

Glazing System Solar/Luminous/Thermal Property Test Report

Report number: OTM1910001



Client:

Company name

Address line 1

Address line 2

Address line 3

Attention: Name

Laboratory:

Optical & Thermal Testing Laboratory

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The Optical & Thermal Testing Laboratory of OTM Solutions Pte Ltd is accredited to ISO/IEC 17025 under the Singapore Accreditation Council - Singapore Laboratory Accreditation Scheme (SAC-SINGLAS, Certificate No: LA-2016-0610-G).

The results reported herein have been performed in accordance with the terms of accreditation under the Singapore Accreditation Council.

Report number:

OTM1910001

Job description:

Glazing system solar / luminous / thermal property testing of a single glazing glass sample.

The glass sample was delivered by the client and received by OTM on 01/10/2019 and was tested on 01/10/2019.

Approved signatory:

Dr. Chen Fangzhi

Laboratory Manager (Tel: +65 9187 7666; Email: chen.fz@otm.sg)

Date of test:

01/10/2019

Date of report:

01/10/2019

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Test method description

<p><u>Methods:</u></p>	<ul style="list-style-type: none"> • ANSI/NFRC 100-2017 Procedure for determining fenestration product U-factors • ANSI/NFRC 200-2017 Procedure for determining fenestration product solar heat gain coefficient and visible transmittance at normal incidence • NFRC 300-2017 Test method for determining the solar optical properties of glazing materials and systems • NFRC 301-2017 Standard test method for emittance of glazing products
<p><u>Instruments</u></p>	<ul style="list-style-type: none"> • PerkinElmer Lambda 950 UV/VIS/NIR spectrophotometer, with 150 mm integrating sphere • PerkinElmer Spectrum Two FTIR spectrometer
<p><u>Calculation software</u></p>	<ul style="list-style-type: none"> • Optics 6.0 • Window 7.4.14.0 • IGDB@OTM V1.1.3 (in-house software for IGDB format data generation)
<p><u>Estimated uncertainties</u></p>	<ul style="list-style-type: none"> • ± 0.006 for solar energy and visible light transmittance/reflectance • ± 0.04 W/(m²K) for U-value • ± 0.005 for SHGC • ± 0.006 for shading coefficient • The uncertainties were estimated at a level of confidence of approximately 95%, with a coverage factor $k = 2$ • The estimated uncertainties do not include uncertainties caused by sample-to-sample variations and sample non-uniformities
<p><u>Notes</u></p>	<ul style="list-style-type: none"> • To convert the results from decimal values to percentages, multiply the decimal values by 100%. Example: visible light transmittance/reflectance of 0.123 is equal to 12.3%. • The “visible light reflectance, front” result listed in the result table of page 5 is equivalent to the glazing system daylight reflectance, described in the BCA circular dated 27 Jun 2016 (Ref: APPBCA-2016-05). The test method NFRC 300 meets all requirements of ASTM E903 and is with

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	<p>more specific requirements for glazing systems, which are specular (without diffuse reflection) and are with inter-reflections between glass layers.</p>
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Disclaimer

- The test report shall not be reproduced except in full, without written approval of the laboratory.
- The test results relate only to the sample tested.
- The test report is issued subject to the “Testing Service Terms and Conditions” annexed to OTM official quotation and on request from OTM.

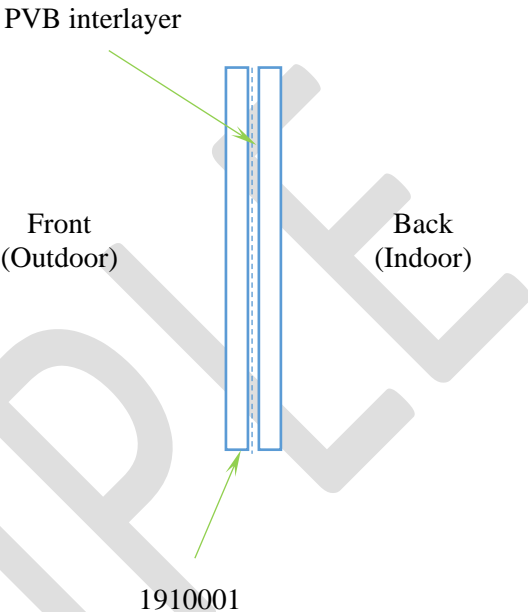
SAMPLE

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Glazing system description

<p><u>System schematics:</u></p>	<ul style="list-style-type: none"> • Glass configuration 
<p><u>Glazing system test results</u></p>	<p>Refer to pages 5 – 6</p>

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Glazing system test results

Sample ID	1910001																								
Client's reference	Glass configuration																								
Dimension	10 mm × 30 cm × 30 cm																								
Test results	<table border="1"> <tr> <td>Solar energy transmittance</td> <td>0.420</td> </tr> <tr> <td>Solar energy reflectance, front</td> <td>0.090</td> </tr> <tr> <td>Solar energy reflectance, back</td> <td>0.070</td> </tr> <tr> <td>Visible light transmittance</td> <td>0.560</td> </tr> <tr> <td>Visible light reflectance, front</td> <td>0.130</td> </tr> <tr> <td>Visible light reflectance, back</td> <td>0.090</td> </tr> <tr> <td>Emissivity, front</td> <td>0.840</td> </tr> <tr> <td>Emissivity, back</td> <td>0.840</td> </tr> <tr> <td>Solar heat gain coefficient</td> <td>0.580</td> </tr> <tr> <td>Shading coefficient</td> <td>0.660</td> </tr> <tr> <td>Summer condition U-value</td> <td>4.90 W/(m²K)</td> </tr> <tr> <td>Winter condition U-value</td> <td>5.40 W/(m²K)</td> </tr> </table>	Solar energy transmittance	0.420	Solar energy reflectance, front	0.090	Solar energy reflectance, back	0.070	Visible light transmittance	0.560	Visible light reflectance, front	0.130	Visible light reflectance, back	0.090	Emissivity, front	0.840	Emissivity, back	0.840	Solar heat gain coefficient	0.580	Shading coefficient	0.660	Summer condition U-value	4.90 W/(m ² K)	Winter condition U-value	5.40 W/(m ² K)
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<p><u>Pictures</u></p>	<p>Test sample photos</p>
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SAMPLE