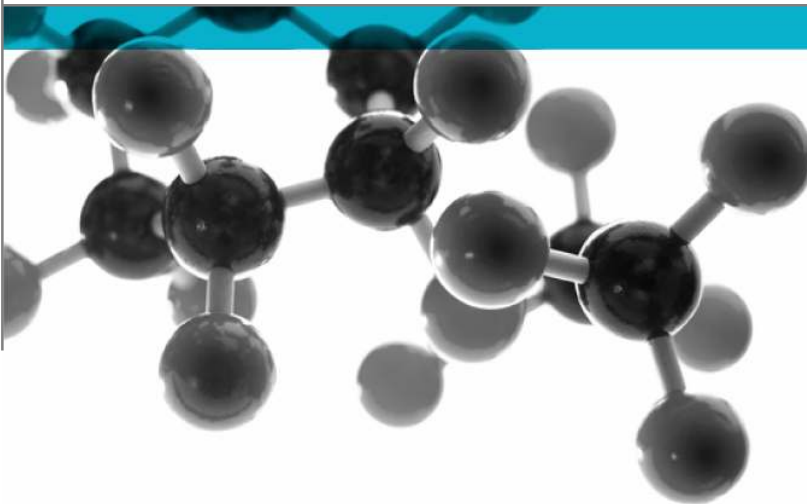


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BS EN ISO 10077-1:2006



Thermal Performance of Windows, Doors & Shutters – Calculation of Thermal Resistance

A Report To: D4 Products Ltd

Document Reference: WIL 327206

Date: 16/05/2013

Copy: 1

Issue No.: 1

Page 1

Testing
Advising
Assuring

TEST CONCLUSIONS

Drawings of:
Manufacturer D4 Products Limited
Product Insulated Roller Shutter Lath
Model Magroll 95mm Insulated Lath

Have been submitted for U-values calculation in accordance with BS EN ISO 10077-1:2006.
By Mark West, a BFRC certified simulator (No. 055) of Exova Warringtonfire Willenhall, a UKAS accredited Testing Laboratory (No. 0621) and EC Notified Body number (No. 1104)

At Key Industrial Park, Fernside Rd, Willenhall, West Midlands, WV13 3YA.
Results and comments as detailed below:

Description	U-value W/(m ² .K)
Lath section including joint	3.3
Lath section core only	1.1

NOTE: Results gained using a polyurethane core with thermal conductivity 0.0241, as advised by the manufacturer. This value was not verified and as such this report should be used for indicative purposes only.

No inferences can be made regarding performance against other requirements of this standard

AUTHORISATION

Simulation performed by: Mark West, Assistant Operations Manager

Report issued by: Mark West, Assistant Operations Manager

Signed



Date 16/05/2013

For and on behalf of Exova Warringtonfire

Report authorised by: Ian Keeling, Operations Manager

Signed



Date 16/05/2013

For and on behalf of Exova Warringtonfire

Report issued: 16 May 2013



0621

NOTE.

Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.

Tests marked NT were not tested

Tests marked NA are not applicable to the product on test.

Exova Warringtonfire is an EC Notified Body Number 1104

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TEST DETAILS

CLIENT DETAILS

Company name D4 Products Ltd
 Address Three Trees
 Quigleys Point
 Co. Donegal
 Ireland

Contact Bryan Northey

ORDER DETAILS

Order number VERBAL
 Dated

PRODUCT DETAILS

Product Insulated Roller Shutter Lath (lath only & core simulated)
 Model Magroll 95mm Insulated Lath
 Manufacturer D4 Products Ltd
 Material Steel/PVC facing & polyurethane core

TEST DETAILS

Test specification BS EN ISO 10077-1:2006
 Full test Yes
 Test to clauses N/a
 Calculation methods BS EN ISO 10077-1:2006 Thermal performance of windows, doors & shutters –
 Calculation of thermal transmittance – Part 1: General
 BS EN ISO 10077-2:2012 Thermal performance of windows, doors & shutters –
 Calculation of thermal transmittance – Part 2: Numerical method for frames

Simulation software & spreadsheet versions used Thermal transmittance models obtained by computer simulation using Therm Finite Element Simulator V5.2.14 provided by LBNL. Software validated in accordance with Annex D of BS EN ISO 10077-2.

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Client:	D4 Products Ltd	Issue No.:	1

TEST PROCEDURE

Introduction This test report should be read in conjunction with the Standard BS EN ISO 10077-1:2006 Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: General, BS EN ISO 10077-2:2012 Thermal performance of windows, doors and shutters – Calculation of thermal resistance – Part 2: Numerical method for frames.

Drawings in DXF format were submitted for calculation of thermal transmittance in accordance with BS EN ISO 10077-1.

Instruction To Test The calculations were conducted on the 7th March 2013 on behalf of D4 Products Ltd.

Calculation method As per Clause 6 of BS EN ISO 10077-1 Input Data the thermal transmittance of the two halves of a lath and the junction between the two was carried out by simulation in accordance with Annex C of BS EN ISO 10077-2 using THERM finite element analysis software version 5.2.14 provided by LBNL.

Values used for the design thermal conductivity of materials in this calculation were taken from Annex A of BS EN ISO 10077-2, and are listed in Annex A of this report.

NOTE: Results gained using a polyurethane core with thermal conductivity 0.0241, as advised by the manufacturer. This value was not verified and as such this report should be used for indicative purposes only.

As such the result contained in this report is partly derived from tabulated values and should be considered indicative and not definitive.

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Client:	D4 Products Ltd	Issue No.:	1

CONCLUSIONS

Evaluation against objective The sectional drawings of the window as provided by the client were subjected to thermal performance calculations in accordance with BS EN ISO 10077-1.

Observations & comments

LIMITATIONS

Limitations The results relate only to the behaviour of the specimens of the element of construction under the particular conditions of the calculation. They are not intended to be the sole criteria for assessing the potential performance of the element in use, nor do they reflect the actual behaviour in use.

Uncertainty of Measurement The uncertainties of measurements calculated for a confidence level of 95% throughout these tests are within the limits of these tolerances.

The user and the simulation software have been validated in accordance with Annex D of BS EN ISO 10077-2:2012, giving the following accuracies:

- Thermal transmittance $\pm 5\%$
 - Linear thermal transmittance $\pm 5\%$
-

ANNEX A: SOURCE DATA

Materials used

Design thermal conductivity of materials used in the simulation
(taken from Annex A BS EN ISO 10077-2:2003 Table A.1 unless otherwise stated)

Material	Conductivity (W/ m.K)	Source
Galvanised Steel facing	50	BS EN ISO 10077-2 Table A.1
PVC facing	0.17	BS EN ISO 10077-2 Table A.1
Polyurethane core Voracor CS1364	0.0241	Unverified manufacturer supplied data (see following page for details)



Dow Chemical Company Limited
Station Road
Birch Vale
High Peak
Derbyshire
SK22 1 BR

Tuesday 9th April 2013

Bryan Northey
D4 Products Limited
Three Trees
Quigley's Point
Co, Donegal,
Ireland

RE: Testing of laboratory prepared foam sample of Voracor CS 1364

Dear Bryan,

A moulded sample of Voracor CS 1364 was prepared in our laboratory facility in Ahlen, Germany. Moulded at an expected core density of 70kg/m³. The sample was then tested for thermal conductivity after conditioning for 24 hours at 22oC.

Thermal Conductivity @ 10°C mean: 0.0241 W/mK

Moulded Core Density: 70.4 Kg/m3

Yours sincerely,

Mark Riley

Technical Sales
Nordic, UK and Ireland

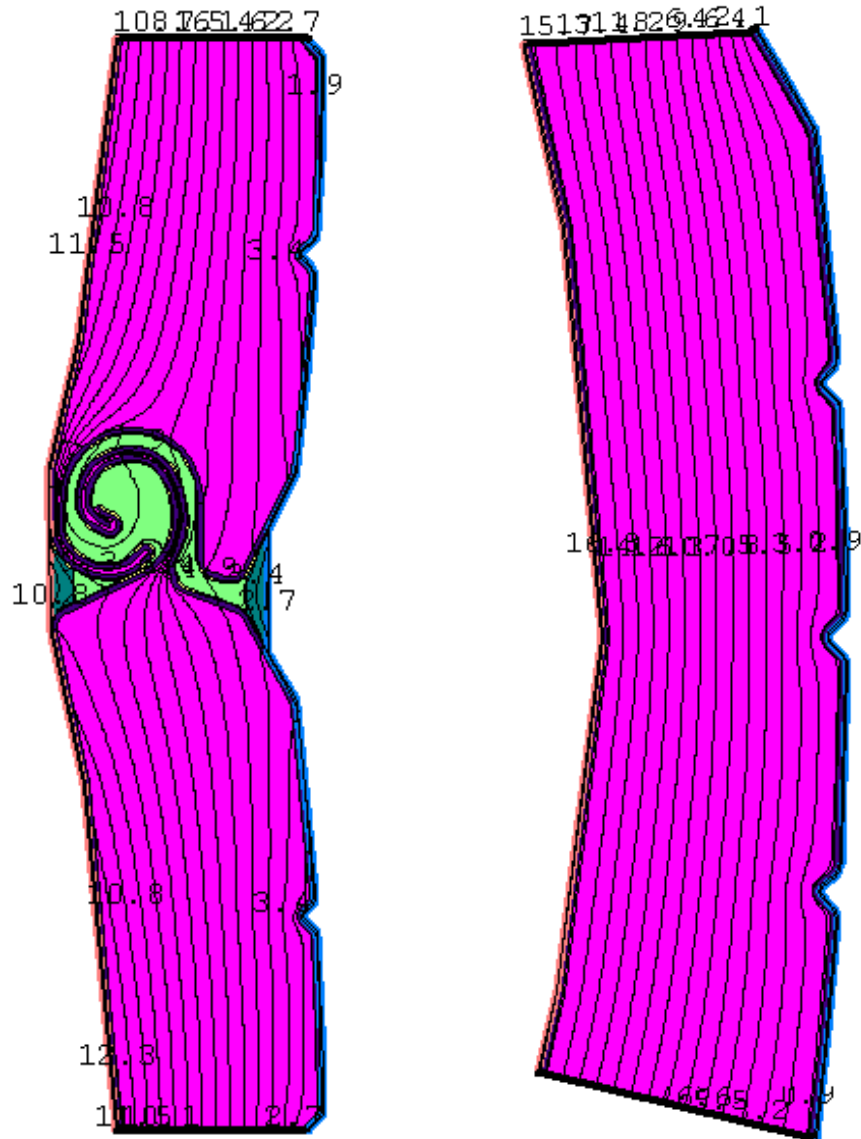
Dow Formulated Systems

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ANNEX B: THERM MODELS

Lath & lath core simulation model



REVISION HISTORY

Issue No :	Re - Issue Date :
Revised By:	Approved By:
Reason for Revision:	

Issue No :	Re - Issue Date :
Revised By:	Approved By:
Reason for Revision:	

END OF REPORT