

AWTA PRODUCT TESTING

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TEST REPORT

CLIENT : ECOPLUS SYSTEMS LIMITED
PO BOX 105577
AUCKLAND CITY 1143
NEW ZEALAND

TEST NUMBER : 7-581937-NO
ISSUE DATE : 16/11/2011
PRINT DATE : 16/11/2011

SAMPLE DESCRIPTION Clients Ref: "Ecoplus AP25"
Glass fibre ceiling tiles
Colour: White/Yellow
Nominal Composition: Glass fibre matt/latex paint finish
Nominal Thickness: 25.00mm Density: 100 kg/m3
End Use: Ceiling Tiles

ISO 8302-1991 Thermal Insulation (Guarded Hot Plate Test)

Test Conditions:

Mean Heat Flux(W/m2) 9.526
Mean Rct (m2K/W) 0.784

Thickness 25.0 mm

SEE SPREADSHEET FOR RESULTS

The thermal resistance values contained in this report are determined by testing in accordance with ISO 8302 and specifically describe the steady state thermal properties of the tested product associated with that method of test

Results contained in this report do not infer thermal information where the product is used under conditions differing from those under which the product was tested

It should be noted that whilst sufficient time has been allowed prior to testing for the product to recover from compression during transit it has been tested at the thickness nominated in the report. This may differ from the client's expectations of nominated thickness at the point of manufacture, we have therefore included the additional calculated measure of the thermal resistance at the client's nominated thickness

The results contained in the report are those which have been requested and do not necessarily denote compliance in entirety to ASNZS 4859.1

190671

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(END OF REPORT)

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Samples, and their identifying descriptions have been provided by the client unless otherwise stated. AWTA Ltd makes no warranty, implied or otherwise, as to the source of the tested samples. The above test results relate only to the sample or samples tested. The above test results are designed to provide THE CLIENT WITH GUIDANCE INFORMATION ONLY.

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AWTA PRODUCT TESTING

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| Date: | 16-Nov-11 | | |
| Project Number: | 190671 | | |
| Sample Description and orientation: | Clients Ref: "Ecoplus AP25". Colour: White/Yellow. Composition: Glass fibre matt/latex paint finish. Thickness: 25mm Density: 100kg/m ³ | | |
| | Sample 1 | Sample 2 | Mean |
| Test Plate Area: | 6.58 x 10 ⁻² | 6.58 x 10 ⁻² | 6.58 x 10 ⁻² m ² |
| Hot Surface Temperature: | 28.001 | 28.000 | 28.000 °C |
| Cold surface Temperature: | 18.499 | 18.983 | 18.741 °C |
| ΔT | 9.502 | 9.017 | 9.260 °C |
| Mean Temperature | 23.250 | 23.492 | 23.371 °C |
| Relative Humidity | 65.000 | 65.000 | 65.000 % |
| Heat Flux: | 9.00 | 10.05 | 9.526 W/m ² |
| Bare Plate Resistance | 0.063 | m ² K/W | |
| Total Thermal Resistance (R) | 0.72 | 0.98 | 0.847 m ² K/W |
| Thermal Resistance [R] | 0.653 | 0.914 | 0.784 m ² K/W |
| Measured Thickness | 25.0 | 25.0 | 25.000 mm |
| Average Measured Thickness | 25.0 | mm * # | Δ Thickness |
| Recovered Thickness | 25.0 | mm | 0.0 mm |
| Client Nominated Thickness | 25.0 | mm | 0.0 mm |
| Error and Uncertainty of Measurement U ₉₅ | 8.400% | * Calculated in accordance with ISO GUM. | |
| Coverage Factor | 1.980 | * Calculated in accordance with ISO GUM. | |
| Plate emissivity | 0.810 | *5 | |
| Test Method: | ISO8302:1991 - Thermal insulation - Determination of steady-state thermal resistance and related properties - Guarded hot plate apparatus. | | |
| Wind Velocity: | | | 0.00 m/s |
| Mass Change: | | | |
| Mass ^{Initial} | 640.50 | 714.40 | 676.44 g |
| Mass ^{Final} | 640.50 | 714.40 | 676.44 g |
| Δ mass | 0.00 | 0.00 | 0.00 % |
| Dimensions (Complete Specimen) | | | |
| Thickness (mm) | 25.00 | 25.0 | 0.025 m |
| Width (mm) | 523.00 | 522.0 | 0.523 m |
| Length (mm) | 523.00 | 522.0 | 0.523 m |
| Tested Volume | 0.0068 | 0.0068 | m ³ |
| Density (ρ) | 93.66 | 104.87 | kg/m ³ |
| Transfer Factor (β) | 0.0237 | 0.0279 | 0.0257 W/mK (Calculated) ^{*1} |
| Apparent Thermal Conductivity (λ _k) | 0.0383 | 0.0274 | 0.0324 W/mK (Calculated) ^{*2} |
| U - Value | 1.397 | 1.024 | 1.196 W/(K.m ²) (Calculated) ^{*3} |
| Calculated R-Value for recovered thickness | N/A | m ² K/W | (Calculated) ^{*4} |
| Calculated R-Value for client nominated thickness | N/A | m ² K/W | (Calculated) ^{*4} |

Tested on Guarded Hotplate Apparatus Model: 10.5 S/N 306-401 Manufactured by: Measurement Technology Northwest System componentry includes Guarded Hotplate Assembly, Airflow Hood with variable speed fans, Ambient and Hotplate temperature sensors, RH and Windspeed sensors, Control and Logging System and Environmental Chamber. All Specimens are tested in a horizontal position.

Where applicable. The mass applied to initiate good thermal contact is 9.836 kg

Test plate dimension is 260mm x 260mm, Complete guarded apparatus dimension is 510mm x 510mm. Single specimens are mounted in a horizontal position with heat flux movement from the bottom of the specimen to the top.

*1 Calculated in accordance with ISO8302:1991(E) Section 3.5.2

*2 Calculated in Accordance with ISO8302.

*3 Calculated as 1/R.

*6

Acceptable

*4 Linear interpolation based on nominal thickness from measured R-Value

Kelvin units and measured Temperature (°C) units may be read as interchangeable where variations from absolute zero are not required.

*5 Plate emissivity was measured by CSIRO using a TASCOS Osaka Model THI-300, S/N 826 041.

*6 Specimens were tested in air conditioned to the same temperature as the cold surface, at ambient pressure.

Edge heat loss

* Calculated per ISO8302 - Section 2.4.5

| | |
|------------------------------|----------|
| T_e | 18.741 |
| T_m | 23.37075 |
| ΔT | 9.2595 |
| $(T_e - T_m)/\Delta T$ | -0.5 |
| $(T_e - T_m)/\Delta T < 0.1$ | Yes |

Thickness variance

(ISO8302 - 3.2.1)

| Specimen | Thickness (m) | Variance (%) |
|-------------------------|---------------|--------------|
| 1 | 0.0250 | 0.00% |
| 2 | 0.0250 | 0.00% |
| Mean | 0.0250 | 0.00% |
| Highest | | 0.00% |
| Lowest | | 0.00% |
| Allowable Variance | < | 2.00% |
| Actual Variance maximum | | 0.00% |
| Compliance | | Yes |

Minimum Thermal Resistance

(ISO8302 -3.2.2.2.1)

| | | |
|--|-------|--------------------|
| Minimum measurable thermal Resistance: | 0.1 | m ² K/W |
| Average obtained thermal resistance: | 0.847 | m ² K/W |
| Within allowable limit: | Yes | |

Measured Thickness

(ISO8302 - 3.6.3)

| | | |
|-----------------------------|--------|----|
| Specimen 1: | 0.0250 | m |
| Specimen 2: | 0.0250 | m |
| Average Measured Thickness: | 25.0 | mm |
| | 0.0250 | m |