INSTITUTE OF ARCHITECTURE AND CONSTRUCTION OF KAUNAS UNIVERSITY OF TECHNOLOGY

BUILDING PHYSICS LABORATORY

Notified Body number: 2018

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Nr. LA.01.031

ilac-MRA

CALCULATION REPORT No. 121 SF/26 U (C)

Date: 30 of June 2026

Determination of thermal transmittance of door

(test title)

Calculation methods: LST EN ISO 10077-1:2017 Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: General (ISO 10077-1:2017) and LST EN ISO 10077-2:2017 Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 2: Numerical method for frames (ISO 10077-2:2017)

(number of normative document or calculation method, description of calculation procedure)

Specimen description: **Single leaf inward opening Security Door Grade 3 SDF03**. Door frame size: 1000 × 2100 mm. Inward opening.
The door frame is made of steel 2,0 mm. The door frame is filled with rock wool RWA45 50 mm Rockwool. Medite Tricoya Extreme cladding 18 mm from inside and 12 mm from outside.
The door leaf is made of steel 1,5 mm. The door leaf is filled with rock wool RWA45 50 mm Rockwool. Medite Tricoya Extreme cladding 12 mm on both sides. The door leaf C-shape profile is surrounded with 24x45 (EN 520, Type A) plasterboards.
Threshold – 1,2 mm stainless steel.
Lock – Fiam 668. Plasterboards (EN 520, Type A) are installed inside the lock box.
Around perimeter – double gasket sealing lines and fire sealing.

(name, description and identification details of a specimen)

Customer: Security Doors Factory LTD. Unit 1B, Europa Trading Estate, Fraser rd, Erith, DA8 1QL, United Kingdom

(name and address)

Manufacturer: Security Doors Factory LTD. Unit 1B, Europa Trading Estate, Fraser rd, Erith, DA8 1QL, United Kingdom

(name and address)

Calculation results:

Name of the indicator and unit	Calculation method reference no.	Calculation result
Thermal transmittance of door, U_d W/(m²·K)	LST EN ISO 10077-1 LST EN ISO 10077-2	1,4

Calculated at: Building Physics Laboratory, Institute of Architecture and Construction of Kaunas University of Technology

(name of the test laboratory)

Specimen description date: 2026-06-23 Date of calculating: 2026-06-30

Additional information: Application, drawing.

(any deviations, exceptions and any information related with particular calculation)

Annexes: Annex 1. Specimen data.
Annex 2. Calculation data according to LST EN ISO 10077-2.
Annex 3. Calculation data according to LST EN ISO 10077-1.

(indicate annex numbers and titles)

Head of laboratory: K. Banionis
(approves the calculation results) (n., surname)

Calculated by: J. Ramanauskas
(technically responsible for calculation) (n., surname)

Laboratorijos dokumentų kopija. Architektūros ir statybos institutas. Kauno technologijos universitetas

Validity – the named data and results refer exclusively to the calculated and described specimens.
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Annex 1. Specimen data

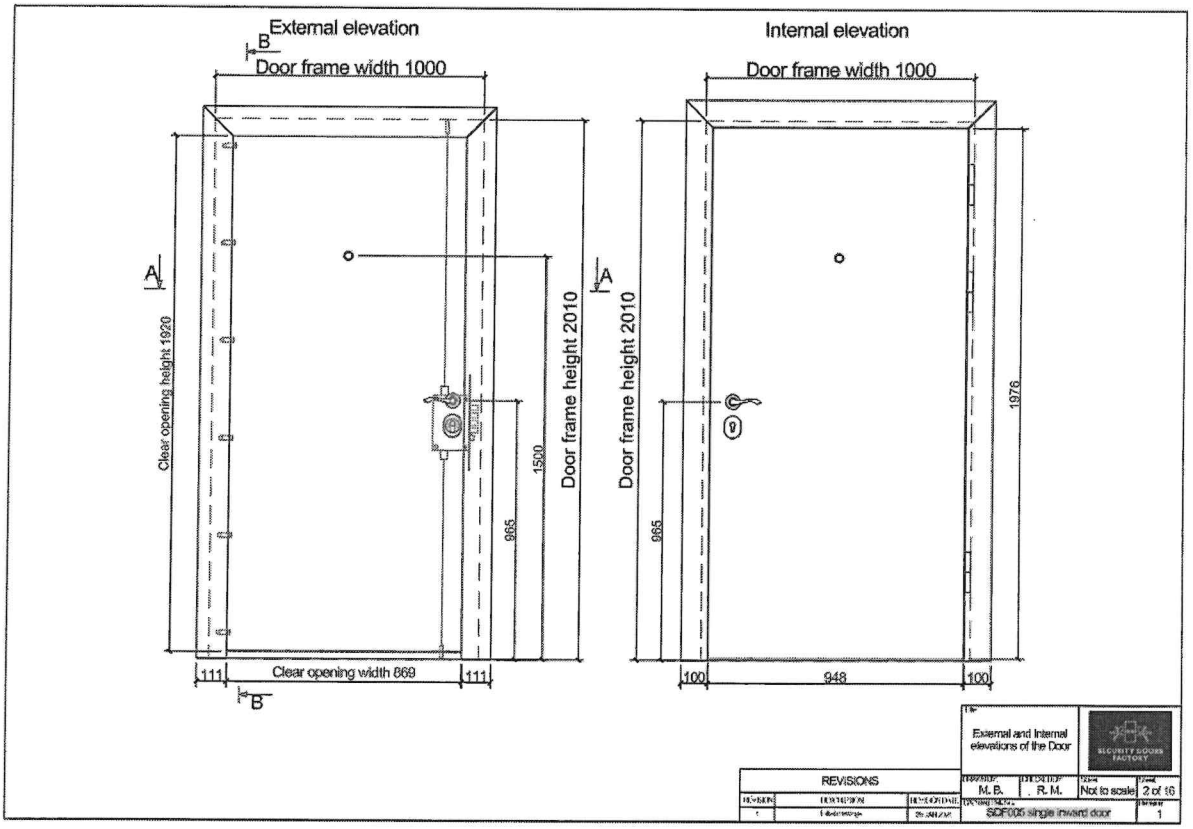


Fig 1. Doors drawings (by the customer submitted information)

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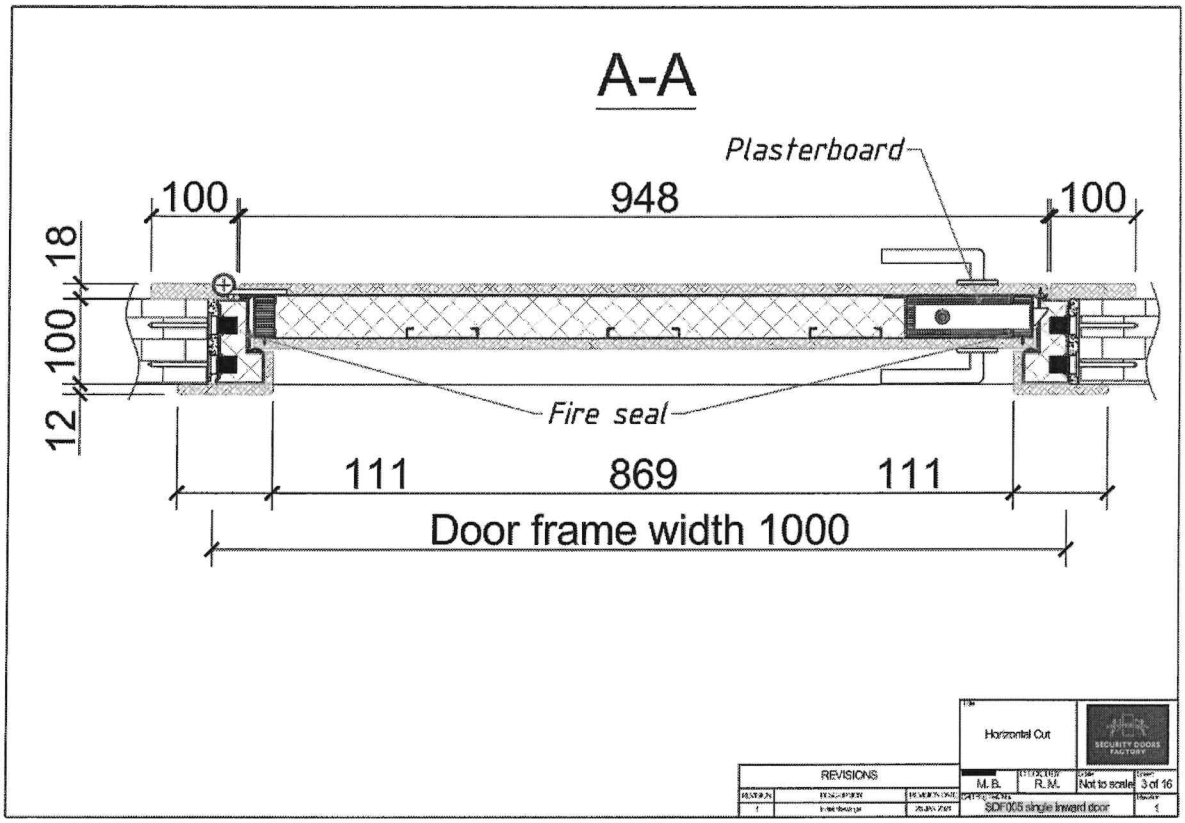


Fig 2. Horizontal section (by the customer submitted information)

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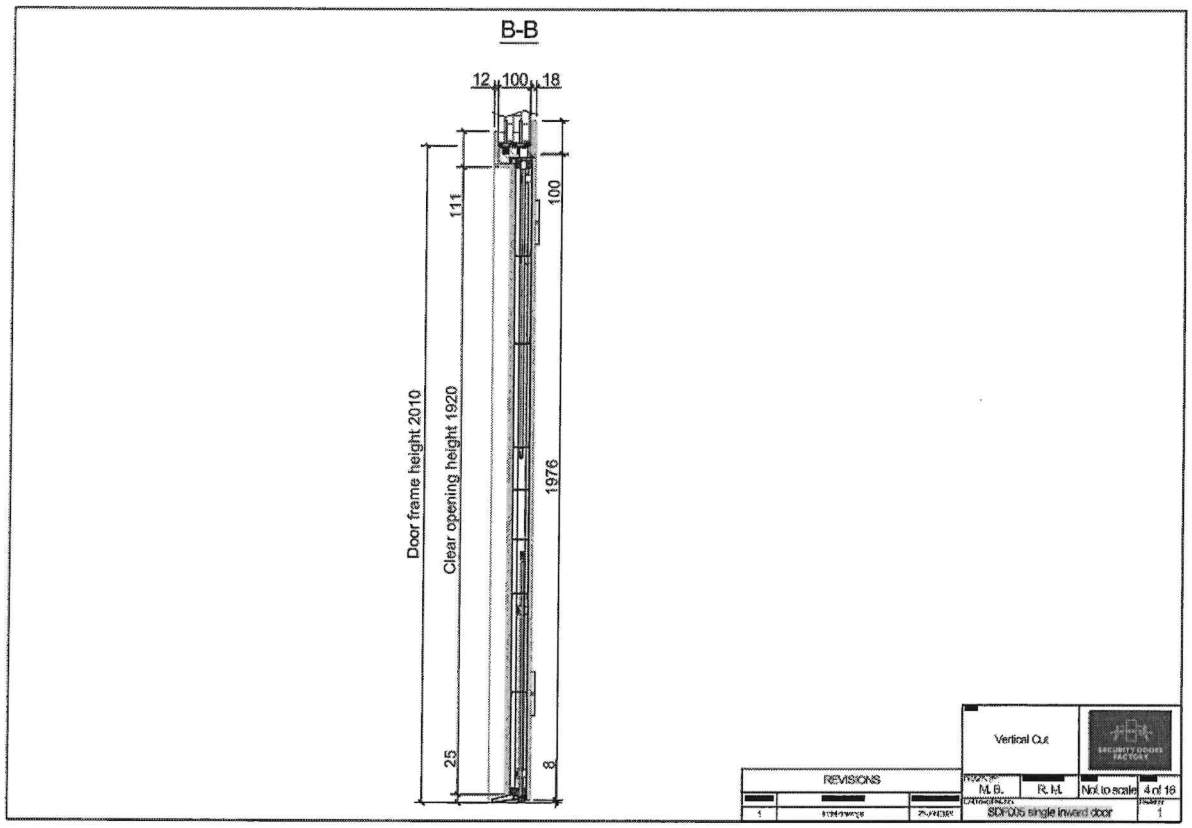


Fig 3. Vertical sections (by the customer submitted information)

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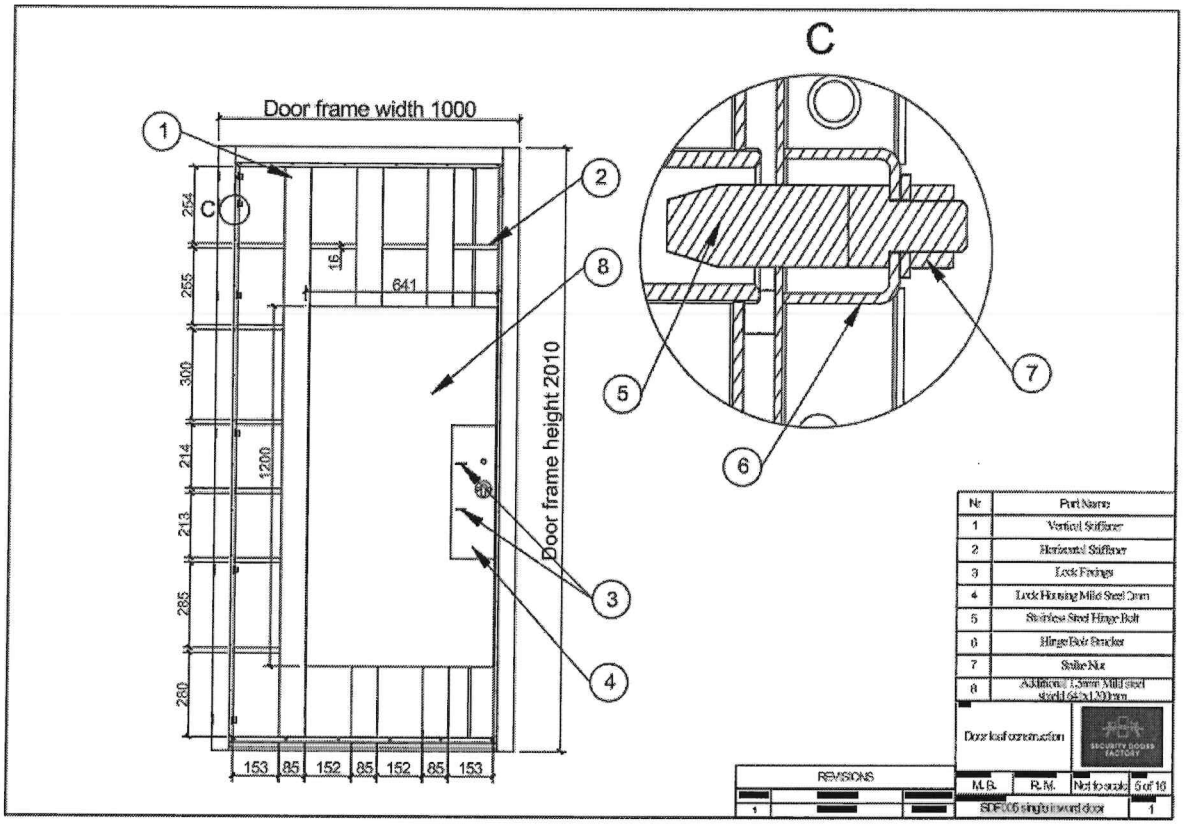


Fig 4. Vertical and horizontal stiffeners in the door leaf (by the customer submitted information)

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MEDITE®
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DECLARATION OF PERFORMANCE
MEDITE TRICOYA EXTREME (MTX)
Reference Number: **CEDOP09**
MEDITE EUROPE DAC
Redmondstown, Clonmel
County Tipperary
Ireland

Product Type	Intended Use	AVCP*	Notified Body Reference
MDF.H-2	External and internal use as non-structural components	4	Not Applicable

*Assessment and verification of constancy of performance system according to Annex V of regulation (EU) No 305/2011

Declared Performance

Essential characteristics	Harmonised technical specification					Harmonised Standard
Thickness Range	4 to <9	9 to <12	12 to <15	15 to <18	18	EN 13986:2004+A1:2015
Bending strength (N/mm²)	30	30	25	20	20	
Internal bond (N/mm²)	0.80	0.80	0.80	0.80	0.80	
Internal bond after boil test (N/mm²)	0.65	0.65	0.65	0.65	0.65	
Swelling in thickness (24hrs) %	2.5	2.0	2.0	1.5	1.5	
Release of formaldehyde [1]	E1	E1	E1	E1	E1	
Reaction to fire	NPD	E	E	E	E	
Water vapour permeability μ	NPD	NPD	NPD	NPD	NPD	
Airborne sound insulation (R)	NPD	NPD	NPD	NPD	NPD	
Sound absorption 250Hz to 500Hz (α)	0.10	0.10	0.10	0.10	0.10	
Sound absorption 1000Hz to 2000Hz (α)	0.20	0.20	0.20	0.20	0.20	
Thermal conductivity (W/m.K)	0.101	0.101	0.101	0.101	0.101	
Biological durability	Use Classes 1,2,3 & 4					
Release (content) of pentachlorophenol (PCP)	≤5ppm	≤5ppm	≤5ppm	≤5ppm	≤5ppm	

[1]: Release of formaldehyde ≤ 0.062 mg/m³ (≤ 0.05ppm) in accordance with requirements of Regulation (EU) 2023/1464 – E05.

The performance of the product identified is in conformity with the declared performance. This declaration of performance is issued under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Guillaume Coste, Technical Services Manager. Clonmel, Ireland. 13/04/2026

CEDOP09 REV7 – 13/04/2026 *'Controlled Document'*

Fig 5. Declaration of performance of Medite Tricoya Extreme (by the customer submitted information)

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RW Slabs

PERFORMANCE

Acoustic performance

The non-directional fibre orientation and density of ROCKWOOL stone wool help absorb sound waves and dampen vibrations, contributing to a reduction in the transmission of external noise when used in external wall applications.

Product	Nominal density (kg/m³)	Thickness (mm)	α_w
RWA45	45	25	0.55 (H)
RWA45	45	100	1.00
RW3	60	25	0.55 (H)
RW3	60	100	1.00
RW4	80	100	1.00
RW5	100	25	0.60 (MH)
RW5	100	100	1.00
RW6	140	100	1.00

Shape indicators, L, M, and H (low, medium, high), show the frequencies at which the practical sound absorption coefficient exceeds the shifted reference curve by 0.25 or more. For more information, see SRL Report No. 82289-SRL-RP-XT-001-P1.

Thermal performance

RW Slabs achieve a thermal conductivity lambda (λ) value as low as 0.034 W/mK.

Stone wool is highly durable and long-lasting. Tests of ROCKWOOL stone wool recovered from old buildings have shown that our stone wool retains its performance characteristics – thermal, mechanical, fire resistance – for at least 50 years, and probably longer. A test of a 65-year-old stone wool sample found in 2023 during a renovation of Copenhagen airport showed that these characteristics had not diminished after 65 years**.

Product	Thermal conductivity	Dimensions (mm)*
RWA45	0.035 W/mK	1200 x 600
RW3	0.034 W/mK	1200 x 600
RW4	0.034 W/mK	1200 x 600
RW5	0.034 W/mK	1200 x 600
RW6	0.035 W/mK	1200 x 600

For further information on the declared performance characteristics, please refer to the product's Declaration of Performance.

** Faced slabs come in 1000mm x 600mm dimensions.*

*** Testing done at Danish Technical Institute (DTI) in 2023, "Testing ROCKWOOL insulation from CPH airport hangar 4".*

Fire performance

RW Slabs are able to resist temperatures of over 1,000°C, and achieve the highest Euroclass A1 non-combustibility classification as defined in EN 13501-1: 2018.

Facings

RW Slabs are available with a number of facing options to one or both sides of the slab, subject to production compatibility and minimum order quantities.

These options are:

- Non-woven mineral black tissue (60gsm).
- Non-woven mineral white tissue (100gsm).
- Aluminium foil.

For more information visit rockwool.com/uk

Pencoed, Bridgend CF35 6NY
Tel: (+44) 1656 862 621 • technical.solutions@rockwool.com
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Fig 6. Declaration of performance of mineral wool ROCKWOOL RWA45 (by the customer submitted information)

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Annex 2. Calculation data according to LST EN ISO 10077-2:2017.

Calculation of door performed according to LST EN ISO 10077-2:2017 Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 2: Numerical method for frames (ISO 10077-2:2017).

Calculations were performed using the program "THERM".

For the calculation are used thermal properties of selected materials according to standard LST EN ISO 10077-2:2017 Annex D Table D.1; LST EN ISO 10456:2007 Table 3 and by the customer submitted information:

1 Steel, λ_{ds} = 50 W/(m·K);

2 Medite Tricoya Extreme cladding, λ_{ds} = 0,101 W/(m·K) (Figure 5);

3 Insulation, rock wool RWA45 ROCKWOOL, λ_{ds} = 0,035 W/(m·K) (Figure 6);

4 Plasterboard, λ_{ds} = 0,25 W/(m·K).

5 Gaskets, λ_{ds} = 0,25 W/(m·K).

6 Fire sealing, λ_{ds} = 0,25 W/(m·K);

7 Stainless steel, λ_{ds} = 17 W/(m·K);

8 Lock, steel, λ_{ds} = 50 W/(m·K).

Unventilated (E) and slightly ventilated (F) air cavities.

Emissivity of surfaces – ε = 0,9.

Surface resistances:

- External (B) – R_{se} = 0,04 m^2·K/W;
- Internal normal (C) – R_{si} = 0,13 m^2·K/W;
- Internal, reduced radiation/convection (D) – R_{si} = 0,20 m^2·K/W.

The internal temperature – θ_{si} = 20,0 °C; the external temperature – θ_{se} = 0,0 °C.

Thermal transmittance of separate parts of doors (scheme of the door for area calculating: fig. 14):

U_1 = 1,52 W/(m^2·K); heat flow rate – q_1 = 30,5 W/m^2 (Figure 7).
U_2 = 1,70 W/(m^2·K); heat flow rate – q_2 = 34,1 W/m^2 (Figure 8).
U_3 = 1,68 W/(m^2·K); heat flow rate – q_3 = 33,6 W/m^2 (Figure 9).
U_4 = 2,38 W/(m^2·K); heat flow rate – q_4 = 47,7 W/m^2 (Figure 10).
U_5 = 0,545 W/(m^2·K); heat flow rate – q_5 = 10,9 W/m^2 (Figure 13).

Linear thermal transmittance of horizontal (Figure 11) and vertical (Figure 12) stiffeners.

Ψ_6 = 0,088 W/(m·K) Figure 11).
Ψ_7 = 0,006 W/(m·K) (Figure 12).

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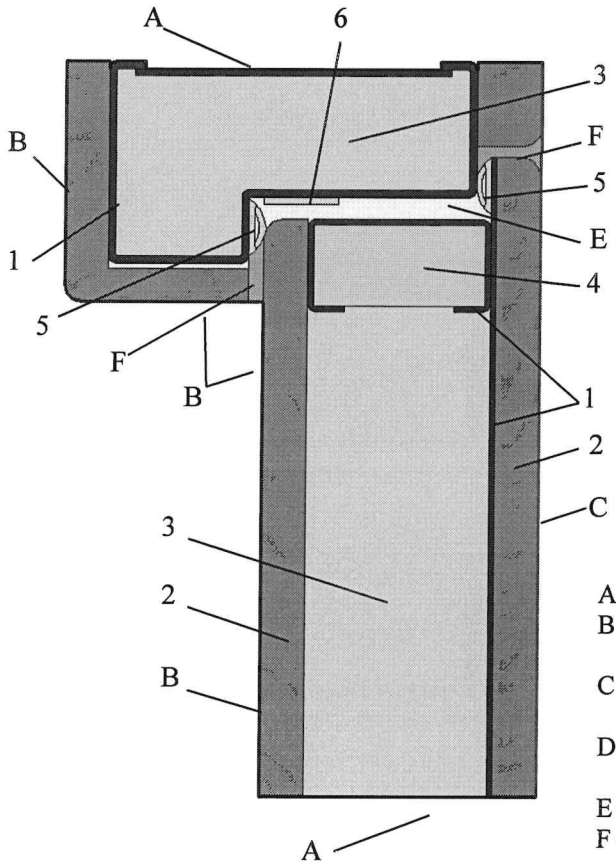
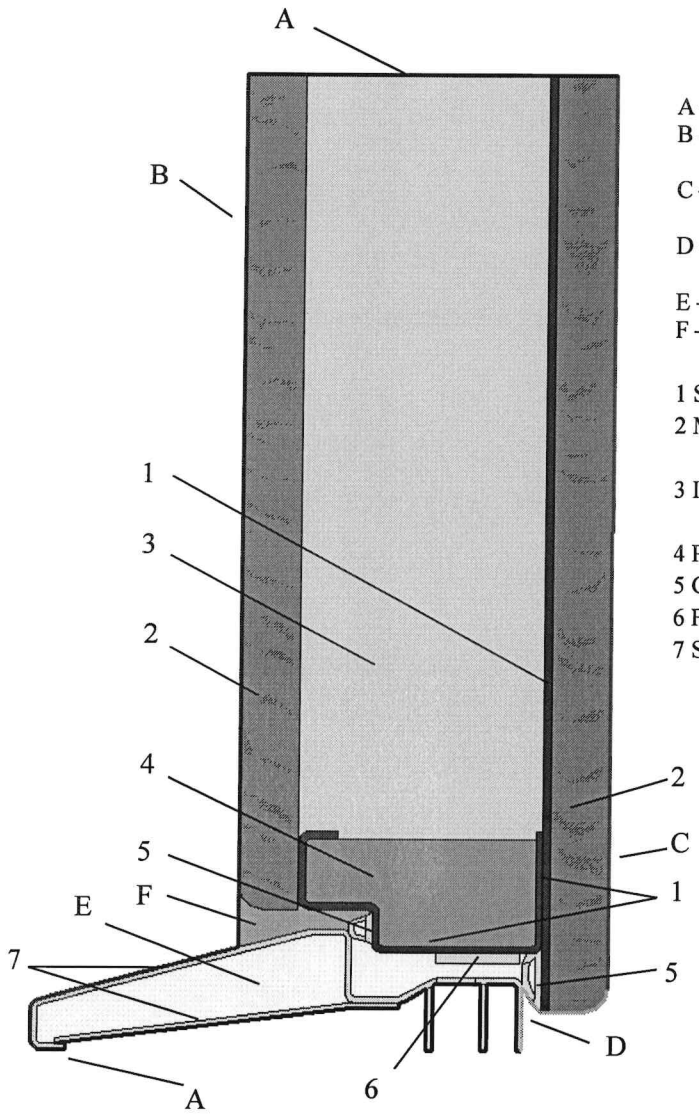


Figure 7. Calculation scheme of part 1 of doors

A – adiabatic boundary conditions;
B – external boundary conditions,
R_{se} = 0,04 m²·K/W;
C – internal boundary conditions,
R_{si} = 0,13 m²·K/W;
D – internal, reduced radiation/convection boundary conditions R_{si} = 0,20 m²·K/W;
E – unventilated air cavity;
F – slightly ventilated air cavities;

1 Steel, λ_{ds} = 50 W/(m·K);
2 Medite Tricoya Extreme cladding,
λ_{ds} = 0,101 W/(m·K);
3 Insulation, RWA45 ROCKWOOL,
λ_{ds} = 0,035 W/(m·K);
4 Plasterboard, λ_{ds} = 0,25 W/(m·K);
5 Gaskets, λ_{ds} = 0,25 W/(m·K);
6 Fire sealing, λ_{ds} = 0,25 W/(m·K).

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A – adiabatic boundary conditions;
B – external boundary conditions,
R_{se} = 0,04 m²·K/W;
C – internal boundary conditions,
R_{si} = 0,13 m²·K/W;
D – internal, reduced radiation/convection boundary conditions R_{si} = 0,20 m²·K/W;
E – unventilated air cavity;
F – slightly ventilated air cavities;

1 Steel, λ_{ds} = 50 W/(m·K);
2 Medite Tricoya Extreme cladding,
λ_{ds} = 0,101 W/(m·K);
3 Insulation, RWA45 ROCKWOOL,
λ_{ds} = 0,035 W/(m·K);
4 Plasterboard, λ_{ds} = 0,25 W/(m·K);
5 Gaskets, λ_{ds} = 0,25 W/(m·K);
6 Fire sealing, λ_{ds} = 0,25 W/(m·K);
7 Stainless steel, λ_{ds} = 17 W/(m·K).

Figure 8. Calculation scheme of part 2 of doors

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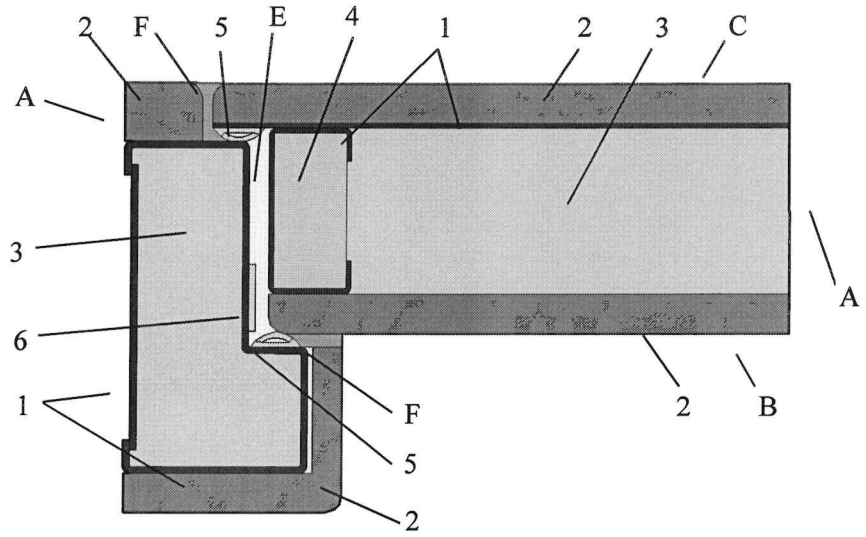


Figure 9. Calculation scheme of part 3 of doors

A – adiabatic boundary conditions;
B – external boundary conditions, R_{se} = 0,04 m²·K/W;
C – internal boundary conditions, R_{si} = 0,13 m²·K/W;
E – unventilated air cavity;
F – slightly ventilated air cavities;

1 Steel, λ_{ds} = 50 W/(m·K);
2 Medite Tricoya Extreme cladding, λ_{ds} = 0,101 W/(m·K);
3 Insulation, RWA45 ROCKWOOL, λ_{ds} = 0,035 W/(m·K);
4 Plasterboard, λ_{ds} = 0,25 W/(m·K);
5 Gaskets, λ_{ds} = 0,25 W/(m·K);
6 Fire sealing, λ_{ds} = 0,25 W/(m·K);
8 Lock, steel, λ_{ds} = 50 W/(m·K).

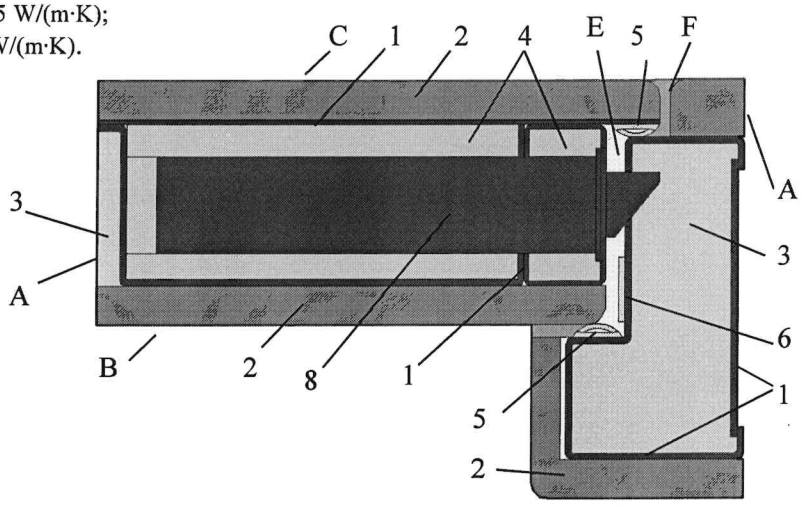
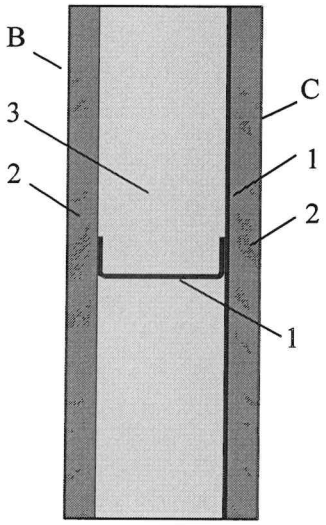


Figure 10. Calculation scheme of part 4 of doors

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A – adiabatic boundary conditions;
B – external boundary conditions,
R_{se} = 0,04 m²·K/W;
C – internal boundary conditions,
R_{si} = 0,13 m²·K/W;
D – internal, reduced radiation/convection boundary conditions R_{si} = 0,20 m²·K/W;
E – unventilated air cavity;
F – slightly ventilated air cavities;

1 Steel, λ_{ds} = 50 W/(m·K);
2 Medite Tricoya Extreme cladding,
λ_{ds} = 0,101 W/(m·K);
3 Insulation, RWA45 ROCKWOOL,
λ_{ds} = 0,035 W/(m·K).

Figure 11. Calculation scheme of linear thermal transmittance of horizontal stiffeners of doors

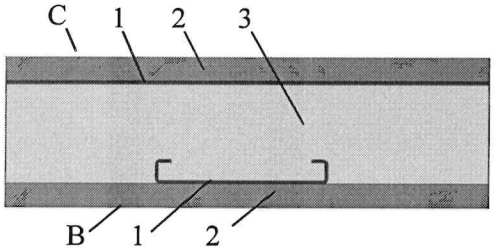


Figure 12. Calculation scheme of linear thermal transmittance of vertical stiffener of doors

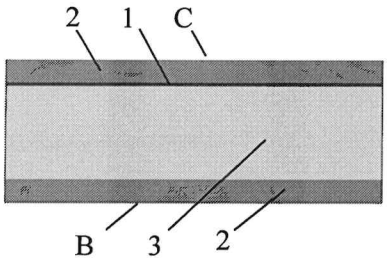


Figure 13. Calculation scheme of part 5 of doors

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Annex 3. Calculation data according to LST EN ISO 10077-1:2017.

Calculation of doors performed according to LST EN ISO 10077-1:2017 Thermal performance of windows, doors and shutters – Calculation of thermal transmittance – Part 1: General (ISO 10077-1:2017).

Values used in the calculation.

Thermal transmittance of separate parts of doors (calculated according to LST EN ISO 10077-2, see. Annex 2) and areas; linear thermal transmittance of horizontal and vertical stiffeners and lengths:

- U_1 = 1,52 W/(m^2·K); A_1 = 0,160 m^2;
- U_2 = 1,70 W/(m^2·K); A_2 = 0,160 m^2;
- U_3 = 1,68 W/(m^2·K); A_3 = 0,635 m^2;
- U_4 = 2,38 W/(m^2·K); A_4 = 0,089 m^2;
- U_5 = 0,545 W/(m^2·K); A_5 = 0,966 m^2;
- Ψ_6 = 0,088 W/(m·K); l_6 = 5,688 m^2;
- Ψ_7 = 0,006 W/(m·K); l_7 = 5,928 m^2.

Whole door area – A_d = 2,01 m^2;

Scheme of the door for area calculating: fig. 14.

The thermal transmittance of the door:

$$U_d = \frac{U_1 \cdot A_1 + U_2 \cdot A_2 + U_3 \cdot A_3 + U_4 \cdot A_4 + U_5 \cdot A_5 + \Psi_6 \cdot l_6 + \Psi_7 \cdot l_7}{A_d} = 1{,}409\ \mathrm{W/(m^2 \cdot K)}$$

The thermal transmittance of the door given to two significant figures U_d = 1,4 W/(m^2·K).

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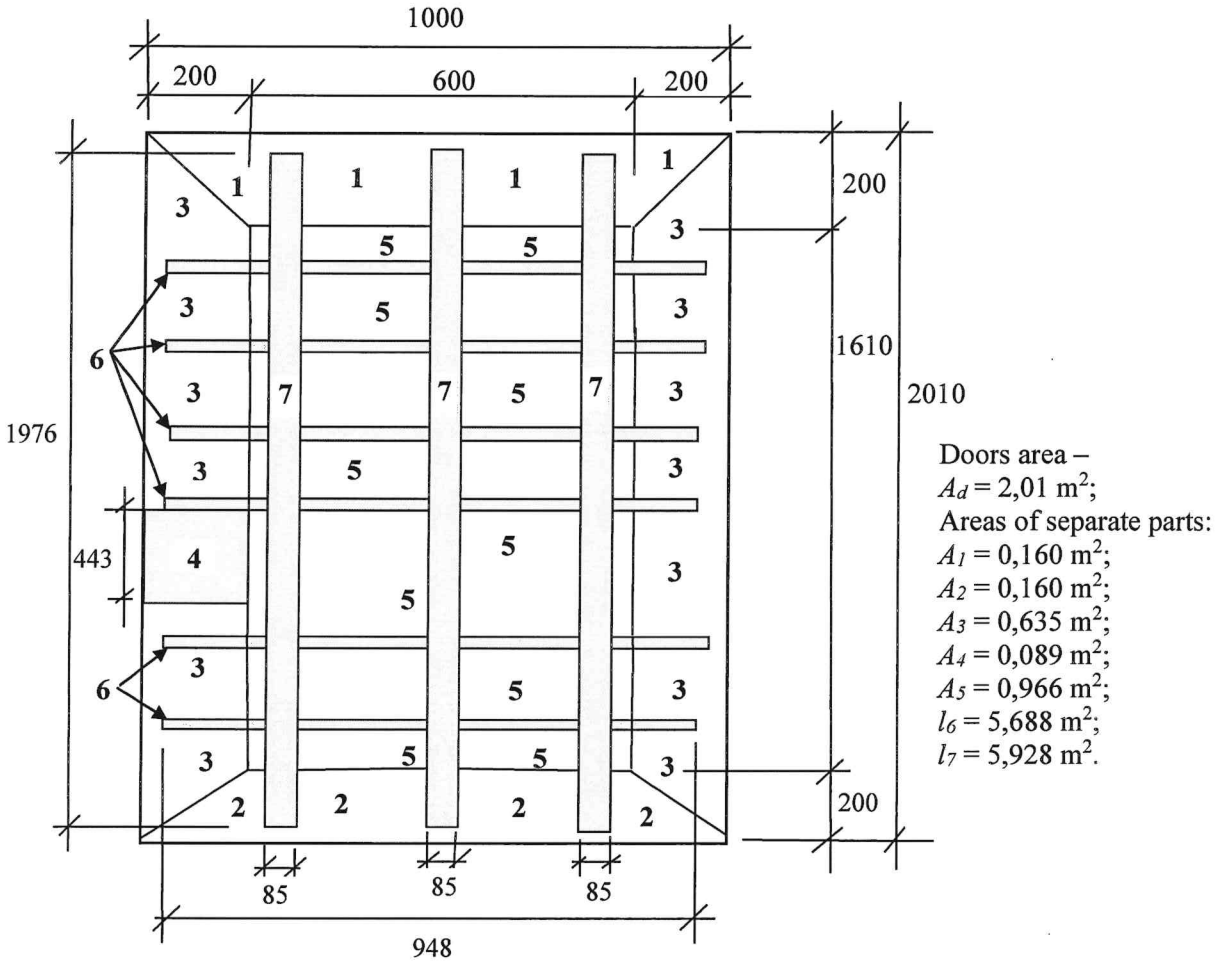


Figure 14. Scheme of the door for area calculating

Date: 2026 06 30

Calculated by: J. Ramanauskas

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