CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a. s.
CENTRE OF BUILDING CONSTRUCTION ENGINEERING,
Joint Stock Company
Workplace Zlín, K Cihelně 304, 764 32 Zlín - Louky
Door and window testing laboratory, heat and acoustical engineering No. 1007.1, accredited by the Czech Accreditation Institute o.p.s.

L 1007.1

Test report
No. 258/08
Determination of thermal transmittance

Order No.: **863 903**

Number of pages: **5**
Number of copies: **3**
Copy No.: **2**

Client: **Karel TRČÁLEK**
Dolní Jasénka 751
755 01 VSETÍN

Manufacturer: **See Client**

Test subject: **Insulating double Glass unit with air infilling**
- with applying of a thermo-insulation coat layer Q-THERM on the position No. 3
- without thermo-insulation coat layer Q-THERM

Date of receiving specimens: July 21, 2008
Date of test performing: July 23 – July 25, 2008
Test performed by laboratory: Building thermal engineering
Laboratory head: Ing. Nizar Al-Hajjar .....
Head of test laboratory No. 1007.1: Ing. Miroslav Figalla .....

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CENTRUM STAVEBNÍHO INŽENÝRSTVÍ, a.s. pracoviště ZLÍN
Laboratoř otvorových výplní, stavební tepelné techniky a akustiky č.1007.1
AKREDITOVANÁ národním akreditačním orgánem

Date: July 30, 2008

1. Test purpose

On the basis of the order on July 6, 2008 and our order No. 863 903 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 Zlín carried out for the Client Karel TRČÁLEK, Dolní Jasénka 751, 755 01 VSETÍN, the test of thermal transmittance of test specimens – (see Test subject and chapter 3) in the sense of the standard ČSN EN ISO 12567-1.

2. Description of tests subject

The test purpose is determination of the thermal transmittance U_{st}, in W/(m^2.K) according to ČSN EN ISO 12567-1" Thermal performance of windows and doors – Determination of thermal transmittance by hot box method – Part 1: Complete windows and doors". From the measured value U_m is determined the standardized thermal transmittance value U_{st}, in W/(m^2.K):

$$U_m = \frac{q_{sp}}{\Delta\theta_n} \quad (1)$$

$$U_{st} = \left[U_m^{-1} - R_{s,t} + R_{(s,t)st}\right]^{-1} \quad (2)$$

Where $\Delta\theta_n$ is the difference between ambient environment temperatures on each test specimen side, in K;

q_{sp} thermal flow density through the test specimen, in W/m^2

$R_{s,t}$ total surface thermal resistance on warm and cold side during the measurement, in m^2·K/W

$R_{(s,t),st}$ standardized total surface thermal resistance on warm and cold side, its value according to ČSN 73 0540-3 is 0.17 m^2.K/W.

3. Description of testing products

- *Title and marking:* Insulating glass unit /IGU/ (without Q-THERM thermo-insulation) marked No. 426/08
- *Composition IGU:* Float a mm – aluminium spacer 16 mm, air - Float 4 mm
- *Title and marking:* Insulating glass unit /IGU/ (with Q-THERM thermo-insulation) marked No. 427/08
- *Composition IGU:* Float a mm- aluminium spacer 16 mm, air - Q-THERM thermo-insulation Float 4 mm

Used sealants: inner: Butyl KÖMERLING GD 115, closing outer: Thiokol

Size: 800 mm x 800 mm

The schematic representation of both alternates – see annex No.1.

Condition of samples upon receipt: without apparent deficiencies.

4. TESTING REGULATIONS USED AND TESTING EQUIPMENT

4.1 Regulations

- ČSN EN ISO 12567-1
- ČSN 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
- Digital psychrometer	M 07 1025
- 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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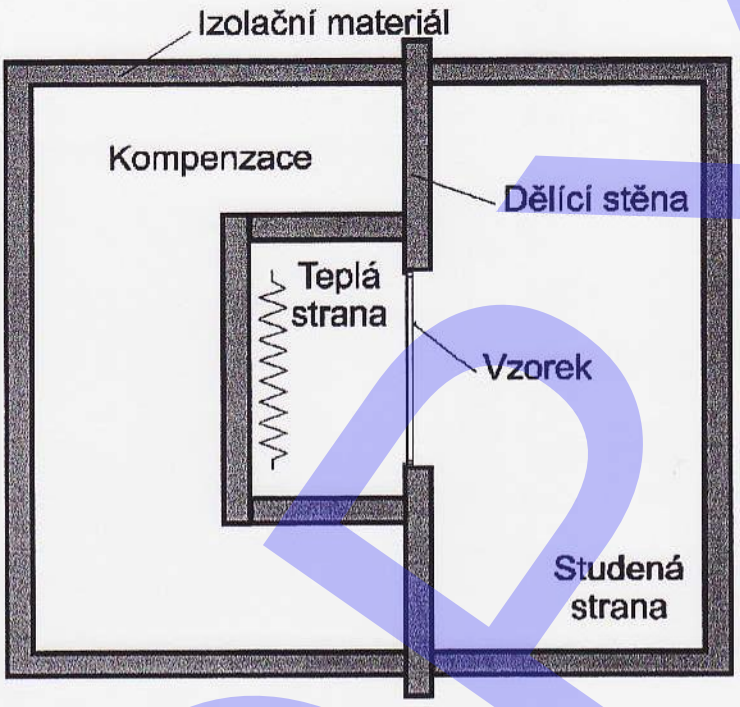
7. Results of measurement

Average air temperature in the laboratory during the measurement: 23,8 °C
Average air relative humidity in the laboratory: 40 % r.h.

Table of measured values

Measured quantity		Physical unit	Measurement results Test specimen No. 426/08	427/08
Inside air temperature	θ_{ni}	°C	21,80	21,67
Outer air temperature	θ_{ne}	°C	-0,30	-0,24
Input power to hot box	Φ_{in}	W	43,037	39,482
Test specimen heat flow	Φ_{sp}	W	36,001	32,519
Total surface thermal resistance	$R_{s,t}$	$m^2.K/W$	0,195	0,182
Measured thermal transmittance	U_m	$W/(m^2.K)$	2,545	2,320
Standardized thermal transmittance	U_{st}	$W/(m^2.K)$	2,716	2,388
Time of measuring in stable state		Hours	8	
Design test specimen area	A_{sp}	m^2	0,640	

The scheme of the testing equipment is in figure1.



Key: Kompenzace: Compensation; Dělící stěna: Surround Panel; izolační materiál: Insulating material; Vzorek: Specimen; Teplá strana: Warm side; Studená strana: Cold side

figure1 - Testing equipment scheme

8. Evaluation

Serial No.	Parameter title	Testing method	Test specimen No.	Test results
1.	Thermal transmittance U_{st} [W/(m^2.K)]	ČSN EN ISO 12567-1	**426/08** **427/08**	**2,72** **2,39**
2.	Thermal resistance *) R [m^2.K/ W]		**426/08** **427/08**	**0,198** **0,249**

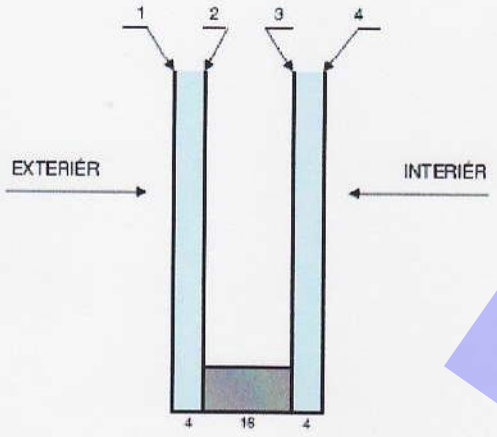
*) Thermal resistance of each alternate was calculated from thermal transmittance U_{st} .

When using the IGU with Q-THERM thermo-insulation the thermal transmittance value is about 13,7 % better (lower) than the value of IGU without modification. When considering thermal resistance aspect the value of IGU with Q-THERM thermo-insulation is greater about 24,9 % than the value of thermal resistance of IGU without modification.

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

NÁKRES DVOJSKLA SE VZDUCHOVOU MEZEROU

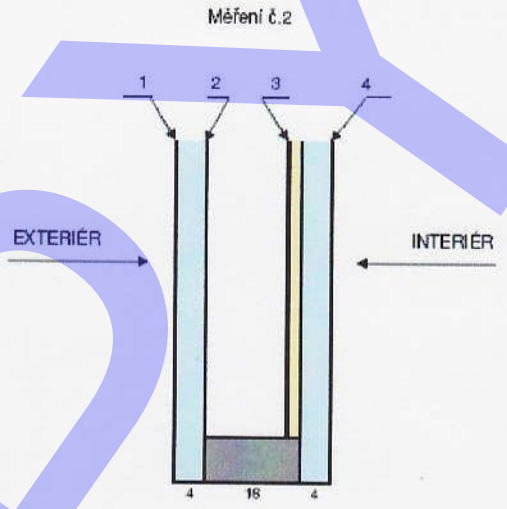
Měření č.1



1/ čiré sklo bez povrch.úpravy
2/ čiré sklo bez povrch.úpravy
3/ čiré sklo bez povrch.úpravy
4/ čiré sklo bez povrch.úpravy

NÁKRES DVOJSKLA SE VZDUCHOVOU MEZEROU A TERMOIZOLACÍ Q-THERM

Měření č.2



1/ čiré sklo bez povrch.úpravy
2/ čiré sklo bez povrch.úpravy
3/ Q-Therm - termoizolace
4/ čiré sklo bez povrch.úpravy

Key:

The left detail drawing presents IGU without modification

NÁKRES DVOJSKLA SE VZDUCHOVOUMEZEROU = IGU drawig with air infilling
Měřeníč. 1 = Measurement No. 1
čiré sklo bez úpravy = float glass without coating (for position No. 1 to No. 4)
EXTERIÉR = Exterior; INTERIÉR = Interior

The right detail drawing presents IGU with modification

NÁKRES DVOJSKLA SE VZDUCHOVOUMEZEROU A TERMOIZOLACÍ Q-THERM = IGU drawig with air infilling and Q-THERM thermo-insulation
Měřeníč. 2 = Measurement No. 2
čiré sklo bez úpravy = float glass without coating (for position No. 1 ,2 and 4); float glass with Q-THERM thermo-insulation (position No. 3)
EXTERIÉR = Exterior; INTERIÉR = Interior