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Technical and Testing Institute for Construction Prague

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Testing Laboratory No 1018.3
accredited by ČIA pursuant to ČSN EN ISO/IEC 17025:2018

TEST REPORT

No. 010-045702

**on thermal transmittance calculation
according to ČSN EN ISO 10077-1,2**

Manufacturer: **«KONTINENT-GROUP» LLC**
Address: Str. Nebesnoy Sotni 33, Cherkasy, Cherkasy region
18002 Ukraine
Company ID: 408409723019
Ordering party: Technical and testing institut for construction Prague
Address: Notified Body 1020, branch Prague
Prosecká 811/76a, Prosek, 190 00 Praha 9
Object of calculation: **External aluminium door, series Framex FT 72**
Order No.: Z010210172
Number of pages of the Test Report incl. title page: 6 Pages of Annexes: 1

Prepared by:

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Approved by:



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Deputy head of the testing department

Print No.: **1**
Number of prints: 3

Prague, 16th June 2022

Stamp of testing department No. 1018.3

Declaration: 1) The test results in this Report relate only to the tested article and they do not substitute any other documents
2) The Test Report must be copied as a whole only otherwise a written consent of the testing laboratory is needed.

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1. Calculation subject data

Calculation object: **External aluminium door, series Framex FT 72 – single leaf with triple glazing;**
dimensions of the door for calculation: 1230 x 2180 mm (door scheme + section – see Annex 1)

Profiles:

Aluminium profiles, series FT – three-chamber profile with thermal break 28 mm (polyamide - Technoform, Germany); depth of profile 72 mm, height 139 mm (at the top and side of the profiles) and 95,5 mm (at the threshold); the middle chamber of the profiles is filled with insulating foam (polyethylene); drainage and decompression holes in the bottom horizontal part of profile: 5 x 23 mm – min. 2 pcs / door leaf + $\varnothing$ 4 mm – 2 x 3 holes

Threshold: Aluminium two-chambers profile with three-chambers thermal break (polyamide - Technoform, Germany); depth of profile 55,8 mm, height 12 mm

Producer: «KONTINENT-GROUP» LLC, Cherkasy region, Ukraine

Glazing:

Insulating triple glass unit composed by: 6 -16Ar-4-18Ar-4i mm LowE (th. 48 mm);

$U_g = 0,9 \text{ W/m}^2\cdot\text{K}$

spacer: material Aluminium ev. plastic (Chromatech Ultra F)

Gasket:

material EPDM - weather strip (1 x frame, 1 x door leaf), glazing gasket
black color (Seçil Plastic kaučuk, Turkey)

Hardware:

door hinges - 3 pcs, three-point door lock, type G-U

Producer: Gretsche-Unitas GmbH, Germany

Note: 1) hardware and accessories were also not considered for the calculation

2) the glazing can be replaced with a full infill ($U \leq U_g$)

Manufacturer: «KONTINENT-GROUP» LLC

Order: Z010210172

Place of production: Str. Mazura 24/7, Smela, Cherkasy region, 20708 Ukraine



2. Calculation methods

Identification of the test method		Title of the test method
ČSN EN ISO 10077-1	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 1: General	Determination of thermal transmission coefficient - by calculation
ČSN EN ISO 10077-2	Thermal performance of windows, doors and shutters - Calculation of thermal transmittance - Part 2: Numerical method for frames	Determination of thermal transmission coefficient - by calculation
ČSN EN ISO 10211	Thermal bridges in building construction - Heat flows and surface temperatures - Detailed calculations	Determination of steady-state thermal transmission properties - by calculation

Additions, deviations or exclusions from the standard procedure or use of non-standardized methods: were not applied.

3. Calculation results

The calculation were performed on: 06.– 09.06.2022

Place of calculation: Office with software (AREA 2017 + MESHGEN 2018)

The calculation were performed by: Ing. Radka Sedmidubská

Boundary conditions:

- reference temperature conditions 20 °C (internal), 0 °C (external)
- surface resistances:
 - a) internal: heat flow horizontal 0,13 m².K/W
 - heat flow in the corners0,20 m².K/W
 - b) external: heat flow horizontal 0,04 m².K/W

The thermal conductance "L" was determined according to ČSN EN ISO 10211 and ČSN EN ISO 10077-2. After that was done calculation of the thermal transmittance "U" - according to the instructions given in ČSN EN ISO 10077-1. Data on calculation conditions are recorded in the used software.

Characteristics of used materials:

No.	Signification	Material	Unit	Value
1	λ	Aluminium (frame)	W/(m.K)	160
2	λ	Insulation panel (replaces glazing)	W/(m.K)	0,035
3	λ	Polyethylene foam	W/(m.K)	0,05
4	λ	Polyamide (thermal break)	W/(m.K)	0,25
5	λ	EPDM (gasket)	W/(m.K)	0,25
6	λ	Air cavity - unventilated ($\epsilon = 0,1$)	W/(m.K)	0,025 – 0,077
7	λ	Air cavity - moderately ventilated ($\epsilon = 0,1$)	W/(m.K)	0,053 – 0,080

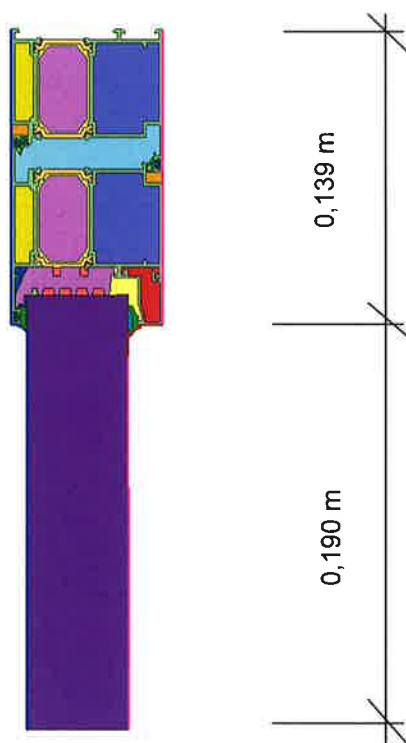
Note: the stated values are based on ČSN EN ISO 10077-2



3.1 Determination of the thermal transmittance of the frame

A) Thermal transmittance – top and side frame

Schematic section:



Results:

Thermal coupling coefficient L_f^{2D} 0,356 W/(m.K)
 Width of the frame b_f 0,139 m
 Thermal transmittance of board replacing glazing U_p 0,65 W/(m².K)
 Width of the board replacing glazing b_p 0,190 m

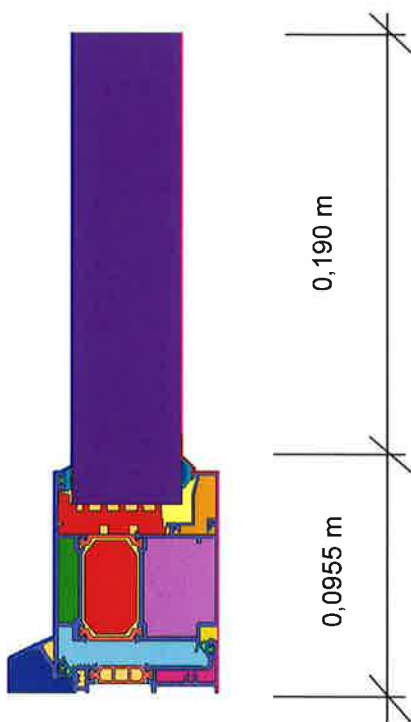
$$U_f = (L_f^{2D} - U_p \cdot b_p) / b_f$$

Thermal transmittance of the frame U_f 1,674 ÷ 1,7 W/(m².K)



B) Thermal transmittance – frame at the threshold

Schematic section:



Results:

Thermal coupling coefficient $L_{r^{2D}}$	0,279 W/(m.K)
Width of the frame b_r	0,0955 m
Thermal transmittance of board replacing glazing U_p	0,65 W/(m ² .K)
Width of the board replacing glazing b_p	0,190 m

$$U_f = (L_{r^{2D}} - U_p \cdot b_p) / b_r$$

Thermal transmittance of the frame U_f 1,631 ÷ 1,6 W/(m².K)

Note: the thermal transmittance of the frame section shall be given to two significant figures, acc. to ČSN EN ISO 10077-2, par. 7.4

The total thermal transmittance of the single leaf door profile U_f :

Alum. door - Framex FT 72:	Determined (proportional) value
Single leaf door 1230 x 2180 m	$U_f = 1,670 \text{ W/m}^2 \cdot \text{K} \div 1,7 \text{ W/m}^2 \cdot \text{K}$



3.2 Determination of the door thermal transmittance 1230 x 2180 mm

Calculation of total thermal transmittance U_D carried out according ČSN EN ISO 10077-1.

Following information about the door was taken into account:

- a) geometric data – area of the frame (A_f), area of the glazing (A_g), infill perimeter (l_p)
- b) data established by this report – thermal transmittance of the frame (U_f)
- c) data declared by the manufacturer – thermal transmittance of the glazing (U_g), linear thermal transmittance of glazing (ψ_g - for spacer Chromatech Ultra F)
- d) data obtained from the standard ČSN EN ISO 10077-1 – linear thermal transmittance of glazing (ψ_g - for aluminium spacer)

On the basis of these values the total thermal transmittance of the window U_W was calculated:

$$A_f = 0,83 \text{ m}^2$$

$$U_f = 1,7 \text{ W/m}^2\cdot\text{K}$$

$$A_g = 1,85 \text{ m}^2$$

$$U_g = 0,9 \text{ W/m}^2\cdot\text{K}$$

$$l_g = 5,80 \text{ m}$$

$$\psi_g = 0,11 \text{ W/m}\cdot\text{K} \text{ (aluminium spacer); } \Psi_g = 0,043 \text{ W/m}\cdot\text{K} \text{ (Chromatech Ultra F)}$$

$$U_D = \frac{A_g \cdot U_g + A_f \cdot U_f + l_g \cdot \psi_g}{A_g + A_f} = \frac{1,85 \cdot 0,9 + 0,83 \cdot 1,7 + 5,80 \cdot 0,043}{1,85 + 0,83} = 1,386 \div 1,4 \text{ W/(m}^2\cdot\text{K)} \dots \text{with aluminium spacer}$$

$$= 1,241 \div 1,2 \text{ W/(m}^2\cdot\text{K)} \dots \text{with spacer Chromatech Ultra F}$$

Note: the thermal transmittance of the window shall be given to two significant figures, acc. to ČSN EN ISO 10077-1, par. 7.2.3

3.3 Result summary - thermal transmittance of the door:

Single-leaf aluminium door, series Framex FT 72 size 1230 x 2180 mm, triple glazing $U_g = 0,9 \text{ W/m}^2\cdot\text{K}$	Test method	Determined value
- with aluminium spacer	ČSN EN ISO 10077-1	$U_D = 1,4 \text{ W/m}^2\cdot\text{K}$
- with <u>plastic</u> spacer Chromatech Ultra F	ČSN EN ISO 10077-1	$U_D = 1,2 \text{ W/m}^2\cdot\text{K}$

4. Annexes

Annex 1 Single-leaf aluminium door, series Framex FT 72 - section

END OF THE TEST REPORT



