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Determination of the thermal transmittance U_m of MKE130 and DK78 windows and the thermographic imaging of the windows

Requested by: Profin Oy

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Task **Determination of the thermal transmittance U_m of MKE130 and DK78 windows and the thermographic imaging of the windows**

Performance of the task Test specimens

The orderer delivered to VTT single frame fixed insulating glass window MKE130 and single frame inside opening window DK78. The size of the windows was 1190 mm² x 1190 mm².

The constructions of the frames and the casements are presented in appendices 1 and 2 informed by the orderer.

The samples were received at VTT on March 14, 2008.

Testausmenetelmä

Test method

The thermal transmittance of the door was determined with the hot-box equipment according to the standard ISO 8990 (1994). The diagram of the test equipment is shown in appendix 2. The test was carried out according to the standard SFS-EN ISO 12567-1(2000): "Thermal performance of windows and doors - Determination of thermal transmittance by hot-box method - Part 1: Complete windows and doors". The average, measured coefficient of the thermal transmittance U_m of the door was calculated applying the following formula:

$$U_m = q_c / \Delta T_n, \text{ where} \quad (1)$$

q_c the average heat flux through the door in steady state conditions,
(W/m²) K

ΔT_n the temperature difference between the so-called environment temperatures in cold and in measurement chambers, K

The test results relate only to the sample tested.

The so-called environmental temperatures in the cold and measurement chambers were calculated using the measured air and surface temperatures to which the specimen was exposed.

Thermograms of the windows were taken after the thermal transmittance measurements. The temperature behind the window was $-0,5\text{ }^{\circ}\text{C}$ and front of the window $+22\text{ }^{\circ}\text{C}$ during the thermal imaging.

The thermograms of the windows DK78 and MKE130 are presented in appendixes 3 and 4.

Date of measurement

The measurement was carried out during the time period of March 25 - 31, 2008.

Test results

The test results of the thermal transmittance measurements are presented in table 1.

Table 1. Thermal transmittance values of the windows MKE130 and DK78. Manufacturer Profin Oy.

Window	T_{ne} ($^{\circ}\text{C}$)	T_{ni} ($^{\circ}\text{C}$)	ΔT_n (K)	q_c (W/m^2)	Thermal transmittance U_m ($\text{W}/\text{m}^2\cdot\text{K}$)
MKE130	-0.38	21.21	21.59	25.48	1.18
DK78	-0.44	20.94	21.59	21.79	1.02

In the table:

T_{ne} the temperature of the environment of cold side


T_{ni} the temperature of the environment of warm side

ΔT_n the temperature difference of the environments


q_c heat flux density.

The estimated uncertainty of the thermal transmittances was $\pm 3\%$.

Espoo, March 8, 2010



Hannu Hyttinen
Research Engineer



Eeva-Liisa Lepistö-Saukko
Research scientist

APPENDIXES 5 piece

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The test results relate only to the sample tested.