Wall Insulation		
Sample weight	gram	1231		
'grams per sq. metre'	g/m^2	3397.3		
Test date		20/10/22	20/10/22	21/10/22
Test apparatus		FOX600		
Measured thickness	mm	167.7		
Test thickness	mm	140	125	110
Density	kg/m^3	24.3	27.2	30.9
Heat-flux	W/m^2	7.58	8.19	8.98
Thermal resistance	m^2K/W	3.43	3.18	2.90
Thermal conductivity	W/mK	0.0408	0.0394	0.0380
Difference between heat flux transducers	%	4.0	3.4	2.4
Results adjusted from test temperature of 23°C to declared temperature of 15°C for New Zealand product *(according to AS/NZS 4859.1 Part 2 Section 5.2)*				
Thermal resistance	m^2K/W	3.54	3.28	2.99
Thermal conductivity	W/mK	0.0395	0.0381	0.0368

* Thermal conductance can be calculated by dividing the thermal conductivity by the thickness of the specimen
* Average temperature gradient in the specimen during test can be calculated by dividing the temperature difference by the thickness of the specimen
* The minimum duration of the measurement portion of the test once steady state (0.2% / 12 mins) is achieved is 6 minutes

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

Table 6: Measured results of D6677

Calibration check	17/10/22 SR09			
BRANZ reference		D6677-1		
Client reference		36.180.870 R3.6 Ceiling Insulation		
Sample weight	gram	966		
'grams per sq. metre'	g/m^2	2670.5		
Test date		22/10/22		
Test apparatus		FOX600		
Measured thickness	mm	192.2		
Test thickness	mm	180	160	140
Density	kg/m^3	14.8	16.7	19.1
Heat-flux	W/m^2	7.08	7.50	8.10
Thermal resistance	m^2K/W	3.67	3.47	3.21
Thermal conductivity	W/mK	0.0490	0.0461	0.0436
Difference between heat flux transducers	%	3.7	2.3	3.7
Results adjusted from test temperature of 23°C to declared temperature of 15°C for New Zealand product *(according to AS/NZS 4859.1 Part 2 Section 5.2)*				
Thermal resistance	m^2K/W	3.79	3.58	3.31
Thermal conductivity	W/mK	0.0475	0.0447	0.0422

* Thermal conductance can be calculated by dividing the thermal conductivity by the thickness of the specimen
* Average temperature gradient in the specimen during test can be calculated by dividing the temperature difference by the thickness of the specimen
* The minimum duration of the measurement portion of the test once steady state (0.2% / 12 mins) is achieved is 6 minutes

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz

Table 7: Measured results of D6678

Calibration check	17/10/22 SR08			
BRANZ reference		D6678-4		
Client reference		64.240.570D R6.4 Ceiling Insulation		
Sample weight	gram	2561		
'grams per sq. metre'	g/m^2	6743.8		
Test date		22/10/22		
Test apparatus		FOX801		
Measured thickness	mm	258.5		
Test thickness	mm	240	220	200
Density	kg/m^3	28.1	30.7	33.7
Heat-flux	W/m^2	4.34	4.57	4.90
Thermal resistance	m^2K/W	6.00	5.69	5.31
Thermal conductivity	W/mK	0.040	0.039	0.038
Difference between heat flux transducers	%	1.6	5.3	4.1
Results adjusted from test temperature of 23°C to declared temperature of 15°C for New Zealand product *(according to AS/NZS 4859.1 Part 2 Section 5.2)*				
Thermal resistance	m^2K/W	6.19	5.87	5.48
Thermal conductivity	W/mK	0.0388	0.0375	0.0365

* Thermal conductance can be calculated by dividing the thermal conductivity by the thickness of the specimen
* Average temperature gradient in the specimen during test can be calculated by dividing the temperature difference by the thickness of the specimen
* The minimum duration of the measurement portion of the test once steady state (0.2% / 12 mins) is achieved is 6 minutes

8. REFERENCES

ASTM C167 — *Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations*. American Society for Testing and Materials, Philadelphia, PA, 2018.

ASTM C518 — *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, 2017.

This is the end of the report

branz.nz | 1222 Moonshine Rd, RD1, Porirua 5381, Private Bag 50 908, Porirua 5240, New Zealand | Phone +64 4237 1170 | branz@branz.co.nz