CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a. s.
CENTRE OF BUILDING CONSTRUCTION ENGINEERING,
Joint Stock Company
Workplace Zlín, K Cihelně 304, 764 32 Zlín - Louky

L 1007.1

Door and window testing laboratory, heat and acoustical engineering No. 1007.1, accredited by the Czech Accreditation Institute, o.p.s.

Tests report
No. 149/10
Determination of thermal transmittance according to SN EN 12412-2

Order No.: **063 280**

Number of pages including the annex: **5**
Number of copies: **3**
Copy No.: **1**

Customer: **DECEUNINCK srl – Member of Deceuninck group**
Piazza della Concordia 6
56025 Pontedera (PI), Itálie

Manufacturer: **See customer**

Test subject:	**The frames of DECEUNINCK ZENDOW PVC Tilt and turn window - P 5001- P 5041**
Test result:	**U_f = 1,3 W/(m^2.K)**

Date of receiving specimens: 18.3.2010
Date of test performing: 20.3.2010 – 21.3.2010
Test performed by laboratory: Building thermal engineering

Laboratory head: Ing. Nizar Al-Hajjar .....
Head of test laboratory No. 1007.1: Ing. Miroslav Figalla .....

Datum: 12.4.2010

1. Test purpose

On the basis of the customer order on 16.2.2010 and the order No. 063 280 the test laboratory of opening infillings, building thermal engineering and acoustics No. 1007.1 CSI Prague, a.s. (Center of Building Construction Engineering, Joint Stock Company) with the place of work in Zlin carried out for the customer DECEUNINCK srl, Member of Deceuninck group, Piazza della Concordia 6, 56025 Pontedera, (PI), Italy, the test of thermal transmittance of The frames of DECEUNINCK ZENDOW PVC Tilt and turn window - P 5001- P 5041 according to SN EN 12412-2.

2. Description of test subject

The test purpose is determination of the thermal transmittance $\boldsymbol{U_f}$ found by measurement according to **SN EN 12 412-2, article 5.3.1** *"Thermal performance of windows, doors and shutters - Determination of thermal transmittance by hot box method - Part 2: frames* ". The measured value of thermal transmittance $\boldsymbol{U_f}$ is determined on the basis of following equation:

$$U_f = \frac{U_{m,t}\, A_t \quad _n - \quad _{fi} \quad _{s,fi}\, A_{fi}}{A_f \quad _n} \qquad W/(m^2\ K)$$

where $U_{m,t}$ is the measured thermal transmittance of the infill insulation and the frame, in W/(m^2 K);

A_f the frame area; frame area is the larger of two projected areas seen from both sides, in m^2;

A_{fi} the remaining area of the infill insulation ($A_{fi} = A_t - A_f$), in m^2

A_t the projected metering area, in m^2;

$_n$ the difference between the environmental temperature on each side of the test specimen under test, in K;

$_{fi}$ the thermal conductance of the infill insulation, in W/(m^2 K);

$_{s,fi}$ the surface difference temperature of the infill insulation, in K.

3. 3. Description of testing products - Test specimen No. 154/10

Technical documentation: Test specimen scheme and cross section - see annex No.1.

Description:

Frame and sash	Frame P 5001, frame reinforcement P 3220, thick. 1,5 mm; sash P 5041, sash reinforcement: P 3214, tl. 1,5 mm; manufacturer of PVC, reinforcement and sealing profiles: Deceuninck NV
Other profiles	glazing bead P 3024
Sealing	inner and outer gasket between the sash and the frame P 3299; outer gasket of infilling panel P 3299
Infilling panel	Infilling panel with total thickness 23,5 mm and compound of: PVC 2x1,5 mm; XPS 20,5 mm
Drainage and decompression	Drainage and decompression of the sash 2 holes with diameter 6 mm, frame drainage 3 holes with diameter 6 mm, decompression not performed
Hardware	All-Peripheral - Siegenia – Favorit SI Line, 7- point closure, handle

Size:	Window frame:	1 200 mm x 1 500 mm
	Sash:	1 125 mm x 1 425 mm
	Relative frame area:	32,2 % window area
	Glazing:	965 mm x 1 265 mm
	Relative glazing area:	67,8 % window area

Infill panel: Infill panel with total thickness 23,5 mm and compound of: PVC 2x1,5 mm; XPS 20,5 mm. One specimen of 800 mm x 800 mm size was prepared from infill insulating panel after profile thermal transmittance testing. Thermal resistance test was performed on this specimen by means of guarded hot plate (P 80) Z 07 3010 according to ISO 8302. The average measured value of Thermal resistance of the infill panel is: R = 0,6173 m^2.K/W for mean temperature t_{st} = 9,86 °C.

Condition of samples upon receipt: without apparent deficiencies.

4. TESTING REGULATIONS USED AND TESTING EQUIPMENT

4.1 Regulations

- SN EN ISO 12567-1 — Testing standard
- SN 73 0540 — Related standard

4.2 Used apparatus and equipment

- Vertical chamber — Z 07 3008
- Push-pulling rule — M 07 1104
- Raking balance weighing machine up to 200kg — M 07 1020
- Digital thickness gauge — M 07 1098
- Digital depth gauge — M 07 1099
- Electric thermometer — M 07 1034
- Wattmeter — M 07 1069

5. Deviations from testing methods and procedures

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6. Description of used non-standardized method

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7. Results of measurement

Average air temperature in the laboratory during the measurement: 20,0 °C
Average relative humidity in the laboratory: 48 %

Table of measured values

Measured quantity		Physical unit	Measurement results Test specimen No. 154/10
Inside air temperature	$_{ni}$	℃	21,50
Outer air temperature	$_{ne}$	℃	-0,28
Input power to hot box	$_{in}$	W	53,643
Surround panel heat flow	$_{sur}$	W	1,941
The heat flow rate through the edge zone	$_{edg}$	W	2,045
Test specimen heat flow	$_{f}$	W	17,006
Total surface thermal resistance	$R_{s,t}$	m^2.K/W	0,181
Thermal transmittance	U_f	W/(m^2.K)	1,348
Time of measuring in stable state		hod	8
Projected test specimen area	A_f	m^2	0,5793
Relative frame and sash area	A_f / A_t	%	32,2

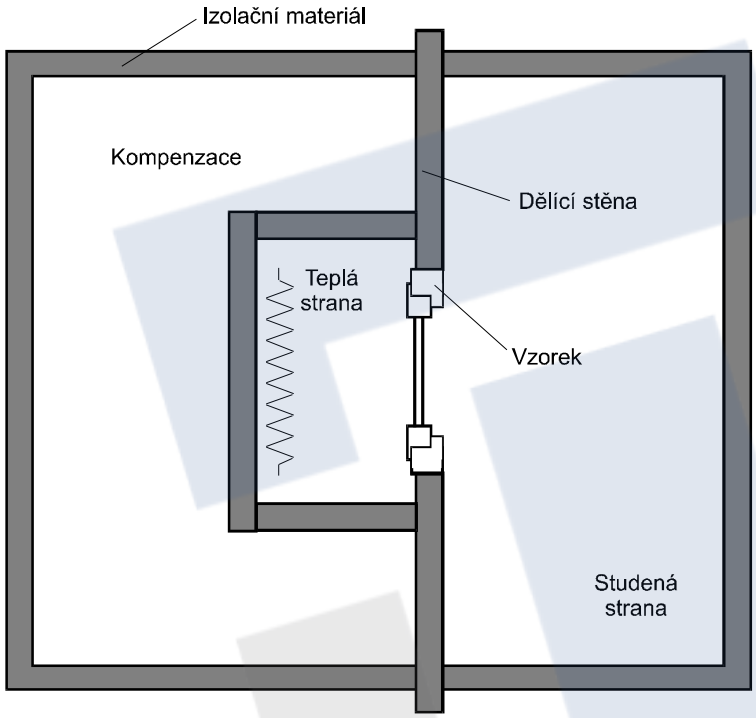
Air speed on the cold side 1,8 m/s; air flow direction up along the specimen
Air speed on the warm side 0,1-02 m/s; air flow direction up along the specimen
Hot box area A_{HB} = 2,465 m^2.

Thermal resistance of surround panel in m^2 K/ W:

$R_{sur} = (d_{sur} / \lambda_{sur})$; $\lambda_{sur} = 0{,}03179 + 0{,}00012 \quad _{me,sur}$

where λ_{sur} is thermal conductivity of testing surround panel in W/(m K);
d_{sur} the thickness of testing surround panel, its value is 0,250 m;
$_{me,sur}$ the mean temperature value of both surfaces of testing surround panel in ℃.

Linear thermal transmittance Ψ_{edge} = 0,01739 W/(m K).
The scheme of the testing equipment is in figure1.



Key: Kompenzace: Compensation; D licí st na: Surround Panel; izola ní materiál: Insulating material; Vzorek: Specimen; Teplá strana: Warm side; Studená strana: Cold side

figure1 - Testing equipment scheme

8. Evaluation

Serial No.	Parameter title	Technical regulation Requirement	Testing method	Test specimen No.	Test result Requirement conformity
1.	Thermal transmittance U_f [W/(m^2.K)]	SN 73 0540 Part 2 $U_f \leq 1{,}7$	SN EN 12412-2	154/10	1,3 Conformity

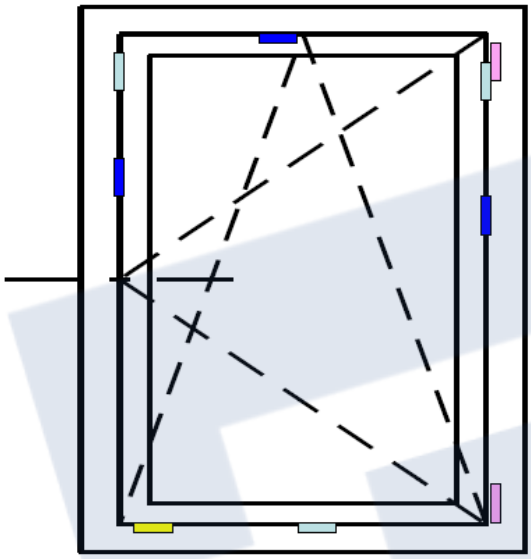
The given result is in accordance with the document ILAC – G8:1996.

The extended measurement uncertainty of thermal transmittance is $U_U = \pm 6{,}0$ %.

Responsible for the test: Petr Pokorný
Report elaborated by: Ing. Nizar Al-Hajjar

Annex No. 1

P 5001 – P 5041



Security striker plate

Normal striker plate

Pivoting part

Tilt and turn hinge