Evidence of Performance
Thermal transmittance

Test Report
No. 16-001831-PR02
(PB-K99-06-en-01)

ROSENHEIM

Client
Solatube International, Inc.
2210 Oak Ridge Way,
Vista, CA 92081-8341
USA

Product
Solatube tubular daylight device

Designation: Solatube 330/750-DS

Performance-relevant product details: Dimension of roof opening, diameter in mm 530 (reference size 0.22 m²); External dimensions, width in mm 695; External dimensions, depth in mm 695; External dimensions, height in mm 905; Configuration of air separating shells 2.5 mm PMMA- sheet, 202 mm air, 1.5 mm PMMA-sheet, 40 mm air, 1.5 mm PMMA-sheet, 25 mm air, 1.5 mm PMMA-sheet, ca. 529 mm air, 3.0 mm PMMA-dome, 91 mm air, 3.2 mm PMMA-dome; Round to square transmission box; Material Opaque polymeric; Height in mm 229; Tubing Material Aluminium; Height in mm Ca. 240; Dome Material 2 PMMA-shells; Height in mm 338; Square flashing; Material Steel; Insulated curb; Material Particle board - OSB; Inlay EPS

Special features: -/-

Results

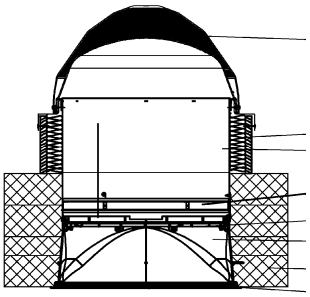
Thermal transmittance

U = 1.3 W/(m²K)

Basis *)

AA – **ift** - Hausverfahren „Thermal transmittance of solatubes“

Representation



Instructions for use

The results obtained can be used for the above mentioned basis.

Validity

The data and results given relate solely to the tested/described specimen. This test/evaluation does not allow any statement to be made on further characteristics of the present structure regarding performance and quality.

Notes on publication

The ift-Guidance Sheet "Conditions and Guidance for the Use of ift Test Documents" applies. The cover sheet can not be used as abstract.

Contents

The report contains a total of 6 page/s and annex (1 page).

ift Rosenheim
09.06.2017

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Test Report No. 16-001831-PR02 (PB-K99-06-en-01) dated 09.06.2017
Client: Solatube International, Inc., Visa, CA 92081-8341 (USA)

1 Object

1.1 Description of test specimen

Product	Solatube tubular daylight device
Product designation	Solatube 330/750-DS
Shipping name / Type / Item number	750-DS
Dimension of roof opening, diameter in mm	530
External dimensions, width in mm	695
External dimensions, depth in mm	695
External dimensions, height in mm	905

Round to square transmission box with diffuser

Shipping name / Type / Item number	750-DS Transition Box (Metric) // 401305
Material	Opaque polymeric material
Width in mm	595
Depth in mm	595
Height in mm	229
Material, thickness in mm	2.8
Circular adaptation, diameter in mm	520

Outer diffuser

Shipping name / Type / Item number	750-DS Prismatic Diffuser-C // 400900
Dimensions, width in mm	567
Dimensions, depth in mm	567
Sealing system	Foam rubber

Diffuser frame

Material	Steel
Surface treatment	Laquer
Profile, width in mm	16
Profile, height in mm	13

Diffuser glazing

Material	PMMA with prismatic structure
Configuration	2.5 mm PMMA-sheet
Mounting of glazing	Foam rubber internal

Inner diffuser

Shipping name / Type / Item number	750-DS Natural Effect Lens // 401100
Dimensions, width in mm	512
Dimensions, depth in mm	512
Sealing system	Foam rubber

Diffuser frame

Material	Polycarbonate
Profile, width in mm	9
Profile, height in mm	15

Diffuser glazing

Material	PMMA
Configuration	1.5 mm PMMA-sheet
Mounting of glazing	Foam rubber internal
Distance to outer diffuser in mm	202

Thermal insulation panel

Shipping name / Type / Item number	750-DS Thermal Insulation Panel (TIP) // 415000
Configuration	1.5 mm PMMA, 25 mm air, 1.5 mm PMMA
Material	Aluminium tube with 2 PMMA-sheets
Height in mm	Ca. 136
Diameter in mm	Ca. 530

Tubing

Shipping name / Type / Item number	750-DS Spectralight® Infinity Extension Tube // 300380
Material	Aluminium
Surface treatment	Coated with reflecting foil
Material, thickness in mm	0.5
Height in mm	Ca. 240
Circular adaptation, diameter in mm	Ca. 530

Insulated curb

Shipping name / Type / Item number	750-DS EU-Curb insulated // EU7501

Wood curb

Material	Particle board - OSB
Density in kg/m³	625
Dimensions, width in mm	640
Dimensions, depth in mm	640
Dimensions, height in mm	204
Material, thickness in mm	18

Inlay

Shipping name / Type / Item number	--
Material	Expanded polystyrene foam - EPS
Density in kg/m³	19.8
Dimensions, width in mm	Ca. 595
Dimensions, depth in mm	Ca. 595
Dimensions, height in mm	200
Configuration	40 mm EPS, 60 mm EPS, 100 mm EPS
Circular recess, diameter in mm	Ca. 540

Square flashing

Material	Steel
Surface treatment	Laquer

Dimensions, width in mm	695
Dimensions, depth in mm	695
Dimensions, height in mm	100
Material, thickness in mm	1
Circular recess, diameter in mm	540
Dome	
Configuration in the middle	3.0 mm PMMA, 91 mm air, 3.2 mm PMMA
Dimension, diameter in mm	610
Dimension, height in mm	338
Inner dome	
Shipping name / Type / Item number	750 DS Inner Dome // 510400
Material	PMMA
Dimension, diameter in mm	580
Dimension, height in mm	236
Material, thickness in mm	3.0
Outer dome	
Shipping name / Type / Item number	750 DS Dome with Raybender® 3000 Technology // 510300
Material	PMMA with prismatic structure
Dimension, diameter in mm	610
Dimension, height in mm	338
Material, thickness in mm	3.2
Sealing system	
Material	Mohair – brush gasket
Position	Outer sealent to flashing
Special features	--

The description is based on specifications provided by the client and on inspection of the test specimen at the **ift.** (Item designations/ numbers as well as material specifications were provided by the client, unless designated as „***ift**-tested*“.)

Test specimen is described in the annex "Product/Sample description".

1.2 Sampling

The following data for sampling have been presented to **ift**:

Sampler: Interferenz Daylight GmbH, 47918 Tönisvorst (Germany)

Documentation: ift Rosenheim did not receive a sampling report.

Date of delivery: 13.03.2017

ift-test specimen-No.: 16-001831-PK01 / WE: 43180-001

2 Procedure

2.1 Basic documents *) of the processes

AA – **ift** - Hausverfahren „Thermal transmittance of solatubes“

2.2 Short description of process

Thermal transmittance
The test is performed following the regular hot box method. The thermal transmittance is determined in steady state. The specimen is located in a test wall, which is surrounded by two half shells and the interior and exterior space. Air and surface temperatures as well as the heating power are measured.

The installation of the test specimen is shown in the schematic view (Fig.1).

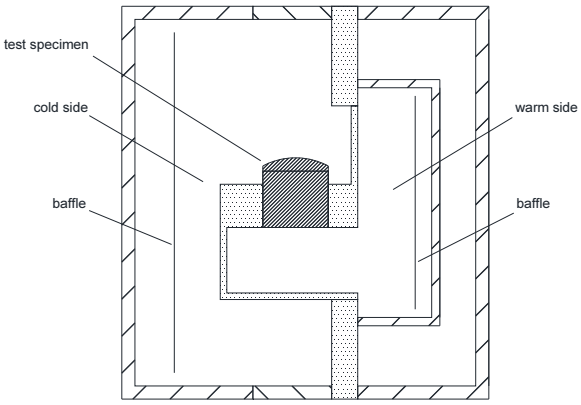

Fig. 1 Schematic view of the test setup.

For the calibration of the test rig the test specimen is replaced by a panel made of insulation foam. The thickness and thermal conductivity of the insulation foam are well known.

The heat loss through the edges is determined by calculation using the finite element method. The additional heat loss through the corners is regarded by determination of a “box”-value for the test setup during the calibration procedure.

The total surface resistance $R_{s,t}$ in the calibration procedure is determined by regarding the definition of the surface resistance in ISO 6946:2007 Table 1 for the direction of the heat flow upwards. Due to the great difference in the projected area and developed area of the test specimen the total surface resistance $R_{s,t}$ was not determined for the measurement results.

The direction of the air flow on the external side differs from the specification in the test standard ISO 12567-2:2005-10-15

3 Detailed results

Thermal transmittance

1508

Project-No.	16-001831-PR02	**Task No.**	16-001831
Basis of testing	AA – ift - Hausverfahren „Thermal transmittance of solatubes“		
Test equipment used	Pst/022762 - Hot Box U-Wert PstZ/022764 - Wand 1 (Hot Box)		
Test specimen	Solatube		
Number of test specimen	43180-001		
Date of testing	28 March 2017		
Testing personnel in charge	Konrad Huber		

Informationen regarding test arrangement / test method

Test method standard/basis.
The determination of the U-value was ajusted according to the test setup (see chapter 2.2).

Implementation of tests / Test results

Designation	Symbol	Value	Unit
Results U_m			
Reference size	A_{sp}	0,22	m²
Air temperature warm side	θ_{ci}	19,6	°C
Air temperature cold side	θ_{ce}	2,2	°C
Environmental temperature - warm	θ_{ni}	19,5	°C
Environmental temperature - cold	θ_{ne}	2,2	°C
Air velocity internal (air flow down)	v_i	approx. 0,1	m / s
Air velocity external (air flow down)	v_e	1,7	m / s
Input power to hot box	Φ_{in}	44,8	W
Heat flow density of specimen	q_{sp}	22,7	W / m²
Thermal transmittance measured	U_m	1,3	W / (m² K)
Uncertainty of measurement	ΔU_m	0,13	W / (m² K)

Measured value *U*			
Thermal transmittance	U	**1,3**	W / (m² K)

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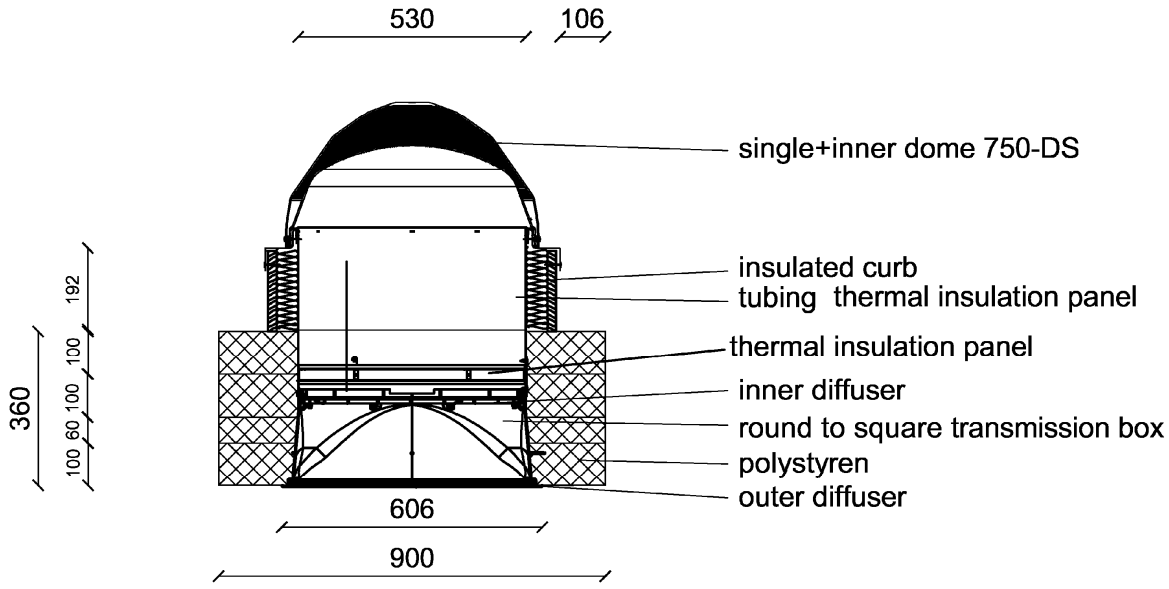

Figure 1: Cross section of the specimen.