

## **TEST REPORT FIRES-FR-134-20-AUNE**

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**Single leaf timber flush door with timber frame, type VLine standard 30**

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## TEST REPORT

### FIRES-FR-134-20-AUNE

**Tested property:** Fire resistance  
**Test method:** BS 476-22:1987 Incorporating Corrigendum No. 1  
**Test type:** Accredited  
**Date of issue:** 27. 04. 2020

**Name of the product:** Single leaf timber flush door with timber frame, type VLine standard 30

**Manufacturer:** RAM Extrusion Limited, Unit 203, Stonebridge Cross Business Park, Pointon Way, Droitwich Spa, WR9 0LW, UK

**Sponsors:** RAM Extrusion Limited, Unit 203, Stonebridge Cross Business Park, Pointon Way, Droitwich Spa, WR9 0LW, UK

**Test carried out by:** FIRES, s.r.o., Testing laboratory  
**Task No.:** PR-20-0107  
**Specimens received:** 16. 03. 2020  
**Date of the test:** 24. 03. 2020

**Technician responsible for the technical side of this report:** Ing. Miroslav Hudák

Number of pages: 35  
Test reports: 2

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## 1. INTRODUCTION

This test report contains the results of a test carried out by FIRES, s.r.o., Testing laboratory in Batizovce, accredited for testing by SNAS. Certificate of accreditation No.: S-159. The purpose of the test was to gain information for product classification.

Five test reports were issued from the same test for four sponsors of test. Names of particular components (acoustic seal, intumescent tape, hinge pad and lock kit) are different according sponsor but they refer to the same product. Declaration of manufacturer that the products are the same and are selling under different names and technical data sheets of all products are stored in the file of testing laboratory.

Sponsor's representatives witnessing the test:

Ing. Juraj Akuratný                      AKURATNY FIRE CONSULTING, s.r.o.

test carried out by                      Miroslav Hudák  
operator                                      Ing. Miroslav Hudák

## 2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 001	Vertical test furnace for fire resistance testing	-
F 69 010	PLC system for data acquisition and control TECOMAT TC 700	-
F 40 019	Visual and calculating software to PLC TECOMAT TC 700	-
F 40 017	Control and communication software to PLC TECOMAT TC 700	-
F 40 018	SW Reliance	-
F 40 020	Driver Tecomat - Reliance (SW)	-
F 71 041, F 71 042	Transducer of differential pressure (-50 to + 150) Pa	pressure inside the test furnace
F 54 070	Digital calliper (0 to 150) mm	-
F 54 049	Racking meter	-
F 73 002	Suspension load-cell scale	finding out of humidity equilibrium state
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors of temperature and relative air humidity	climatic conditions measuring
F 18 501 - F 18 508	Plate thermometers	temperature inside the test furnace, according to EN 1363-1
F 18 002 - F 18 200	Unsheathed thermocouples type K 2 x Ø 0,5 mm	temperatures on the unexposed surface of the specimen
F 18 701	Sheathed thermocouple type K Ø 3 mm	ambient temperature
F 18 001	Roving thermocouple	-
F 74 007 - F 74 012	Cable position transducers (0 to 1250) mm	measuring of deflection
F 54 024	Ruler for measuring of deflection (by laser)	measuring of deflection
F 90 005	Gap gauge for fire resistance testing Ø 25 mm	-
F 90 006	Gap gauge for fire resistance testing Ø 6 mm	-
F 90 007	Frame for supporting the cotton pad (100 x 100) mm for fire resistance tests	-
F 57 005	Digital stop-watch	-



### 3. PREPARATION OF THE SPECIMENS

Testing laboratory noted down production data of the specimens from a certified production. Test specimen data are listed in following table:

Place of production	Held on the test report FIRES-FR-058-20-AUNE
Production number	62/13.3.20
Date of production	13.3.2020
Check-out date	13.3.2020
Number of certificate ISO 9001	031212
Issuing Body	Intertek Certification Limited, UK
Date of issuing	15.04.2019

Specimens were delivered to the testing laboratory in assembled state by the test sponsor. Installation of the specimens to the supporting construction was carried out by workers of the sponsor.

### 4. PREPARATION OF THE TEST

#### 4.1 DESCRIPTION OF THE SPECIMENS STRUCTURE

Two specimens of Single leaf timber flush door with timber frame, type VLine standard 30 were used for fire resistance test.



#### Dimensions

Overall dimensions of door frame (without architraves):	(992 x 2079) mm (width x height)
Overall dimensions of door leaf:	(926 x 2040 x 44) mm (width x height x thickness)
Clear opening of door frame:	(908 x 2037) mm (width x height)
Weight of door leaf:	40,1 kg – Specimen No. 1
(measured in the testing laboratory)	39,9 kg – Specimen No. 2

#### Door frame

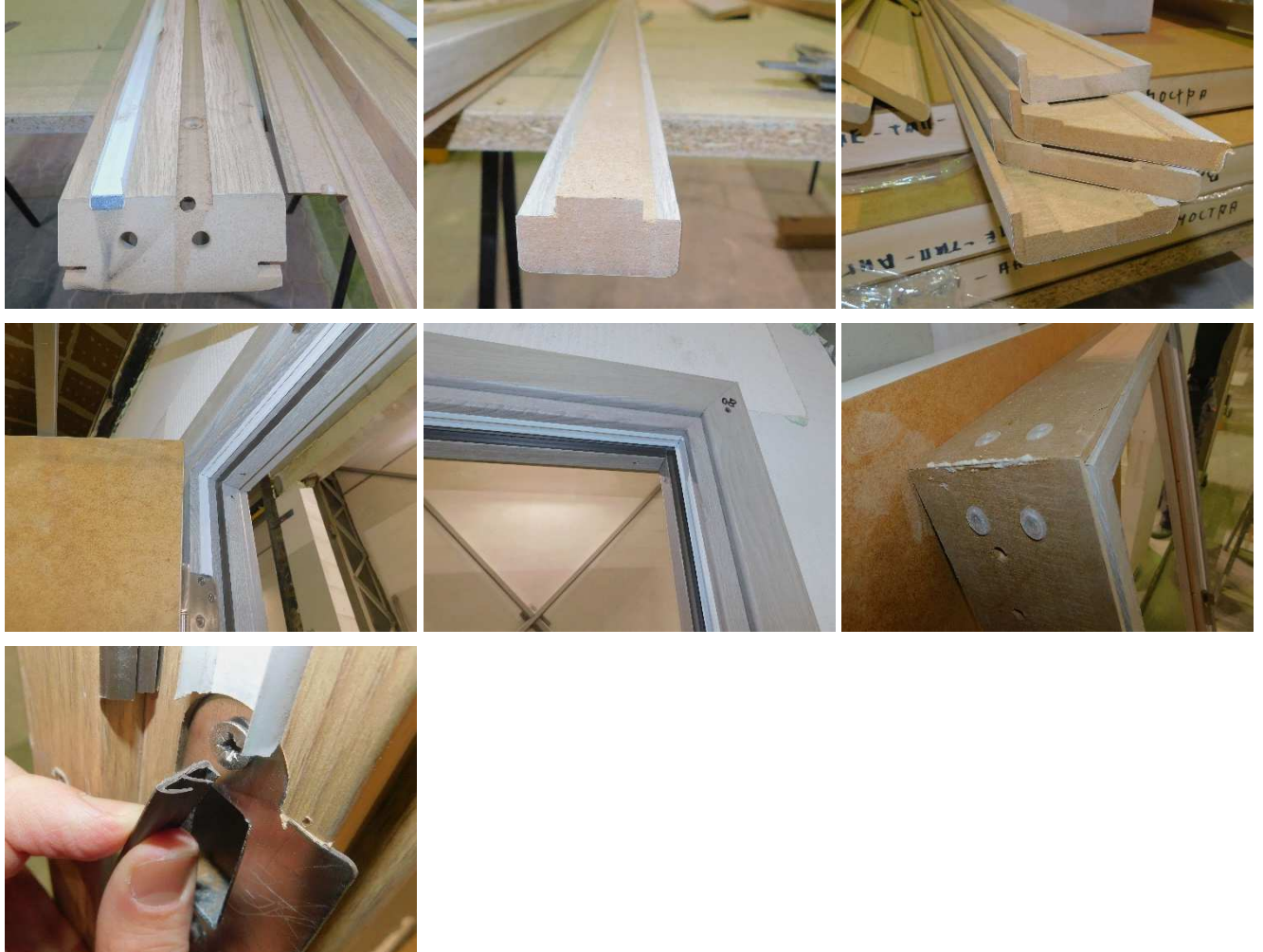
Door frame (door jambs and door head) is made of MDF boards (100 x 30) mm (supplier: Yildiz Entegre Romania S.A.) with bulk density 705 kg/m<sup>3</sup>, with milled groove (15 x 4) mm for intumescent tape and (16 x 4) mm for door stop profile. Door jambs and door head are joined with wood glue Den Braven WOODFIX D2 (manufacturer: Den Braven), wood dowels (Ø 8 x 40) mm and with screws (Ø 5 x 30) mm. Dimension of door frame rebate is (45 x 12) mm (depth x width). Door stop is made of MDF board (30 x 16) mm (supplier: Yildiz Entegre Romania S.A.) with bulk density 720 kg/m<sup>3</sup> fixed to door frame with steel screws (Ø 5 x 80) mm in max spacing 500 mm. Supplied with additional screws for Concrete (Ø 7.5 x 80) mm and self-drilling (Ø 5.5 x 85) mm.



Architraves are made of MDF boards (64 x 12) mm (supplier: Yildiz Entegre Romania S.A.) and are freely insert into door frame.

Around perimeter of door frame is placed acoustic door seal, type RAMFLEX (manufacturer: RAM Extrusion).

Surface treatment of door frame is made of finish foil 40 gr/m<sup>2</sup> (manufacturer: VTO decor).



### Door leaf

The frame of the door leaf is made of two finger jointed softwood profiles with bulk density 443 kg/m<sup>3</sup> (supplier: Ecoforest) with dimensions:

- outer profiles (40 x 38) mm;
- inner profiles (45 x 38) mm.

Profiles are joined with PVAc glue ORGALOK MA 35, mass 1 g/cm<sup>3</sup> (manufacturer: ORGANIK KIMYA SANAYI VE TICARET A.S) and steel staples (14 x 13 x 9) mm in max spacing of 500 mm. Corners are joined with butt joint and fixed with steel staples.





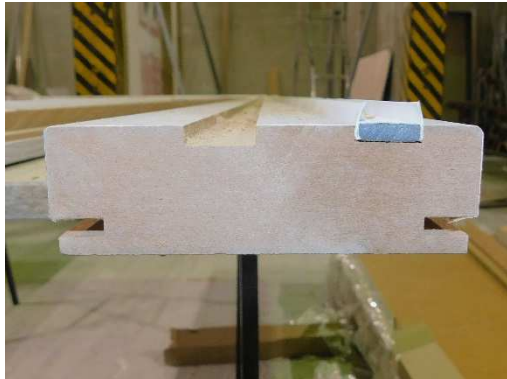
### Core of the door leaf

One-piece of H-Flachs Flaxboard 38 board with thickness of 38 mm, with bulk density 320 kg/m<sup>3</sup> (supplier: H-Flachs GmbH). Overall dimensions of board are (1870 x 756) mm.

Construction of door leaf incl. core of door leaf is covered with one layer of HDF board, 3 mm thick with bulk density 850 kg/m<sup>3</sup> (supplier: Pfeleiderer Polska Sp z o.o.) from both door faces. The HDF boards are glued to the construction of door leaf with PVAc glue ORGALOK MA 35, mass 1 g/cm<sup>3</sup> (manufacturer: ORGANIK KIMYA SANAYI VE TICARET A.S).

### Intumescent tape

Intumescent tape, type Pyrosist 9010 (15 x 4) mm (manufacturer: RAM Extrusion Ltd) is placed around the perimeter of door frame in milled groove (15 x 4) mm.



Intumescent hinge pads, type Pyrosist, 1 mm thick (manufacturer: RAM Extrusion) is placed behind the hinges.

Intumescent lock kit, type Pyrosist Ironmongery Protection, 1 mm thick (manufacturer: RAM Extrusion) is placed on the mortice lock.



### Hinges

3 pieces of hinges, type ARRONE AR 8782-RH-SSS-A1 LH + ARRONE AR 8782-LH-SSS-A1 LH (100 x 70), (manufacturer: HOPPE UK LIMITED, UK).

Position of hinges (to center of hinge):

- 200 mm from the bottom edge of door leaf;
- 1020 mm from the bottom edge of door leaf;
- 200 mm from the upper edge of door leaf.





### Lock

One-point mortise lock, type ARRONE AR8101-R-60-SSS with steel strike plate (manufacturer: HOPPE UK LIMITED, UK) operated with stainless steel door handles, order code: DCYVE-SN-DEV (supplier: Darcel). Handle is placed 1000 mm from the bottom edge of door leaf. Latch is placed 1025 mm from the bottom edge of door leaf (to the center of the latch).



### Automatic closing mechanism

Automatic closing mechanism, type ARRONE AR1500-SSS/SSS (manufacturer: HOPPE UK LIMITED, UK) installed on the door leaf surface.



More detailed information about the construction of the specimens is shown in the drawings which are a part of this test report. Drawings were delivered by the sponsor.

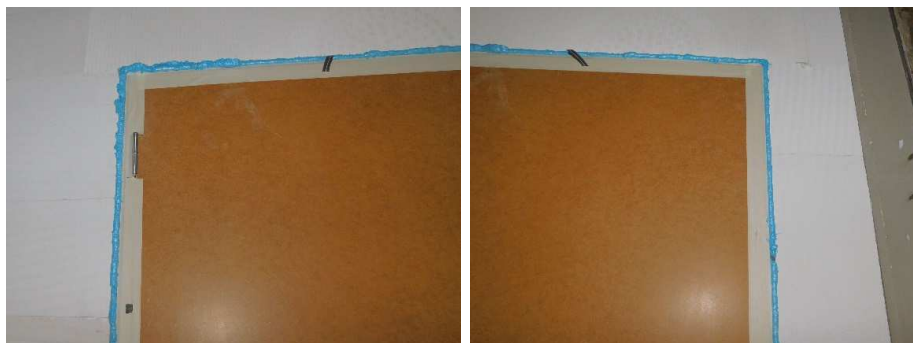
All the information about technical specifications of used materials and semi-products, information about their type sign were delivered by sponsor. This information was not subject to the specimen verification. Parameters which were verified are quoted in paragraph 4.3.

## 4.2 DESCRIPTION OF THE SPECIMENS FIXATION

The test specimens are fixed in rigid supporting construction made by aerated concrete blocks 100 mm thick with bulk density 450 kg/m<sup>3</sup>.

Specimens are fixed to the openings in supporting construction with screws (Ø 7,5 x 150) mm placed 100 mm from the bottom edges of door frame and next in spacing max 470 mm (five screws on each vertical edge of door frame) + one screw in middle of door head.

Door frame is placed in opening using fire resistant packers (10 x 100) mm with thickness of 1, 3 and 5 mm (manufacturer: BLUE 60 UK Limited). Gap between door frame and supporting construction (10 mm wide) is filled with fire resistance PU foam Blue 60 (manufacturer: BLUE 60 UK Limited). The Blue 60 foam was applied and then cut back prior to the application of architraves. The foam was not capped.



**Orientation of the specimens during the test**

specimen No. 1	Hinges of door leaf placed on the exposed face of the specimen (opening towards test furnace)
specimen No. 2	Hinges of door leaf placed on the unexposed face of the specimen (opening out of test furnace)

**4.3 VERIFICATION OF THE SPECIMENS**

The conformity of the drawings and the test specimens was verified before and after the fire resistance test. This verification has been carried out on extra delivered product for this purpose. The specimens corresponded to the drawings which are a part of this test report. The visual review of the test specimens, the used materials as well as the size verification of basic dimensions and the specimens' attachment to the supporting construction were subject to this verification.

**4.4 CLIMATIC CONDITIONING OF THE SPECIMENS**

Test specimens were stored in the hall of the testing laboratory and were conditioned according to BS 476-20:1987 under the following climatic conditions:

Ambient air temperature [°C]

mean	19,8
standard deviation	0,7

Relative air humidity [%]

mean	41,5
standard deviation	1,5

The humidity equilibrium state of test specimens was determined by repetitive balancing of door leaves. The humidity equilibrium state of the test specimens was achieved.

**5. CARRYING OUT OF THE TEST**

**5.1 CONDITIONS OF THE TEST**

Conditions during the test in the test furnace (temperature – standard temperature/time curve, pressure, O<sub>2</sub> content) as well as in the testing room (ambient temperature) corresponded to BS 476-20:1987. Detailed information is a part of this test report, or can be found in the test record.

Values characterizing the testing room environment directly before the test:

<b>Ambient air temperature [°C]</b>
16,0





## 5.2 RESULTS OF THE TEST

Measured values are stated in this test report. Description of the specimens' behaviour during the test:

### Specimen No. 1

Time [min:s]	Face of specimen	Observation
03:00	ES	Flaming of the door leaf surface;
03:30	NS	Smoke release around the door handle;
05:00	NS	Soft smoke release around the perimeter of door leaf;
12:20	NS	Smoke release around the door handle and from lock edge of door leaf in height of door handle;
15:00	NS	No further significant changes visible;
20:00	NS	No further significant changes visible;
24:00	NS	Smoke release around top hinge;
30:00	NS	No further significant changes visible;
33:00	NS	Darkening of door leaf surface in joint of core of door leaf and frame of door leaf;
34:00	NS	Glowing in the lower right part of the door leaf;
35:00	NS	Cotton pad test applied in place of glowing – negative;
<b>36:20</b>	NS	Sustained flaming in the lower left part of the door leaf – <b>integrity failure</b> ;
37:20		Termination of the test.

### Specimen No. 2

Time [min:s]	Face of specimen	Observation
03:00	NS	Flaming of the door leaf surface;
05:00	NS	Soft smoke release around the perimeter of door leaf;
12:20	NS	Smoke release around the door handle and from lock edge of door leaf in height of door handle;
15:00	NS	No further significant changes visible;
22:00	NS	Smoke release around top hinge;
28:00	NS	Smoke release around middle hinge;
30:00	NS	No further significant changes visible;
33:00	NS	Darkening of door leaf surface in joint of core of door leaf and frame of door leaf;
35:00	NS	Glowing in the lower left part of the door leaf;
<b>35:15</b>	NS	Sustained flaming in the lower left part of the door leaf – <b>integrity failure</b> ;
37:20		Termination of the test.

ES exposed face of specimen  
NS unexposed face of specimen

## 6. CLOSING

### Evaluation of the test:

#### Specimen No. 1

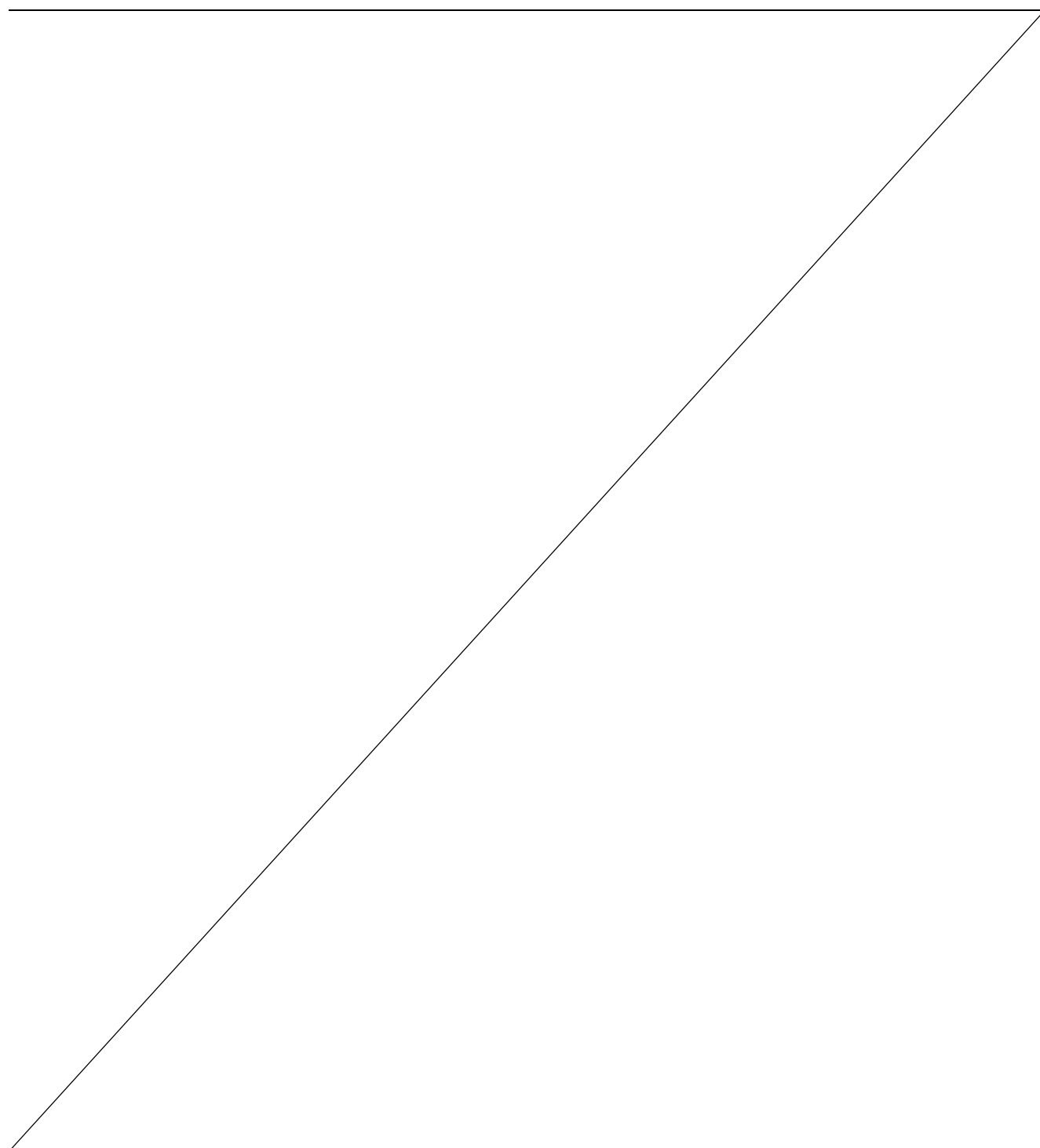
Performance criterion	Time till the performance criterion is achieved
integrity – sustained flaming	36 minutes
integrity – gap gauges $\varnothing$ 6 mm and $\varnothing$ 25 mm	37 minutes no failure
integrity – cotton pad	36 minutes
insulation – average temperature (140 K)	36 minutes
insulation – maximal temperature (180 K)	36 minutes



**Specimen No. 2**

<b>Performance criterion</b>	<b>Time till the performance criterion is achieved</b>
integrity – sustained flaming	35 minutes
integrity – gap gauges Ø 6 mm and Ø 25 mm	37 minutes no failure
integrity – cotton pad	35 minutes
insulation – average temperature (140 K)	35 minutes
insulation – maximal temperature (180 K)	35 minutes

The fire test was terminated in the 38<sup>th</sup> minute after the specimen No. 1 integrity failure in the 37<sup>th</sup> minute and specimen No. 2 integrity failure in the 36<sup>th</sup> minute.





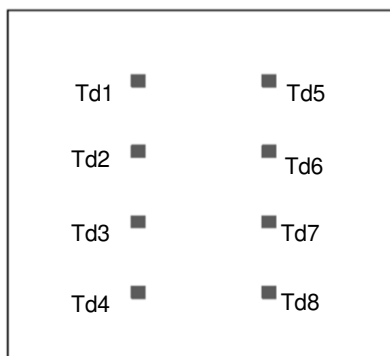
**Measured values inside the test furnace**

Time t [min]	Temperature [°C]											Deviation	Pressure [Pa]
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To	d <sub>e</sub> [%]	p
0	19,1	21,5	16,0	19,5	16,2	15,9	19,1	18,0	18,2	20,0	16,0		
5	781,0	713,2	652,2	620,7	830,5	735,6	623,6	555,9	689,1	576,0	15,8	5,9	-1,2
6	563,9	550,4	536,3	534,2	597,4	565,5	506,8	449,7	538,0	603,0	15,9	2,6	0,1
7	592,5	591,7	601,9	578,7	629,7	637,8	595,3	630,5	607,3	626,0	15,9	1,6	-1,3
8	601,9	620,2	637,9	632,9	603,4	603,4	606,9	586,1	611,6	645,0	15,7	0,6	1,8
9	644,5	653,8	635,8	599,6	662,7	657,6	615,8	609,5	634,9	663,0	15,7	0,0	-1,3
10	683,5	690,2	699,4	655,0	678,4	694,0	673,4	692,5	683,3	678,0	15,6	0,1	-1,0
11	655,4	664,8	656,3	610,9	661,4	666,5	631,3	637,4	648,0	693,0	15,7	-0,7	-1,6
12	759,2	710,7	697,7	659,4	744,3	727,6	651,7	604,6	694,4	705,0	15,7	-0,7	0,8
13	756,5	757,0	758,9	760,8	772,8	757,6	726,2	682,7	746,6	717,0	16,0	-0,3	1,5
14	685,2	675,9	667,3	655,6	696,8	687,9	652,5	645,2	670,8	728,0	15,8	-0,9	1,0
15	693,2	693,3	703,6	694,0	686,1	694,9	671,5	647,2	685,5	739,0	15,8	-1,4	1,9
16	717,6	724,1	740,6	719,0	719,7	732,3	706,6	697,7	719,7	748,0	15,6	-1,6	-1,0
17	752,4	757,6	769,1	734,0	768,2	770,1	723,3	699,7	746,8	757,0	15,5	-1,6	-1,1
18	776,0	781,1	787,8	760,7	775,9	792,3	756,4	749,8	772,5	766,0	15,6	-1,4	1,1
19	788,6	794,4	793,3	765,4	787,8	799,2	762,1	749,1	780,0	774,0	15,6	-1,3	1,8
20	782,0	783,1	783,9	760,4	787,0	797,7	753,0	738,0	773,1	781,0	15,6	-1,3	-1,0
21	768,8	775,8	773,1	762,7	772,0	791,7	765,8	781,7	774,0	789,0	15,8	-1,3	-0,8
22	779,9	794,8	807,1	798,4	780,7	798,0	779,0	766,8	788,1	796,0	15,8	-1,3	1,0
23	807,6	817,5	832,4	836,3	811,6	819,5	806,3	789,1	815,0	802,0	16,0	-1,1	1,4
24	830,2	836,8	844,8	834,6	826,6	837,3	812,0	788,6	826,4	809,0	16,1	-1,0	-1,7
25	817,7	827,8	834,2	815,3	822,5	831,3	802,8	789,1	817,6	815,0	16,0	-0,9	1,6
26	806,6	816,2	826,1	810,1	814,7	825,4	790,3	768,2	807,2	820,0	16,1	-1,0	-1,8
27	788,9	800,8	808,8	800,5	798,9	810,1	772,0	737,5	789,7	826,0	16,0	-1,1	1,6
28	817,8	834,1	852,1	866,7	825,7	821,8	818,0	777,6	826,7	832,0	16,3	-1,1	-1,4
29	803,5	819,0	830,5	839,5	816,4	813,3	791,9	740,6	806,8	837,0	16,4	-1,2	0,6
30	815,4	829,7	847,7	862,1	819,9	814,8	808,5	757,6	819,5	842,0	16,5	-1,2	0,0
31	832,8	849,6	868,2	875,8	843,9	837,1	834,0	801,5	842,9	847,0	16,5	-1,2	-1,1
32	847,7	862,1	876,5	884,1	857,7	849,6	851,8	834,6	858,0	851,0	16,5	-1,1	1,2
33	840,7	853,4	865,6	875,6	852,8	846,0	836,7	805,9	847,1	856,0	16,3	-1,1	1,2
34	837,5	852,3	868,6	878,7	850,3	843,9	838,2	808,4	847,2	860,0	16,3	-1,2	-1,5
35	844,4	861,9	878,3	894,2	858,1	846,8	846,1	807,5	854,7	865,0	16,3	-1,2	1,2
36	858,4	873,1	887,8	898,6	872,5	857,4	856,5	823,3	866,0	869,0	16,3	-1,1	1,3
37	851,0	863,0	861,7	860,9	866,6	866,3	811,6	834,2	851,9	873,0	16,2	-1,2	-1,5

**Note: temperature measured by individual thermocouples is affected by flaming of specimen surface**

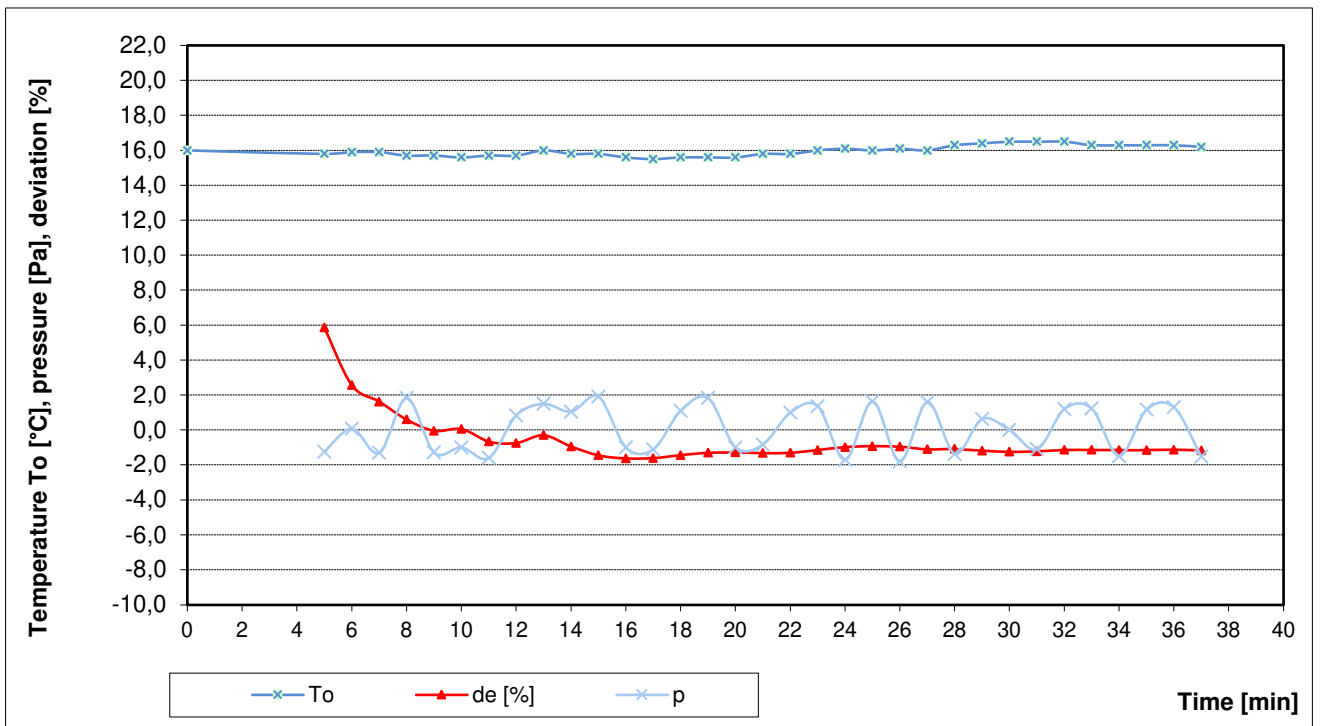
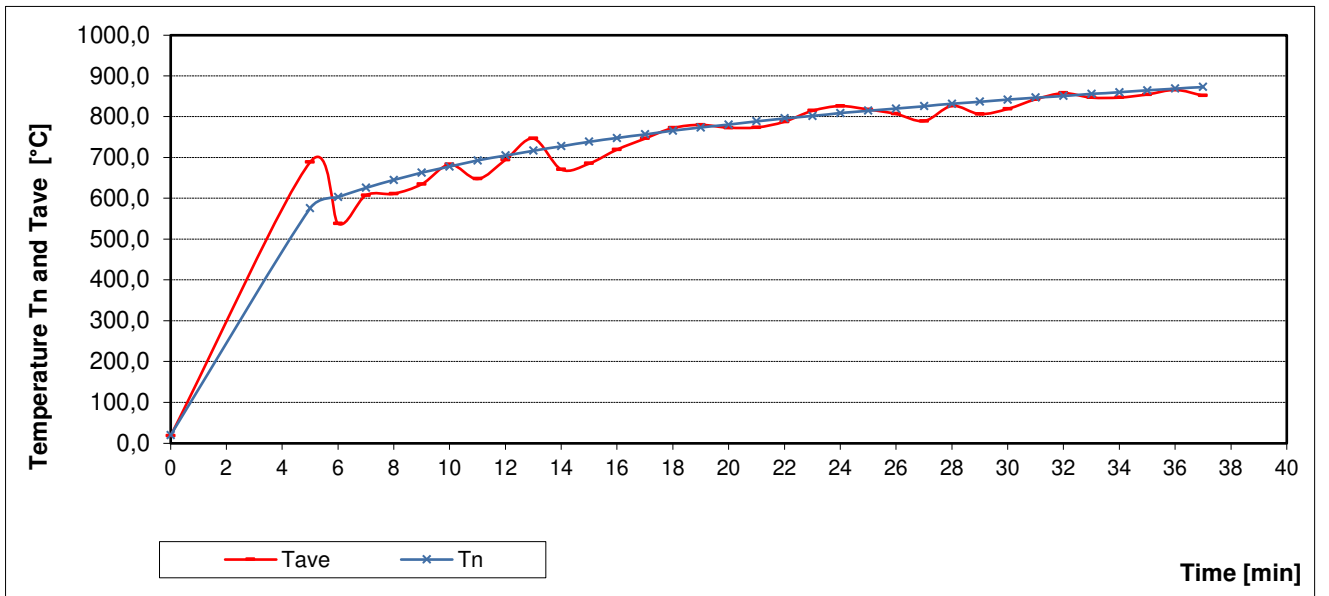
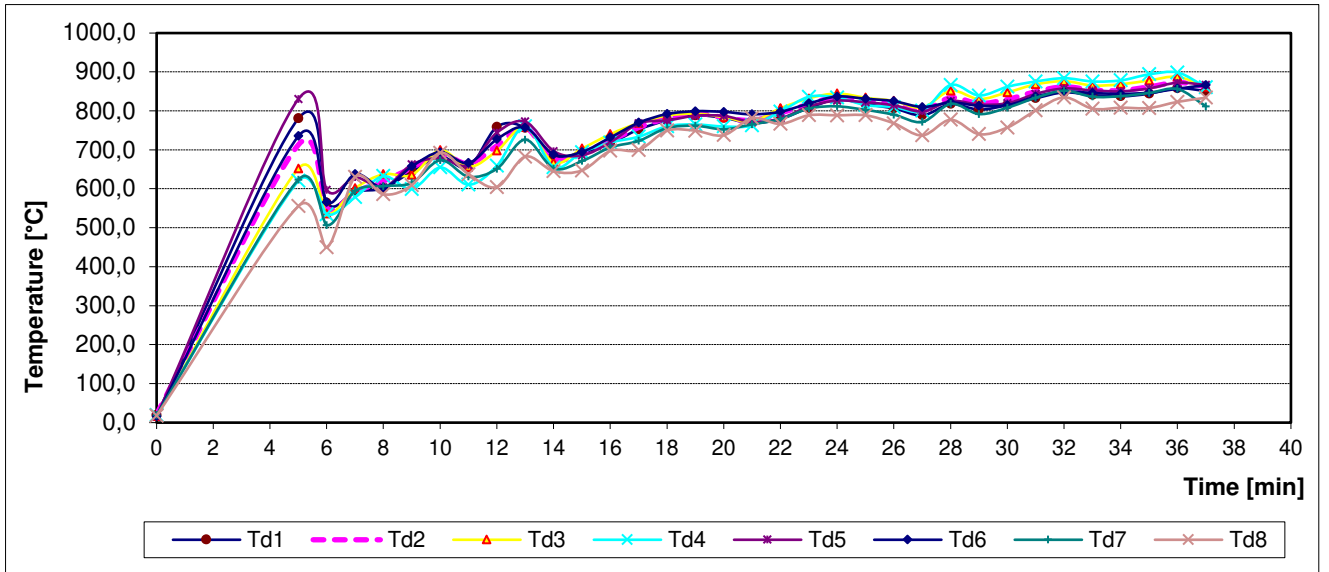
- Tave** Average temperature in the test furnace calculated from individual thermometers
- Tn** Standard temperature in the test furnace laid down according to test guideline
- d<sub>e</sub>** Deviation of the average temperature from the standard temperature calc. acc. to test guideline
- To** Ambient temperature
- p** Pressure inside the test furnace at the height of neutral pressure level 1000 mm above notional floor level

**Layout of measuring points in the test furnace:**





Measured values inside the test furnace / graph





## Measured values on the unexposed surface of the test specimen No. 1

The initial average temperature of the unexposed specimen surface: 16,6 °C

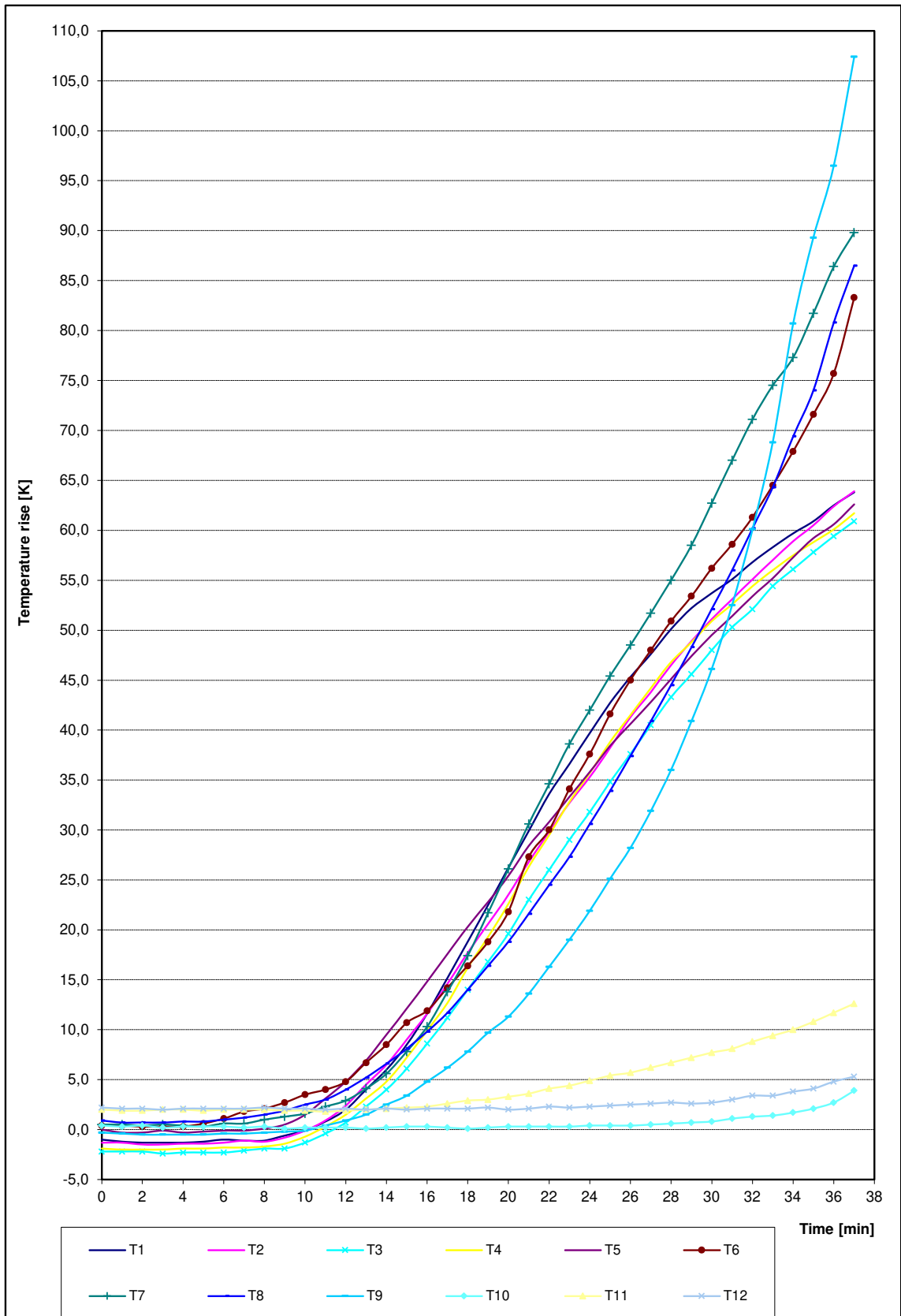
Time t [min]	Temperature rise [K]											
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
0	-1,0	-1,3	-2,2	-1,9	0,0	0,4	0,5	0,9	-0,3	0,4	2,0	2,2
1	-1,2	-1,3	-2,2	-2,0	-0,3	0,4	0,5	0,7	-0,4	0,3	1,9	2,1
2	-1,3	-1,5	-2,2	-2,0	-0,3	0,3	0,4	0,7	-0,5	0,4	1,9	2,1
3	-1,3	-1,5	-2,4	-2,0	-0,1	0,3	0,5	0,7	-0,5	0,2	2,0	2,0
4	-1,3	-1,4	-2,3	-1,9	-0,3	0,3	0,4	0,8	-0,5	0,3	2,0	2,1
5	-1,2	-1,4	-2,3	-1,9	-0,2	0,6	0,3	0,8	-0,5	0,3	1,9	2,1
6	-1,0	-1,3	-2,3	-1,8	-0,1	1,1	0,6	1,0	-0,4	0,3	2,0	2,1
7	-1,1	-1,1	-2,1	-1,8	-0,1	1,8	0,6	1,2	-0,4	0,2	2,0	2,1
8	-1,1	-1,2	-1,9	-1,7	0,1	2,1	1,0	1,5	-0,3	0,3	2,0	2,2
9	-0,6	-0,8	-1,9	-1,4	0,5	2,7	1,3	1,9	-0,2	0,1	1,9	2,1
10	-0,1	-0,1	-1,3	-0,7	1,5	3,5	1,6	2,5	-0,1	0,2	1,9	2,1
11	0,8	0,9	-0,4	0,3	3,1	4,0	2,3	3,0	0,4	0,2	1,8	2,0
12	2,0	2,4	0,7	1,5	4,8	4,8	2,9	4,0	0,9	0,2	1,9	2,1
13	4,0	4,5	2,3	3,1	6,9	6,7	4,1	5,2	1,5	0,1	2,0	2,0
14	6,0	6,5	4,0	4,8	9,5	8,5	5,6	6,6	2,5	0,2	2,1	2,1
15	8,5	9,0	6,1	7,2	12,1	10,7	7,8	8,1	3,4	0,3	2,2	2,0
16	11,6	11,6	8,6	9,9	14,8	11,9	10,3	9,8	4,8	0,3	2,3	2,1
17	15,2	14,6	11,2	12,7	17,6	14,2	13,8	11,7	6,2	0,2	2,6	2,1
18	18,8	17,7	14,0	16,2	20,3	16,4	17,4	14,0	7,8	0,1	2,9	2,1
19	22,5	20,6	16,8	19,3	22,8	18,8	21,7	16,4	9,7	0,2	3,0	2,2
20	26,2	23,5	19,6	22,6	25,4	21,8	26,1	18,8	11,3	0,3	3,3	2,0
21	29,9	26,8	23,0	26,3	28,4	27,3	30,6	21,6	13,6	0,3	3,6	2,1
22	33,6	29,8	26,0	29,5	30,8	30,0	34,6	24,5	16,3	0,3	4,1	2,3
23	36,6	32,7	29,0	32,8	33,3	34,1	38,6	27,3	19,0	0,3	4,4	2,2
24	39,7	35,3	31,8	35,7	35,8	37,6	42,0	30,6	21,9	0,4	4,9	2,3
25	42,7	38,2	34,8	38,8	38,4	41,6	45,4	33,9	25,1	0,4	5,4	2,4
26	45,3	41,3	37,6	41,5	40,6	45,0	48,5	37,4	28,2	0,4	5,7	2,5
27	47,6	43,8	40,5	44,2	42,8	48,0	51,7	40,9	31,9	0,5	6,2	2,6
28	50,1	46,5	43,3	46,8	45,1	50,9	55,0	44,5	36,0	0,6	6,7	2,7
29	52,2	48,9	45,6	48,8	47,4	53,4	58,5	48,3	40,9	0,7	7,2	2,6
30	53,7	51,1	48,0	50,9	49,5	56,2	62,7	52,1	46,1	0,8	7,7	2,7
31	55,1	53,1	50,3	52,6	51,4	58,6	67,0	56,0	52,5	1,1	8,1	3,0
32	56,8	55,1	52,1	54,4	53,4	61,3	71,1	60,2	60,1	1,3	8,8	3,4
33	58,3	57,0	54,4	56,0	55,2	64,5	74,5	64,3	68,8	1,4	9,4	3,4
34	59,7	58,9	56,1	57,5	57,3	67,9	77,3	69,4	80,7	1,7	10,0	3,8
35	60,9	60,5	57,8	58,8	59,2	71,6	81,7	74,0	89,3	2,1	10,8	4,1
36	62,5	62,4	59,4	60,1	60,6	75,7	86,4	80,8	96,5	2,7	11,7	4,8
37	63,8	63,9	60,9	61,7	62,6	83,3	89,8	86,5	107,4	3,9	12,6	5,3

Negative values are quoted because temperature rises are calculated from the initial average temperature of the specimen surface.

Please see figure showing the layout of measuring points on the specimen surface which is a part of this test report



**Measured values on the unexposed surface of the test specimen No. 1 / graph**





## Calculated values from measured values on the specimen No. 1 surface

The initial average temperature of the unexposed specimen surface:

16,6 °C

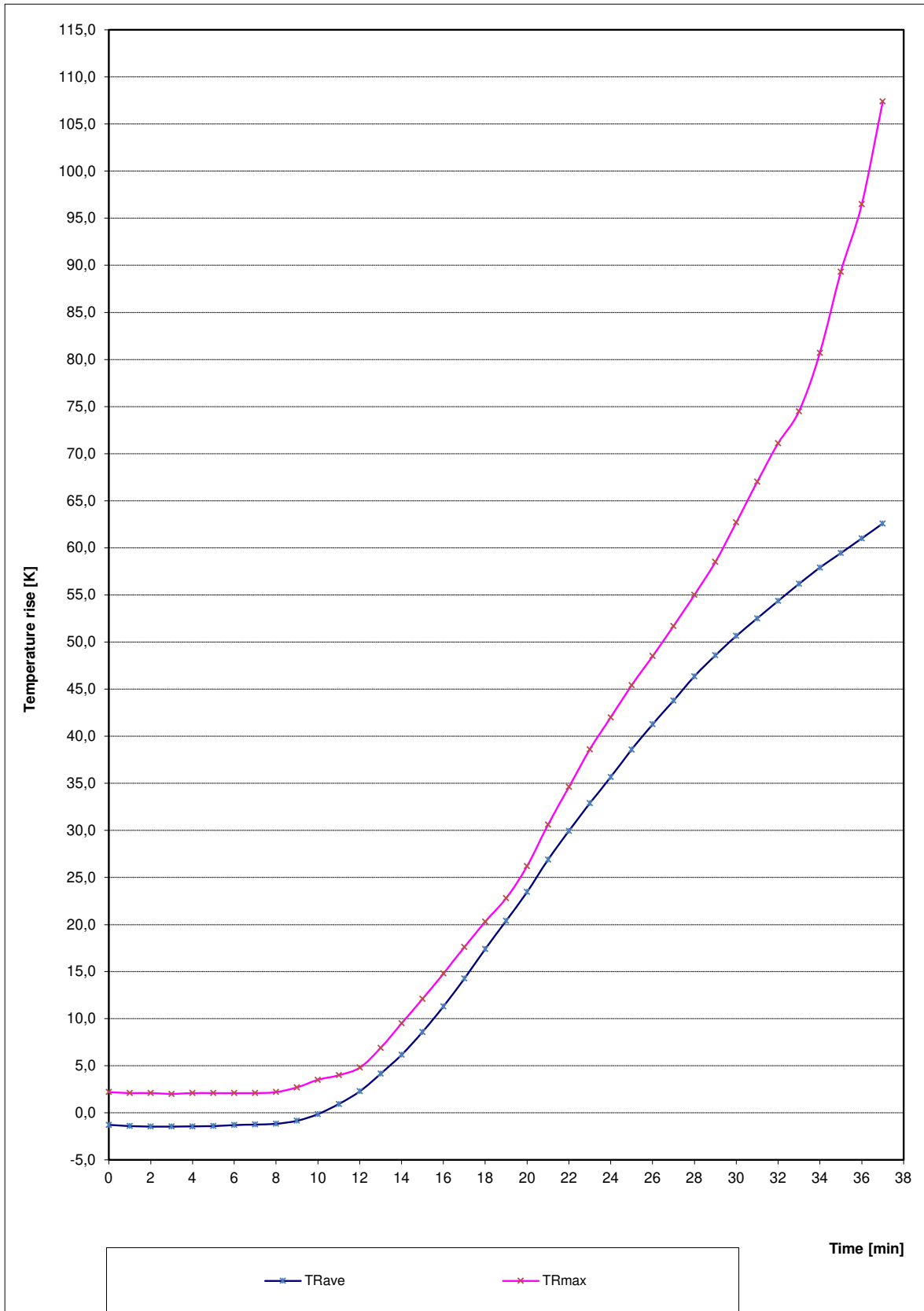
Time t [min]	Temperature rise [K]	
	TRave	TRmax
0	-1,3	2,2
1	-1,4	2,1
2	-1,5	2,1
3	-1,5	2,0
4	-1,4	2,1
5	-1,4	2,1
6	-1,3	2,1
7	-1,2	2,1
8	-1,2	2,2
9	-0,8	2,7
10	-0,1	3,5
11	0,9	4,0
12	2,3	4,8
13	4,2	6,9
14	6,2	9,5
15	8,6	12,1
16	11,3	14,8
17	14,3	17,6
18	17,4	20,3
19	20,4	22,8
20	23,5	26,2
21	26,9	30,6
22	29,9	34,6
23	32,9	38,6
24	35,7	42,0
25	38,6	45,4
26	41,3	48,5
27	43,8	51,7
28	46,4	55,0
29	48,6	58,5
30	50,6	62,7
31	52,5	67,0
32	54,4	71,1
33	56,2	74,5
34	57,9	80,7
35	59,4	89,3
36	61,0	96,5
37	62,6	107,4

Negative values are quoted because temperature rises are calculated from the initial average temperature of the specimen surface.

**TRave** average temperature rise above initial average temperature calculated from T1-T5  
**TRmax** maximal temperature rise above initial average temperature calculated from T1-T12



Calculated values from measured values on the specimen No. 1 surface / graph







## Measured values on the unexposed surface of the test specimen No. 2

The initial average temperature of the unexposed specimen surface: 16,5 °C

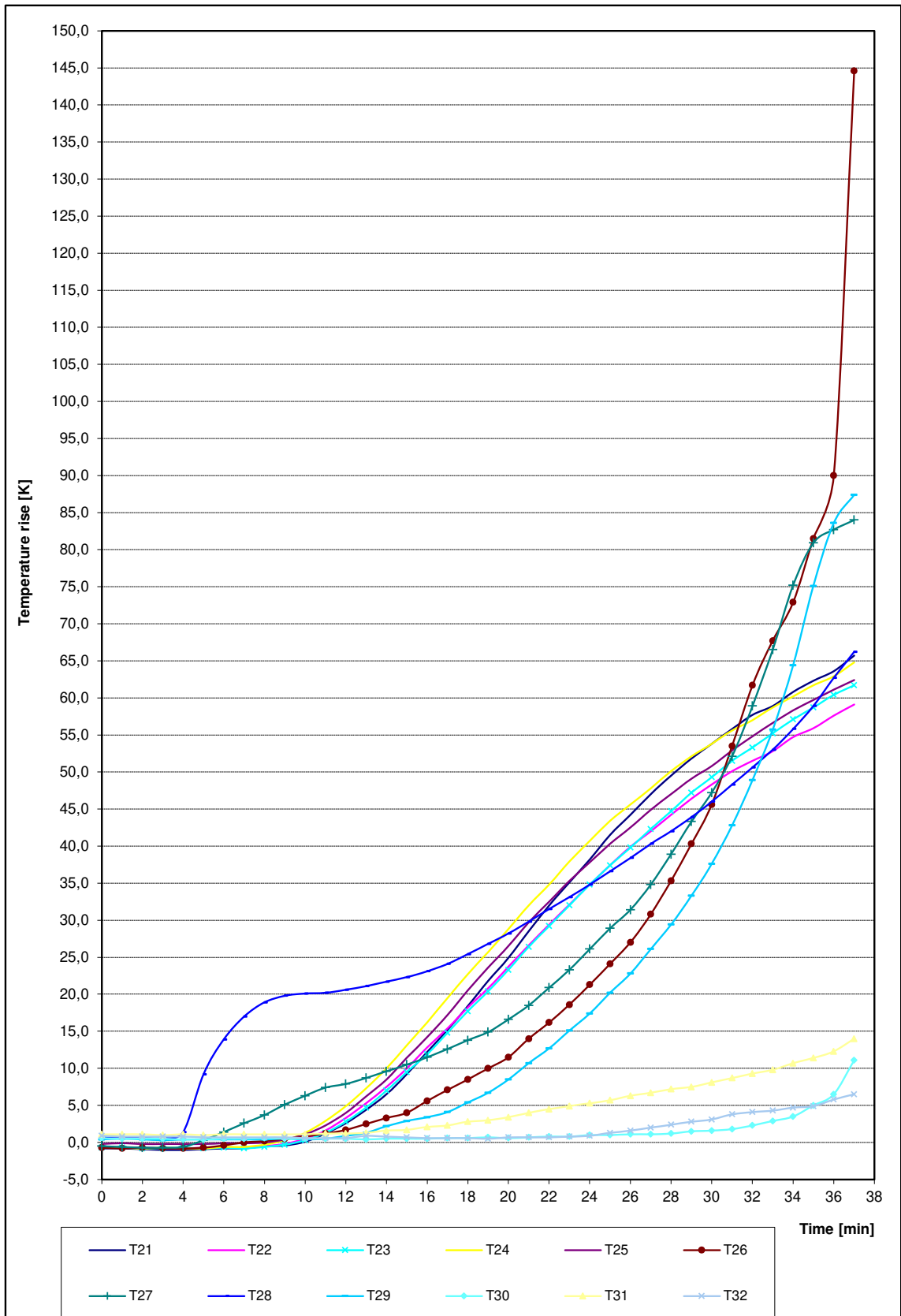
Time t [min]	Temperature rise [K]											
	T21	T22	T23	T24	T25	T26	T27	T28	T29	T30	T31	T32
0	-0,8	-0,7	-0,7	-0,7	-0,2	-0,7	-0,5	0,8	0,4	0,6	1,1	0,9
1	-0,8	-0,7	-0,7	-0,7	-0,1	-0,8	-0,6	0,7	0,5	0,5	1,1	0,8
2	-0,9	-0,7	-0,8	-0,8	-0,2	-0,7	-0,7	0,6	0,4	0,5	1,1	0,8
3	-1,0	-0,8	-0,8	-0,7	-0,2	-0,8	-0,7	0,6	0,3	0,5	1,0	0,8
4	-1,0	-0,8	-0,7	-0,8	-0,2	-0,8	-0,6	1,4	0,4	0,4	1,1	0,8
5	-0,9	-0,7	-0,8	-0,8	-0,2	-0,7	0,3	9,2	0,4	0,4	1,0	0,7
6	-0,8	-0,6	-0,7	-0,6	-0,1	-0,4	1,4	13,9	0,4	0,5	1,1	0,7
7	-0,8	-0,7	-0,8	-0,6	-0,1	0,0	2,6	17,0	0,4	0,5	1,1	0,7
8	-0,5	-0,5	-0,6	-0,3	0,0	0,2	3,7	18,9	0,4	0,6	1,1	0,7
9	-0,4	-0,2	-0,3	0,3	0,4	0,5	5,1	19,8	0,5	0,5	1,1	0,7
10	0,1	0,5	0,3	1,3	1,1	0,8	6,3	20,1	0,4	0,5	1,1	0,6
11	1,2	1,6	1,3	2,9	2,3	1,2	7,4	20,2	0,5	0,5	1,2	0,6
12	2,6	3,3	2,8	4,9	4,0	1,7	7,9	20,6	0,9	0,5	1,2	0,6
13	4,4	5,3	4,7	7,3	6,2	2,5	8,7	21,1	1,3	0,4	1,3	0,9
14	6,5	7,5	7,0	10,0	8,5	3,3	9,6	21,7	2,2	0,5	1,6	0,8
15	9,2	10,0	9,5	13,1	11,4	4,0	10,5	22,3	2,9	0,5	1,7	0,7
16	12,2	12,8	11,9	16,2	14,2	5,6	11,5	23,1	3,4	0,5	2,1	0,6
17	15,2	15,4	14,8	19,5	17,2	7,1	12,6	24,1	4,1	0,6	2,3	0,6
18	18,4	18,2	17,7	22,7	20,5	8,5	13,8	25,4	5,4	0,6	2,8	0,6
19	21,8	20,8	20,4	25,7	23,6	10,0	14,9	26,8	6,7	0,7	3,0	0,5
20	24,9	23,7	23,3	28,8	26,5	11,5	16,6	28,2	8,5	0,6	3,4	0,7
21	28,5	26,6	26,4	32,0	29,7	14,0	18,5	29,8	10,7	0,7	4,0	0,7
22	32,0	29,4	29,2	34,8	32,5	16,2	20,9	31,5	12,7	0,8	4,5	0,7
23	35,1	32,1	32,0	37,9	35,3	18,6	23,3	33,1	15,1	0,8	4,9	0,8
24	38,2	34,8	34,8	40,7	37,8	21,3	26,1	34,8	17,4	1,0	5,3	0,9
25	41,5	37,4	37,4	43,4	40,3	24,1	28,9	36,6	20,2	1,0	5,7	1,3
26	44,2	39,9	39,8	45,6	42,5	27,0	31,4	38,4	22,8	1,1	6,3	1,6
27	47,0	42,0	42,3	47,8	44,9	30,8	34,8	40,3	26,1	1,1	6,7	2,0
28	49,5	44,2	44,7	50,1	47,0	35,3	38,9	42,0	29,4	1,2	7,2	2,4
29	51,8	46,4	47,2	52,1	49,1	40,3	43,3	43,9	33,3	1,5	7,5	2,8
30	53,8	48,3	49,3	53,8	50,8	45,6	47,2	46,0	37,6	1,6	8,1	3,1
31	55,8	50,1	51,5	55,6	52,9	53,5	52,1	48,3	42,8	1,8	8,7	3,8
32	57,7	51,5	53,3	57,0	54,8	61,7	58,9	50,6	48,9	2,3	9,3	4,1
33	58,9	52,8	55,2	58,7	56,6	67,7	66,5	53,0	55,7	2,9	9,8	4,3
34	60,8	54,7	57,1	60,2	58,3	72,9	75,2	55,8	64,4	3,5	10,7	4,7
35	62,3	55,9	58,7	61,7	59,7	81,5	80,9	58,9	75,1	5,0	11,4	4,9
36	63,6	57,6	60,4	62,9	61,1	90,0	82,7	62,7	83,6	6,5	12,3	5,8
37	65,7	59,1	61,7	64,8	62,4	144,6	84,0	66,2	87,4	11,1	14,0	6,5

Negative values are quoted because temperature rises are calculated from the initial average temperature of the specimen surface.

Please see figure showing the layout of measuring points on the specimen surface which is a part of this test report



**Measured values on the unexposed surface of the test specimen No. 2 / graph**





## Calculated values from measured values on the specimen No. 2 surface

The initial average temperature of the unexposed specimen surface:

16,5 °C

Time t [min]	Temperature rise [K]	
	TRave	TRmax
0	-0,6	1,1
1	-0,6	1,1
2	-0,7	1,1
3	-0,7	1,0
4	-0,7	1,4
5	-0,7	9,2
6	-0,6	13,9
7	-0,6	17,0
8	-0,4	18,9
9	0,0	19,8
10	0,7	20,1
11	1,9	20,2
12	3,5	20,6
13	5,6	21,1
14	7,9	21,7
15	10,6	22,3
16	13,5	23,1
17	16,4	24,1
18	19,5	25,4
19	22,5	26,8
20	25,4	28,8
21	28,6	32,0
22	31,6	34,8
23	34,5	37,9
24	37,3	40,7
25	40,0	43,4
26	42,4	45,6
27	44,8	47,8
28	47,1	50,1
29	49,3	52,1
30	51,2	53,8
31	53,2	55,8
32	54,9	61,7
33	56,4	67,7
34	58,2	75,2
35	59,7	81,5
36	61,1	90,0
37	62,7	144,6

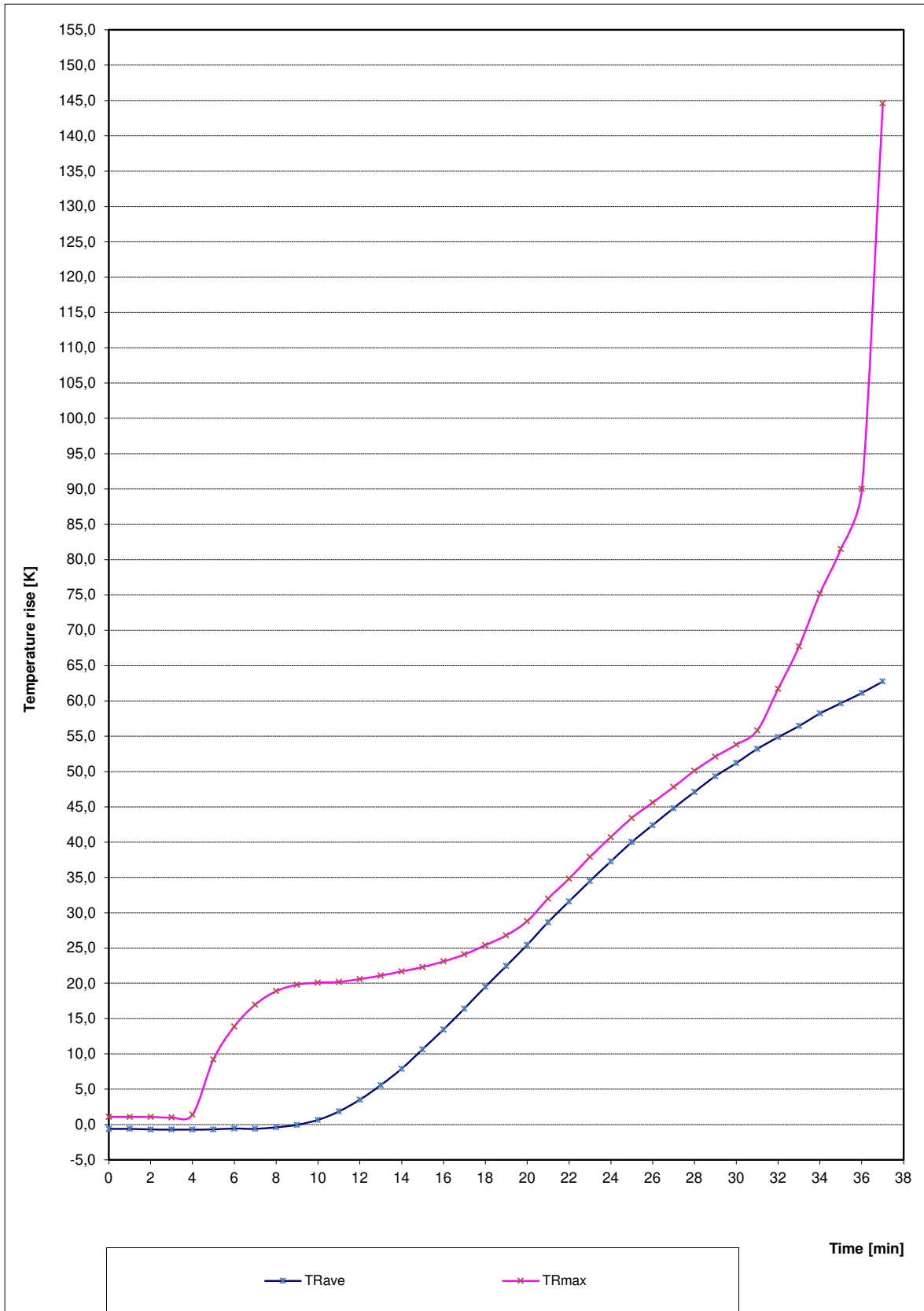
Negative values are quoted because temperature rises are calculated from the initial average temperature of the specimen surface.

**TRave** average temperature rise above initial average temperature calculated from T21-T25

**TRmax** maximal temperature rise above initial average temperature calculated from T21-T32



Calculated values from measured values on the specimen No. 2 surface / graph





**Deflection of the specimen**

Time t [min]	Deflection [mm]																					
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22
0	0,0	0,0	0,1	0,1	0,2	0,2	0,5	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
1	0,1	0,0	0,5	0,4	0,6	0,2	0,5	0,2														
2	0,1	0,0	1,2	0,6	0,6	0,5	0,0	0,2														
3	0,1	0,0	1,5	0,6	0,6	0,5	-0,1	0,2														
4	0,1	0,0	1,7	0,9	0,6	0,8	-0,2	0,2														
5	0,1	0,0	2,3	1,1	0,6	1,0	-0,3	0,3	1,0	7,0	3,0	0,0	0,0	1,0	0,0	3,0	5,0	1,0	0,0	-1,0	-12,0	0,0
6	0,2	0,2	2,6	1,3	0,7	1,2	-0,8	0,4														
7	0,2	0,2	2,8	1,5	0,8	1,4	-0,8	0,4														
8	0,2	0,3	3,0	1,6	0,9	1,7	-0,8	0,5														
9	0,3	0,4	3,3	1,7	0,9	1,9	-0,8	0,5														
10	0,4	0,5	3,5	1,9	1,0	2,0	-0,8	0,6	1,0	9,0	3,0	0,0	0,0	1,0	0,0	3,0	7,0	1,0	0,0	-1,0	-13,0	0,0
11	0,4	0,6	3,9	2,0	1,0	2,0	-0,8	0,6														
12	0,4	0,8	4,0	2,0	1,0	2,0	-0,8	0,6														
13	0,4	0,8	4,2	2,1	1,0	2,1	-0,8	0,6														
14	0,4	1,0	4,4	2,2	1,0	2,3	-0,8	0,6														
15	0,5	1,1	4,6	2,2	1,0	2,5	-0,8	0,7	1,0	10,0	4,0	0,0	1,0	1,0	0,0	3,0	9,0	1,0	0,0	-1,0	-17,0	0,0
16	0,6	1,3	4,7	2,5	1,0	2,7	-0,8	0,8														
17	0,7	1,5	4,8	2,6	1,1	3,0	-0,7	0,9														
18	0,8	1,7	5,0	2,8	1,3	3,7	-0,6	1,0														
19	1,0	1,7	5,1	2,9	1,5	4,1	-0,2	1,0														
20	1,0	1,8	5,1	3,1	1,5	4,6	0,1	1,0	1,0	10,0	5,0	0,0	0,0	1,0	0,0	3,0	9,0	3,0	0,0	-1,0	-22,0	0,0
21	1,0	1,8	5,1	3,2	2,0	4,9	0,6	1,0														
22	1,0	1,9	5,2	3,2	2,2	5,2	1,0	1,0														
23	1,0	2,0	5,1	3,2	2,5	5,8	1,9	1,0														
24	1,0	2,0	5,2	3,3	3,0	6,6	3,2	1,0														
25	1,0	2,2	5,2	3,4	3,5	7,6	4,5	1,0	1,0	7,0	5,0	0,0	0,0	1,0	0,0	2,0	6,0	1,0	1,0	-1,0	-20,0	0,0
26	1,0	2,6	5,1	3,4	4,2	8,5	5,8	1,0														
27	1,0	2,9	5,1	3,5	4,8	9,3	6,9	1,0														
28	1,0	2,9	5,2	3,5	5,4	10,0	7,4	1,0														
29	1,0	2,9	5,1	3,6	5,6	10,2	7,7	1,0														
30	1,0	2,9	5,2	3,6	5,6	10,1	7,9	1,0	1,0	2,0	2,0	0,0	0,0	2,0	0,0	0,0	6,0	-1,0	-2,0	-3,0	-17,0	0,0
31	1,0	2,9	5,1	3,6	5,6	9,9	7,9	1,0														
32	1,0	2,9	5,1	3,6	5,6	9,5	7,9	1,0														
33	1,0	2,9	4,7	3,6	5,6	9,0	7,9	1,0														
34	1,0	3,0	4,5	3,6	5,8	8,3	7,9	1,0														
35	1,0	3,1	3,9	3,6	6,1	7,7	7,9	1,0														
36	1,0	3,2	3,5	3,6	6,2	7,1	7,9	1,0														
37	1,0	3,2	2,9	4,0	6,5	6,7	7,9	1,0														

**Deflection [mm]** Deflection of test specimen

D1 - D8 deflection of the door measured with cable extension positioning transducer

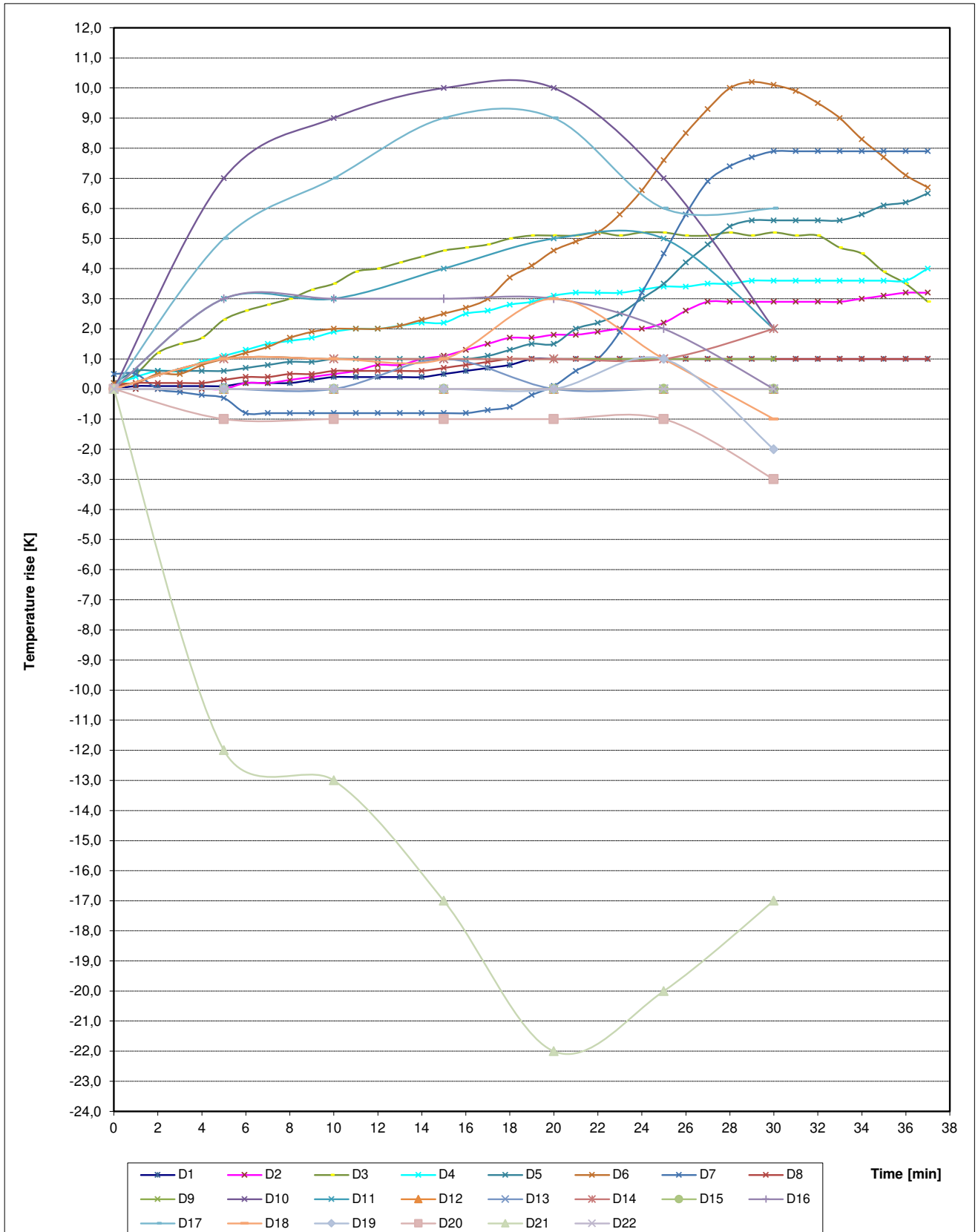
D9 - D22 deflection of door measured manually by ruler

Positive values of deflection represent deflection to the heat stress.

Negative values of deflection represent deflection from the heat stress.

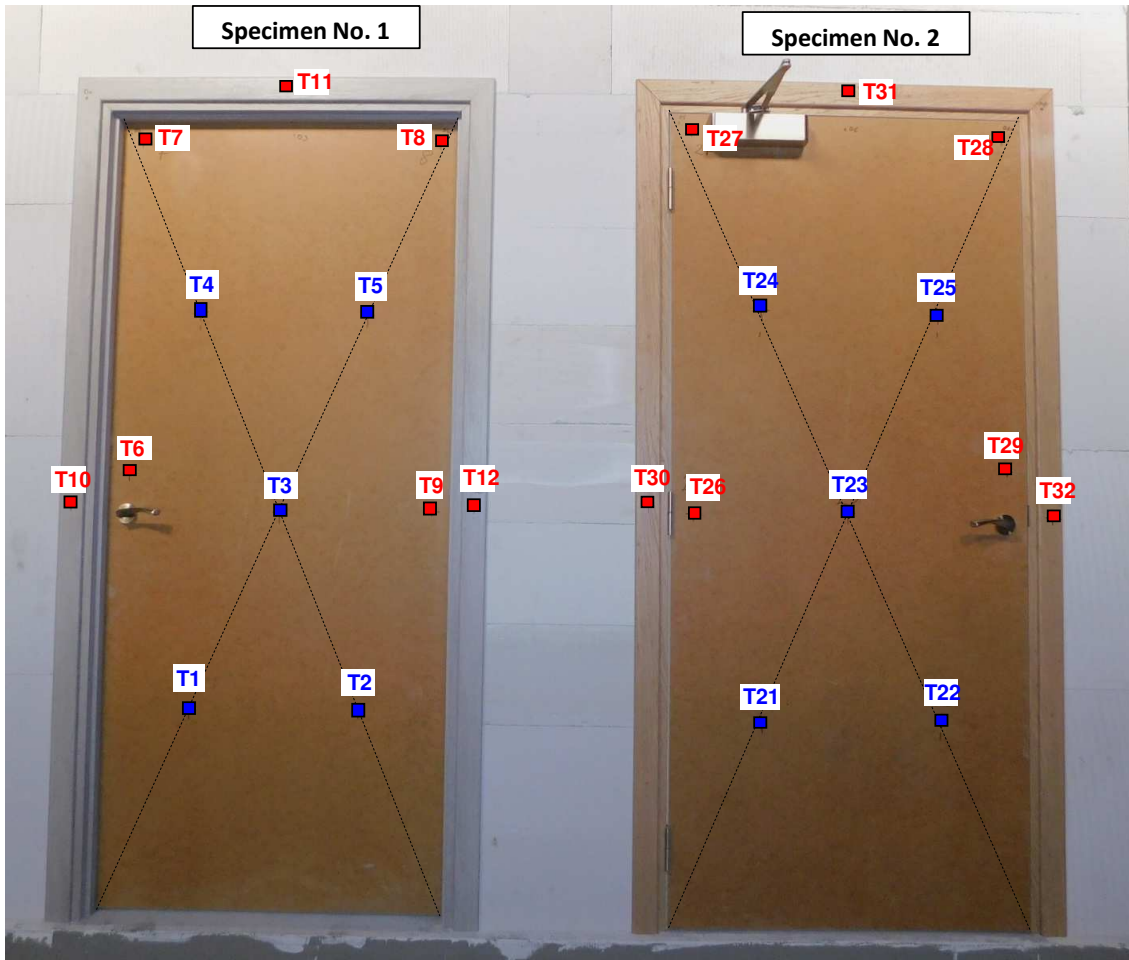


**Deflection of the specimens / graph**





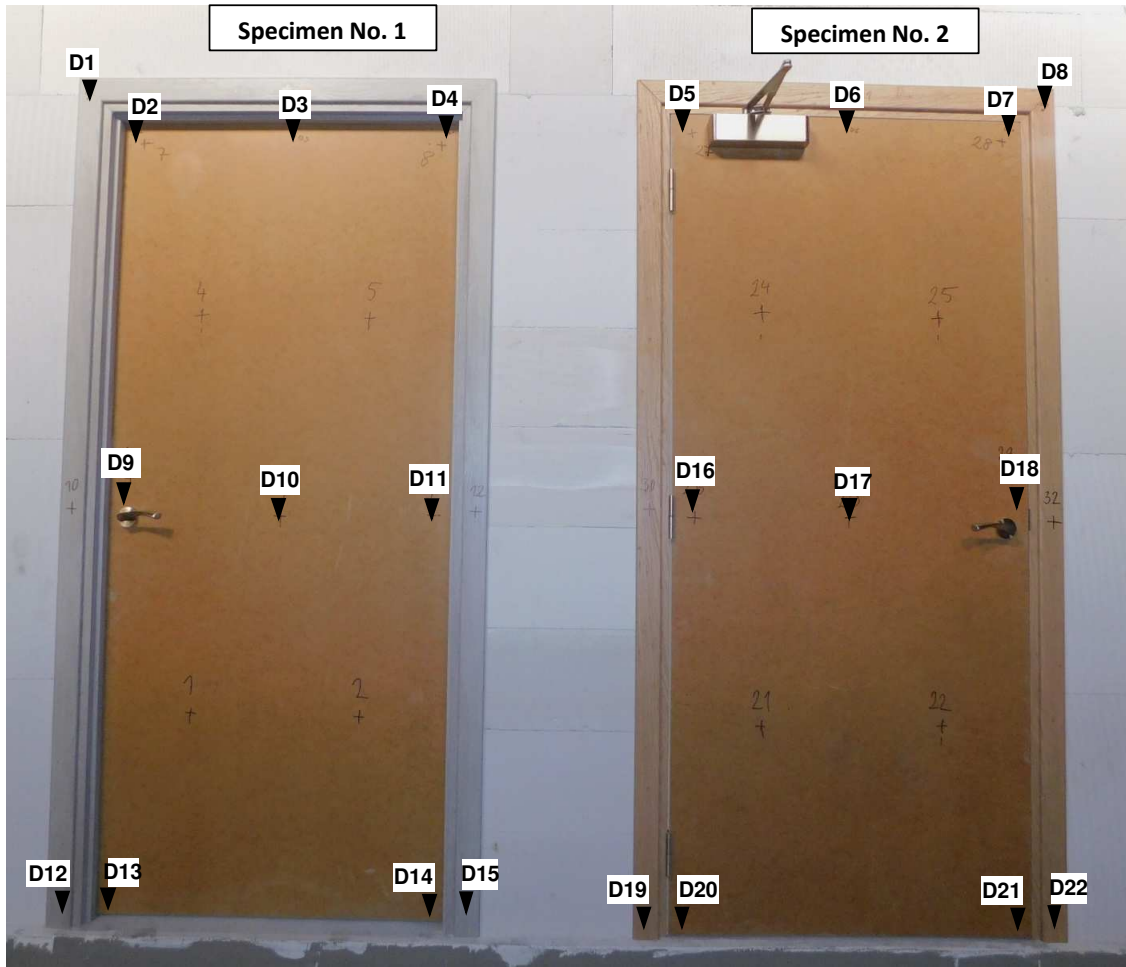
**Layout of measuring points on the unexposed specimens surface**



- Thermocouples attached for the average and maximum temperature rise evaluation according to BS 476-22
- Thermocouples attached for the maximum temperature rise evaluation according to BS 476-22



**Specimen deflection - layout of the measuring points**



**Deflection [mm] - specimen deflection**

- ▼ D1 to D8 Deflection measured with cable position transducer
- ▼ D9 to D22 Deflection measured by laser beam





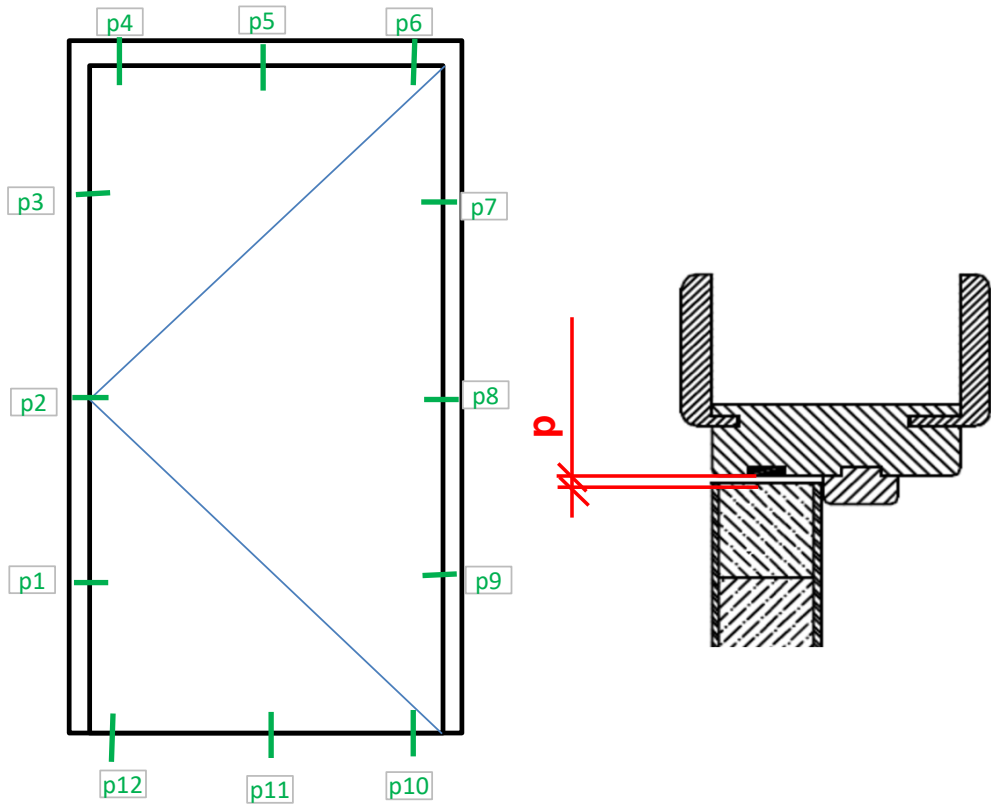
**Measured and calculated values of gaps around the perimeter of door leaves**

Specimen No. 1

Place of measurement "p"	Measured values [mm]			Mean [mm]	Maximum [mm]
	p1	p2	p3		
Lock edge of door leaf	p1: 3,3	p2: 3,5	p3: 3,3	3,4	3,5
Upper edge of door leaf	p4: 3,3	p5: 3,5	p6: 3,0	3,3	3,5
Hinged edge of door leaf	p7: 4,4	p8: 4,1	p9: 4,3	4,3	4,4
Bottom edge of door leaf	p10: 5,8	p11: 5,9	p12: 6,2	6,0	6,2

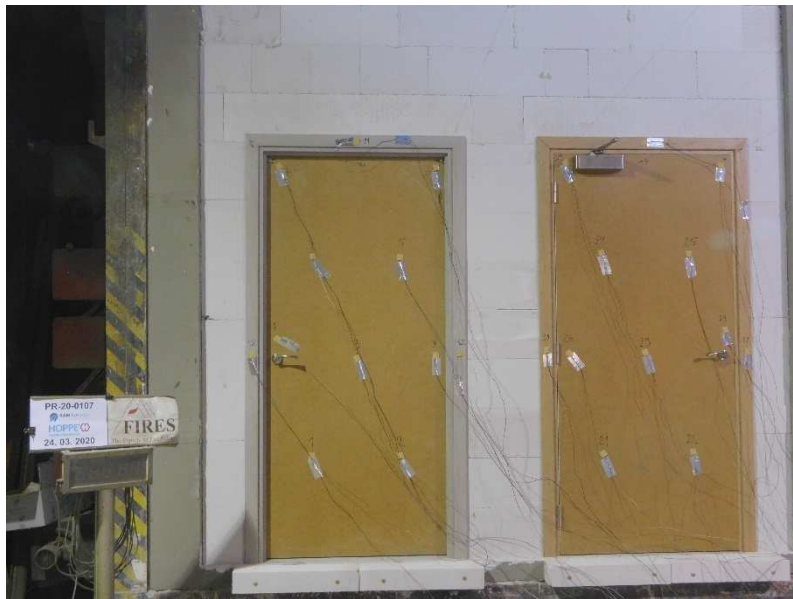
Specimen No. 2

Place of measurement "p"	Measured values [mm]			Mean [mm]	Maximum [mm]
	p1	p2	p3		
Lock edge of door leaf	p1: 2,7	p2: 3,3	p3: 3,0	3,0	3,3
Upper edge of door leaf	p4: 3,1	p5: 2,4	p6: 1,3	2,3	3,1
Hinged edge of door leaf	p7: 3,5	p8: 3,7	p9: 3,6	3,6	3,7
Bottom edge of door leaf	p10: 6,0	p11: 5,9	p12: 6,1	6,0	6,1





PHOTOS TAKEN DURING THE TEST



View of test specimens before test commencement.



4<sup>th</sup> minute of the test.



10<sup>th</sup> minute of the test.



PHOTOS TAKEN DURING THE TEST



16<sup>th</sup> minute of the test.



25<sup>th</sup> minute of the test.



32<sup>nd</sup> minute of the test.



PHOTOS TAKEN DURING THE TEST



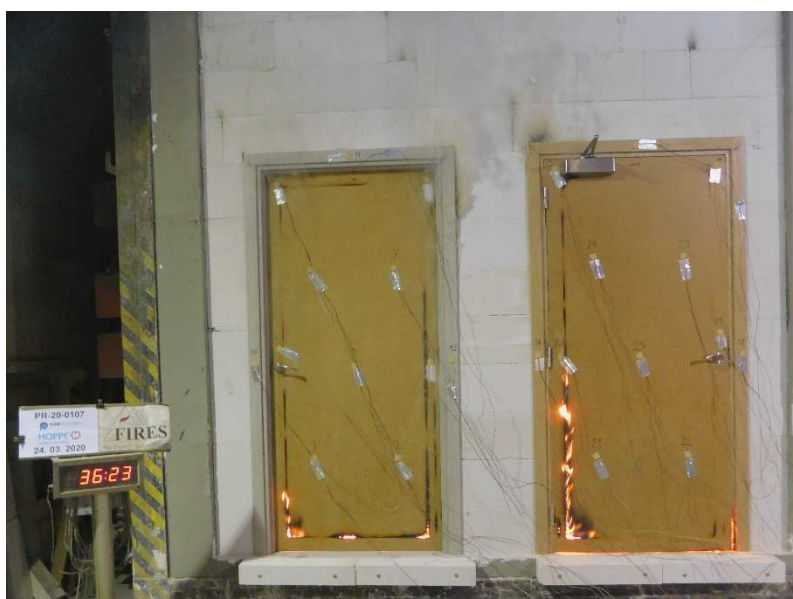
34<sup>th</sup> minute of the test.



36<sup>th</sup> minute of the test.

Specimen No. 2

Sustained flaming in the lower left part of the door leaf – **integrity failure;**



37<sup>th</sup> minute of the test.

Specimen No. 1

Sustained flaming in the lower left part of the door leaf – **integrity failure;**



PHOTOS TAKEN DURING THE TEST



38<sup>th</sup> minute of the test.

Termination of the test.



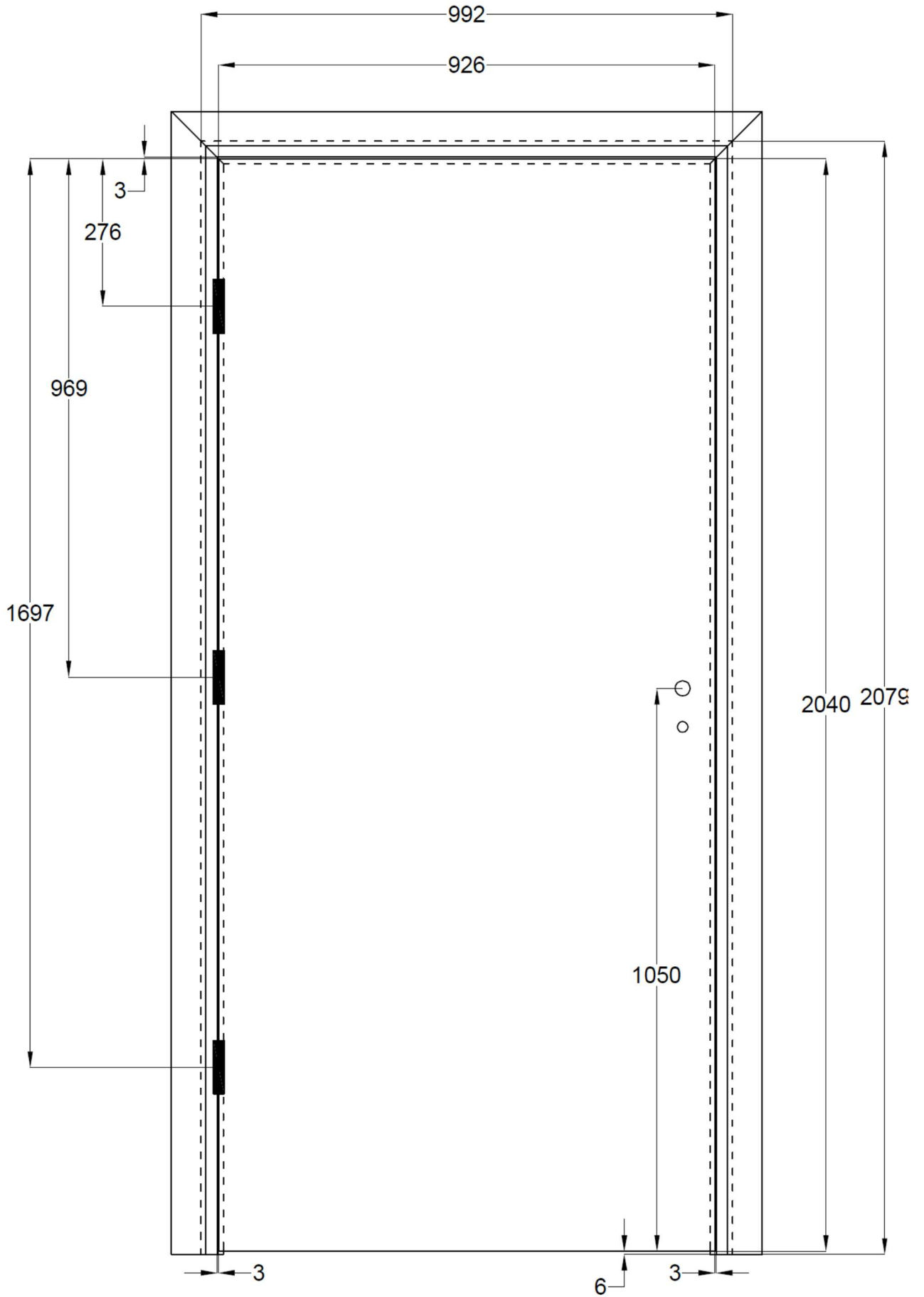
Unexposed specimen face after the termination of the test.



Exposed specimens face after the termination of the test.

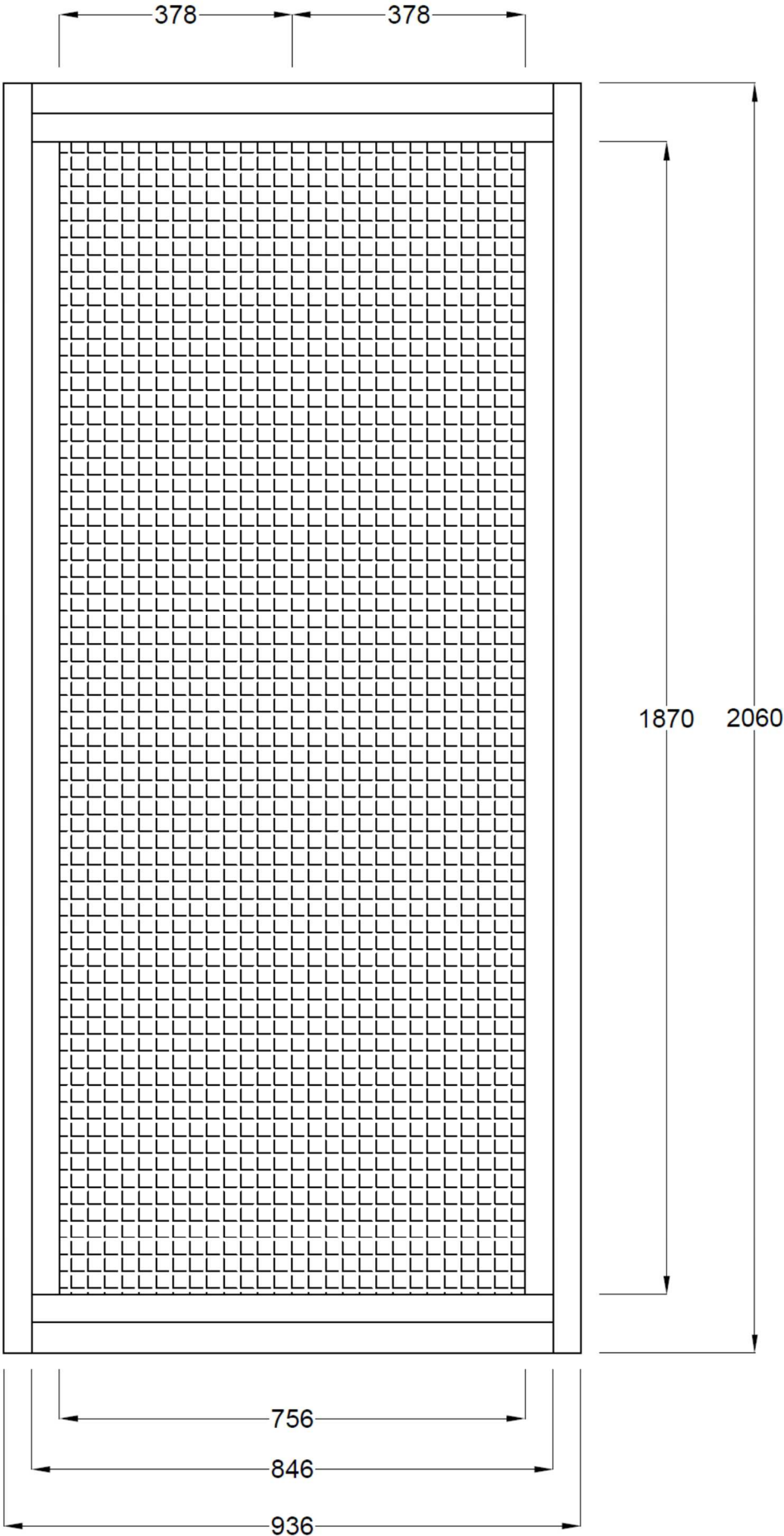


DRAWINGS



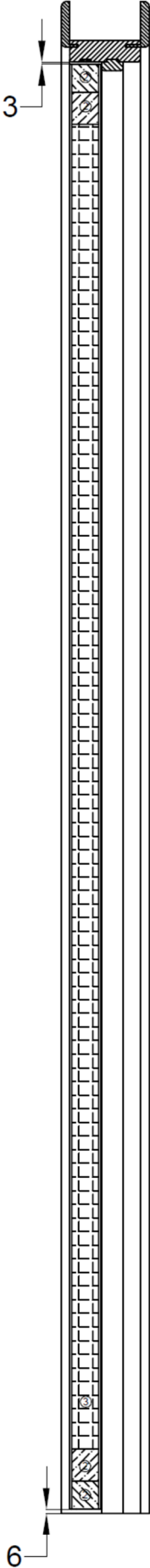


**DRAWINGS**





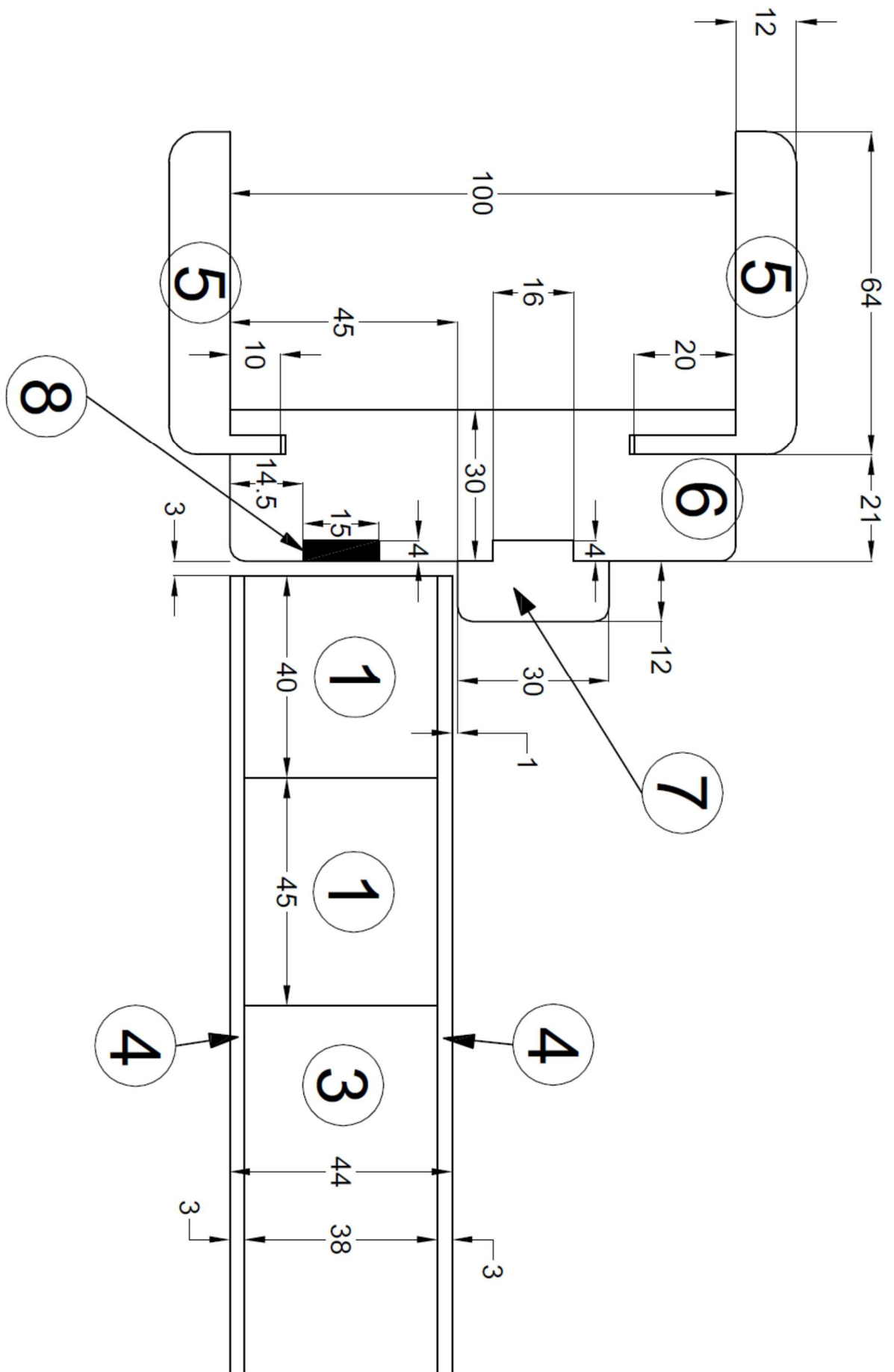
**DRAWINGS**





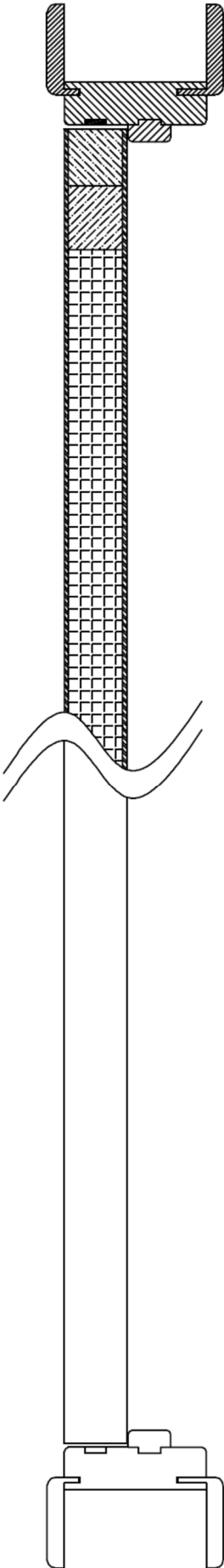


DRAWINGS





**DRAWINGS**



**DRAWINGS****NOTES**

1. Stiles
  - a) Inner 38 thick 45 high - Softwood
  - b) Outer 38 thick 40 high - Softwood
2. Rails Top and Bottom
  - a) Inner 38 thick 45 high - Softwood
  - b) Outer 38 thick 40 high - Softwood
3. Core - H-Flachs Flaxboard 38
4. HDF-3 thick - Facings
5. MDF-12 thick - Architraves
6. MDF-30 thick - Frame
7. MDF-16 thick - door stop
8. Intumescent seal 15/4 , 14.5 mm from the beginning of the frame



## 8. FINAL PROVISION

- This report details the method of construction, the test conditions and results obtained when the specific element of construction described herein was following the procedure outlined in BS 476-20. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report.
- Because of the nature of the fire resistance testing and consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.
- The test results refer only to the tested subjects. This test report is not an approval of the tested product by the test laboratory or the accreditation body overseeing the laboratory's activities. The test was carried out on testing equipment that is the property of FIRES, s.r.o., Batizovce. Without the written permission of the test laboratory this test report may be copied and/or distributed only as the whole. Any modifications of the test report can be made only by the fire resistance test laboratory FIRES, s.r.o., Batizovce.

Approved by:

Ing. Štefan Rástocký  
leader of the testing laboratory



Prepared by:

Ing. Miroslav Hudák  
technician of the testing laboratory

## 9. NORMATIVE REFERENCES

BS 476-20: 1987  
Incorporating Amendment No. 1  
and Corrigendum No. 1  
BS 476-22: 1987  
Incorporating Corrigendum No. 1

Fire tests on building materials and structures – Part 20: Methods for determination of the fire resistance of elements of construction (general principles)  
Fire tests on building materials and structures – Part 22: Methods for determination of the fire resistance of non-loadbearing elements of construction

**THE END OF THE TEST REPORT**