



TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Testing Institute for Construction Prague

Akreditovaná zkušební laboratoř, Autorizovaná osoba, Notifikovaná osoba, Oznámený subjekt, Subjekt pro technické posuzování,
Certifikační orgán, Inspekční orgán / Accredited Testing Laboratory, Authorised Body, Notified Body, Technical Assessment Body,
Certification Body, Inspection Body, Prosecká 811/76a, 190 00 Praha 9

Central laboratory – Testing Department Praha

Prosecká 811/76a, 190 00 Praha 9

tel.: +420 286 019 435, e-mail: praha@tzus.cz, www.tzus.eu



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

TEST REPORT

No. 010-045697

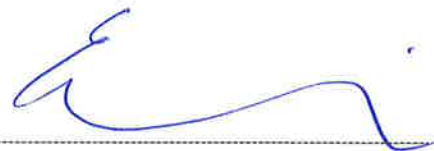
**on thermal transmittance calculation
according to ČSN EN ISO 10077-1,2**

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: **Aluminium window, series Framex FT 72**
Order No.: Z010210172

Number of pages of the Test Report incl. title page: 5

Pages of Annexes: 1

Prepared by:


Ing. Radka Sedmidubská

Test technician - specialist

Approved by:


Ing. Iveta Jiroutová

Deputy head of the testing department

Print No.: 1

Number of prints: 3



Prague, 15th 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.

Technical and Test Institute for Construction Prague, Central laboratory

Nemanická 441, 370 00 České Budějovice, Czech Republic

Bank: Komerční banka, Praha 1

Entered in the Commercial Register maintained by Municipal Court in Prague, Section ALX, Insert 711, Comp. ID: 00015679, VAT: CZ00015679

Phone.: +420 387 023 211

Account No.: 1501-931/0100

www.tzus.eu

e-mail: pilarova@tzus.cz

1. Calculation subject data

Calculation object: **Single-leaf aluminium window, series Framex FT 72 – single window turn and tilt with triple glass**; dimensions of the window for calculation: 1230 x 1480 mm (window scheme + section – see Annex 1)

Profiles:

Aluminium profile, series FT – three-chamber profile with thermal break 34 mm (polyamide - Technoform, Germany); depth of profile 72 mm, height 108 mm; the middle chamber of the profile is filled with insulating foam (polyethylene); drainage and decompression holes in the bottom horizontal part of profile: 5 x 23 mm – min. 2 / casement + $\varnothing$ 4 mm – 2 x 3 holes
Producer: «KONTINENT-GROUP» LLC, Cherkasy region, Ukraine

Glazing:

Insulated triple glass unit composed by: 4i -18Ar-4-18Ar-4i mm LowE (th. 48 mm); $U_g = 0,5$ W/m².K
spacer: material Aluminium ev. plastic (Chromatech Ultra F)

Gasket:

material EPDM - weather strip (2 x frame, 1 x casement), incl. center gasket, glazing gasket black color (Seçil Plastic kaučuk, Turkey)

Hardware:

all - round window fittings - number of closing points 10
window hinges – 2 pcs, type Galicub
Producer: FAPIM S.p.A., Italy

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

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: 09.05.2022 – 18.05.2022

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
 - 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.

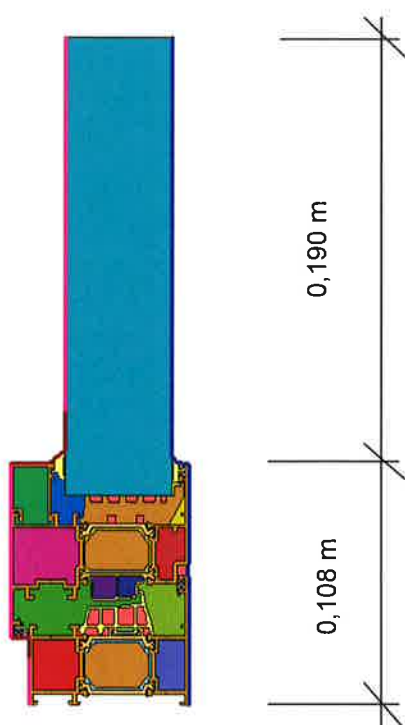
Characteristics of used materials:

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 ($\varepsilon = 0,1$)	W/(m.K)	0,025 - 0,064
7	λ	Air cavity - moderately ventilated ($\varepsilon = 0,1$)	W/(m.K)	0,051

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

3.1 Determination of the thermal transmittance of the frame

Schematic section:



Results:

Thermal coupling coefficient L_f^{2D}	0,275 W/(m.K)
Width of the frame b_f	0,108 m
Thermal transmittance of board replacing glazing U_p	0,649 W/(m ² .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 1,405 ÷ 1,4 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

3.2 Determination of the thermal transmittance of the window 1230 x 1480 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:

$$A_f = 0,54 \text{ m}^2$$

$$U_f = 1,4 \text{ W/m}^2\cdot\text{K}$$

$$A_g = 1,28 \text{ m}^2$$

$$U_g = 0,5 \text{ W/m}^2\cdot\text{K}$$

$$\psi_p = 0,11 \text{ W/m}\cdot\text{K (aluminium spacer)}$$

$$= 0,043 \text{ W/m}\cdot\text{K (Chromatech Ultra F)}$$

$$U_w = \frac{A_g \cdot U_g + A_f \cdot U_f + l_g \cdot \psi_g}{A_g + A_f} = 1,043 \div 1,0 \text{ W/(m}^2\cdot\text{K)} \dots \text{with aluminium spacer}$$
$$= 0,875 \div 0,88 \text{ W/(m}^2\cdot\text{K)} \dots \text{with plastic spacer (Chromatech Ultra F)}$$

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 window:

Single-leaf aluminium window, series Framex FT 72 size 1230 x 1480 mm, triple glazing $U_g = 0,7 \text{ W/m}^2\cdot\text{K}$	Test method	Determined value
- with aluminium spacer	ČSN EN ISO 10077-1	$U_w = 1,0 \text{ W/m}^2\cdot\text{K}$
- with plastic spacer – type Chromatech Ultra F	ČSN EN ISO 10077-1	$U_w = 0,88 \text{ W/m}^2\cdot\text{K}$

4. Annexes

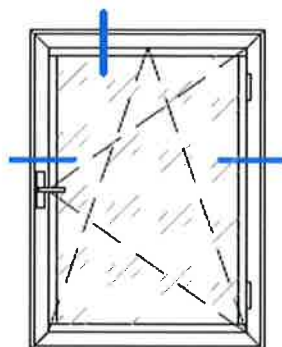
Annex 1..... Single-leaf aluminium window, series Framex FT 72 - window scheme + section

END OF THE TEST REPORT



Single-leaf aluminium window, series Framex FT 72

window scheme



Section diagram - Framex FT 72

