

TEST REPORT FIRES-FR-177-08-AUNE

Steel single leaf door with panic lock



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Reg. No. 041/S-159

Testing laboratory No. 041/S-159 accredited by
Slovak institute for accreditation service

TEST REPORT

Test report number: FIRES-FR-177-08-AUNE
Tested property: Fire resistance
Test method: STN EN 1634-1/AC: 2007
Date of issue: 26. 09. 2008

Name of the product: Steel single leaf door with panic lock
Manufacturer: Bakircilar Çelik Kapi Alüminyum Mobilya İnşaat Tic. Ve San. Ltd., Şti. Organize Sanayi Yolu döşeme altı Odabaşı Köyü, Antalya, Turkey
Sponsor: Standart BM Trada Belgelendirme A.Ş., İçerenköy Mah. Çayır Yolu Sokak Ay Plaza No:2, Kat:5 Kadiköy, 34752 Istanbul, Turkey

Project No: PR-08-0253
Specimen received: 12. 08. 2008
Date of the fire test: 20. 08. 2008
Technician responsible for the technical side of this report: Michaela Gorlická

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1. INTRODUCTION

This test report contains the results of the test carried out at the testing laboratory of FIRES, s. r. o. in Batizovce. The purpose of the test was acquirement of information for product classification.

No representatives from the sponsor's side witnessed the test.

Test directed by: Marek Gorlický
 Test carried out by: Michaela Gorlická
 Operator: Ján Hurajt

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2. MEASURING EQUIPMENT

Identification number	Measuring equipment	Note
F 90 001	Vertical test furnace for fire testing	-
F 69 005	PLC system for data acquisition and control TECOMAT NS 950	-
F 40 010	Visual and calculating software to PLC TECOMAT NS 950	-
F 40 009	Control and communication software to PLC TECOMAT NS 950	-
F 40 008	SW Control Web 2000	-
F 40 011	Driver Tecomat – CW 2000 (SW)	-
F 71 008 – F 71 009	Transducer of differential pressure (from -50 to +150) Pa	pressure inside the test furnace
F 54 020	Digital calliper (0 – 200) mm	-
F 54 059	Racking meter (0 – 5) m	-
F 69 009	PLC system for data acquisition and climate control TECOMAT TC 604	-
F 60 001 - F 60 009	Sensors for measuring of ambient temperature and relative air humidity	measuring of climatic conditions
F 06 501 - F 06 508	Plate thermometers	temperature inside the test furnace, according to EN 1363-1
F 06 150 - F 06 170	Unsheathed thermocouples type K 2 x 0,5 mm	temperatures on the unexposed face of the specimen
F 06 701	Sheathed thermocouple type K 3 mm	ambient temperature
F 06 001	Unsheathed thermocouple type K, 2 x 0,5 mm	roving thermocouple
F 74 007 – F 74 010	Cable-extension position transducer (0-1250) mm	measuring of deflection
F 54 024	Metallic ruler	measuring of deflection (laser)
F 90 005	Gap gauge for fire resistance testing 25 mm	-
F 90 006	Gap gauge for fire resistance testing 6 mm	-
F 90 007	Frame for supporting the cotton pad (100 x 100) mm for fire resistance tests	-
F 57 002	Digital stop-watch	-
F 72 002	Optical radiometer Schmid-Boelter	measuring of radiation from the unexposed specimen surface
F 96 001	Testing equipment for the repeated opening and closing	mechanical test
F 40 005	Operative SW for repeated opening and closing	mechanical test
F 54 005	Set of plates for measuring of gaps	mechanical test
F 69 003	ALMEMO 2290-8	mechanical test
F 73 001	Tensometer (0 – 500) kg	operating forces

3. PREPARATION OF THE SPECIMEN

Information about tested specimen is stated in the following table:

Place of the specimen production	Bakircılar Çelik Kapi Alüminyum Mobilya İnşaat Tic. Ve San. Ltd., Şti. Organize Sanayi Yolu döşeme altı Odabaşı Köyü, Antalya, Turkey
Production number	062723 / 037012
Date of production	25.07.08
Date of check - out	25.07.08

The test specimen was delivered to the testing laboratory by sponsor in the complete state. Installation of the specimen to the supporting construction was carried out by workers of testing laboratory according to request of sponsor.

4. PREPARATION OF THE TEST

4.1 DESCRIPTION OF THE SPECIMEN STRUCTURE

The test specimen consisted of steel single leaf door with panic lock and steel door frame.

Dimensions of the test specimen:

Dimension of the door leaf: (960 x 2000 x 66,5) mm (width x height x thickness);
 Nominal dimension of door (door opening): (890 x 1940) mm (width x height);
 Weight of specimen: 141,7 kg

Door frame:

Door frame was made of two parts which were made of steel sheets, 1,5 mm thick. The individual parts of door frame were jointed by the rivets placed in spacing 330 mm.

Door leaf:

The door leaf was made of steel sheets, 2 mm thick. Steel sheets were welded around the perimeter of door leaf. There were three cross-ties inside the door leaf, made of steel sheets 2 mm thick shaped U. The cross-ties were placed horizontally on the upper and bottom part of door leaf and in the middle of height of door leaf.

Gasket PE (20 x 8) mm, was placed around the perimeter of door leaf apart from bottom door edge.

Door frame and door leaf was coated by the polyester coating 80 µm.

Core of the door leaf:

Two layers of mineral wool boards type TAŞ YÜNÜ - IZOCAM, each 30 mm thick (pressed to 25 mm) with bulk density 70 kg/m³ (IZOCAM, Turkey). The plaster board Knauf, 12,5 mm thick with bulk density 835 kg / m³ (KNUAF) was placed between layers of mineral wool.

Intumescent tapes:

Intumescent tape (50 x 2) mm (width x thickness) (Seçil Cont, Turkey) was placed around the perimeter of door leaf apart from bottom door edge.

Hinges:

3 pieces of steel hinges type Spring hinges - Hydraulic function (Omni Metaroloji, Turkey)

First upper hinge was placed 225 mm from the upper edge of door leaf.

Second upper hinge was placed 1410 mm from the bottom edge of door leaf.

Lower hinge was placed 230 mm from the bottom edge of door leaf.

Placement of the hinges was measured from the bottom edges of hinges.

Lock:

Panic lock with steel latch Type 30-220 Kale Arco (producer Kale Kilit, Turkey). The panic lock was fixed on the door face without hinges.

Bottom edge of the latch was placed 935 mm from the bottom edge of door leaf.

More detailed information about specimen construction is shown in the drawings which form the appendix of this test report. Drawings were delivered by the sponsor of the test.

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

4.2 DESCRIPTION OF THE SPECIMEN FIXATION TO THE SUPPORTING CONSTRUCTION

Test specimen was fixed to the rigid supporting construction made of aerated concrete blocks, 150 mm thick with bulk density 613 kg/m^3 .

The door frame overlapped supporting construction (detail is visible in the drawings).

Orientation of the test specimen: hinges on the unexposed door face.

Supporting construction, its thickness and type of specimen fixation to the supporting construction and specimen orientation were chosen by the sponsor.

4.3 SPECIMENS INSPECTION

Before the fire resistance test, conformity of drawings and test specimen was checked. Specimen inspection consisted of visual review of the test specimen and used components, review of the specimen function and size verification (main dimensions of specimen, dimension of used intumescent tapes, location of the hinges and lock) and type of specimen fixation.

Measuring of gaps was carried out before the fire test. Measured gaps:

Measuring point	Measured values
hinged edge of door	from 3,7 mm to 3,5 mm
lock edge of door	from 4,2 mm to 6,3 mm
top edge	from 3,6 mm to 6,1 mm

The manufacturer has declared width of gaps $3 \text{ mm} \pm 1 \text{ mm}$ (gaps with intumescent tapes).

4.4 CLIMATIC CONDITIONING OF THE SPECIMEN

Test specimen was stored in the climatic hall and conditioned according to STN EN 1363-1 under the following climatic conditions:

Relative air humidity [%]		Ambient air temperature [°C]	
mean	standard deviation	mean	standard deviation
47,5	3,6	23,5	0,5

4.5 MECHANICAL CONDITIONING

- The mechanical test was carried out according to STN EN 14600 as follows:

§ repeated opening and closing – number of cycles: 5000 cycles.

- The test specimen was subjected to the final setting according to STN EN 1634-1 clause 10.1.4 before the fire test.

Operating forces of the door leaf was not measured, because door was without self-closing mechanism.

5. CARRYING OUT THE TEST

5.1 TEST CONDITIONS

Conditions in the test furnace (temperature – standard time temperature curve, pressure, content of O₂), in the testing room (ambient temperature) corresponded to STN EN 1363-1. Detailed information is shown in appendix of this report, or in Quality records of the testing laboratory.

Values characterizing environment in the testing room directly before the test:

Relative air humidity [%]	Ambient air temperature [°C]
43	21,9

5.2 TEST RESULTS

Measured average and maximum temperatures on the unexposed specimen surface are shown in appendices of the test report.

Time [min:s]	Observation of specimen behavior during the course of the test
03:50	Fuming around the perimeter of the door leaf;
11:00	Fuming around the perimeter of the door frame;
13:30	The PE gasket on the lock door edge fell down;
25:00	The latch of the lock is melted on the exposed door face;
28:00	Darkening of the door frame above door leaf and around the upper hinge;
37:16	Fuming above the door leaf;
45:00	No changes;
70:00	The surface of door frame is black, darkening of the door surface around the perimeter of door, Deflection of the door frame on the upper corner on the hinged side of the door cca 4 cm, no gap was created;

Time [min:s]	Observation of specimen behavior during the course of the test
80:00	Gloving inside the door frame in the place of frame deflection (see the 70 th minute);
90:00	The coat on door frame was falling down;
115:00	No changes;
132:10	Termination of the test.

5.3 EVALUATION OF THE TEST

integrity – <i>sustained flaming</i>	132 minutes no failure
integrity – <i>gap gauges O 6 mm / O 25 mm</i>	132 minutes no failure
integrity – <i>cotton pad</i>	132 minutes no failure
insulation – <i>average temperature (140 K)</i>	61 minutes
insulation – <i>maximal temperature (180 K)</i>	45 minutes
insulation – <i>maximal temperature (180 K) – supplementary procedure</i>	23 minutes
insulation – <i>maximal temperature – door frame (360 K)</i>	55 minutes
radiation [15 kW.m ⁻²]	132 minutes no failure

The test was discontinued in the 133rd minute at the request of sponsor.

6. CLOSING

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 EN 1363-1, and where appropriate STN EN 1363-2. Any signification deviation with respect to size, constructional details, loads, stress, 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 Ltd. 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 Ltd. Batizovce.

Issued by:

Responsible for the technical side of this report:

Ing. Štefan Rástocký
leader of the testing laboratory



Michaela Gorlická
technician of the testing laboratory

7. NORMATIVE REFERENCES

STN EN 1634-1/AC: 2007	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance tests for doors and shutter assemblies. Part 1: Fire doors and shutters
STN EN 1363-1: 2001	Fire resistance tests– Part 1: General requirements
STN EN 1363-2: 2001	Fire resistance tests – Part 2: Alternative and additional procedures
STN EN 14600: 2006	Fire resisting and/or smoke control door sets and operable windows - Requirements and classification

8. LIST OF APPENDICES

Appendix No. 1	Measured values inside the test furnace Appendix
No. 2	Measured values inside the test furnace / graph
Appendix No. 3	Measured values on the unexposed specimen surface
Appendix No. 4	Measured values on the unexposed specimen surface / graph
Appendix No. 5	Calculated values from the measured values on the unexposed specimen surface, radiation and specimen deflection
Appendix No. 6	Calculated values from the measured values on the unexposed specimen surface, radiation and specimen deflection /graph
Appendix No. 7	Layout of the measuring points on the specimen surface
Appendix No. 8 - 12	Photos taken during the course of the fire test and after the termination of the test
Appendix No. 13 - 14	Drawings

Measured values inside the test furnace

Time t [min]	Temperature [°C]											Deviation d _e [%]	Pressure [Pa]	
	Td1	Td2	Td3	Td4	Td5	Td6	Td7	Td8	Tave	Tn	To		p1	p2
0	36,1	33,1	50,6	39,4	33,7	28,3	34,9	25,5	35,2	20,0	21,9	0,0	0,0	0,0
5	565,6	576,7	590,3	612,5	562,5	*	617,3	538,0	580,4	576,2	22,4	-3,2	15,7	-1,2
10	662,5	662,8	668,1	685,0	674,7		719,4	686,8	679,9	678,3	22,9	-1,6	17,3	0,2
15	693,3	700,7	705,9	720,2	707,7		738,7	728,5	713,6	738,5	23,3	-1,4	16,7	-0,2
20	755,1	756,2	755,5	767,8	784,3		802,4	780,1	771,6	781,3	23,4	-1,5	18,5	0,8
25	785,5	786,9	786,3	797,2	818,1		830,4	811,2	802,2	814,6	23,5	-1,4	18,5	0,2
30	817,8	821,8	820,9	829,9	852,2		861,7	841,9	835,2	841,8	23,7	-1,3	18,0	0,6
35	836,9	841,3	840,4	847,9	868,7		877,4	858,8	853,1	864,8	24,0	-1,3	18,4	0,9
40	874,4	883,2	881,9	884,9	895,2		904,2	883,7	886,8	884,7	24,3	-1,2	19,2	1,0
45	894,6	903,9	902,3	903,3	911,5		919,8	901,5	905,3	902,3	24,5	-1,0	18,3	-0,4
50	913,9	922,2	920,7	920,9	930,9		936,1	917,3	923,1	918,1	24,8	-0,8	18,1	0,4
55	917,3	924,1	922,4	923,8	936,5		940,8	927,2	927,4	932,3	24,9	-0,6	19,2	0,3
60	933,4	937,8	934,5	936,3	957,1		959,5	941,1	942,8	945,3	24,9	-0,6	18,6	0,4
65	940,0	946,0	943,1	943,8	961,0		962,4	945,9	948,9	957,3	25,2	-0,6	18,9	0,3
70	954,1	961,0	958,4	957,3	972,2		973,1	953,3	961,3	968,4	25,5	-0,6	19,3	0,2
75	975,0	981,0	978,2	975,2	990,8		988,7	969,5	979,8	978,7	25,7	-0,6	18,5	0,8
80	983,5	990,9	988,3	986,0	996,9		996,7	980,9	989,0	988,4	26,0	-0,5	18,9	0,2
85	983,6	991,2	989,4	987,6	996,3		996,4	983,5	989,7	997,4	26,3	-0,5	18,0	0,0
90	991,8	995,0	990,4	989,4	1009,0		1009,0	991,5	996,8	1005,9	26,6	-0,5	18,3	0,2
95	999,8	1002,0	996,7	995,7	1019,0		1014,0	997,3	1003,6	1014,0	26,3	-0,6	19,0	-0,1
100	1009,0	1012,0	1006,0	1005,0	1031,0		1026,0	1008,0	1014,2	1021,7	26,5	-0,6	18,2	-0,7
105	1014,0	1016,0	1010,0	1009,0	1034,0		1030,0	1011,0	1018,1	1029,0	26,9	-0,6	18,8	-0,1
110	1036,0	1035,0	1029,0	1029,0	1070,0		1053,0	1036,0	1041,6	1036,0	26,7	-0,6	19,5	0,5
115	1025,0	1030,0	1024,0	1023,0	1043,0		1042,0	1029,0	1031,1	1042,6	27,1	-0,6	17,3	-1,8
120	1037,0	1038,0	1031,0	1030,0	1060,0		1052,0	1035,0	1040,7	1049,0	27,5	-0,6	19,1	-0,1
125	1054,0	1054,0	1047,0	1047,0	1078,0		1070,0	1052,0	1057,8	1055,1	27,6	-0,6	19,0	0,6
130	1064,0	1065,0	1058,0	1056,0	1092,0		1080,0	1063,0	1068,2	1061,0	27,6	-0,5	19,0	-0,1
131	1064,0	1065,0	1058,0	1057,0	1088,0		1080,0	1064,0	1068,4	1062,1	27,6	-0,5	19,0	-0,1
132	1062,0	1062,0	1055,0	1054,0	1084,0		1077,0	1062,0	1065,6	1063,3	27,7	-0,5	18,9	-0,4

Note: * failure of equipment

Tave Average temperature in the test furnace calculated from individual thermometers

Tn Standard temperature in the test furnace laid down according to test guideline

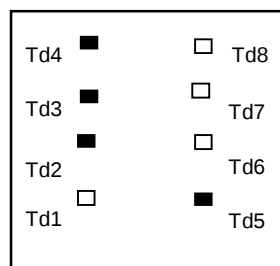
d_e Deviation of the average temperature from the standard temperature calc. acc. to test guideline

To Ambient temperature

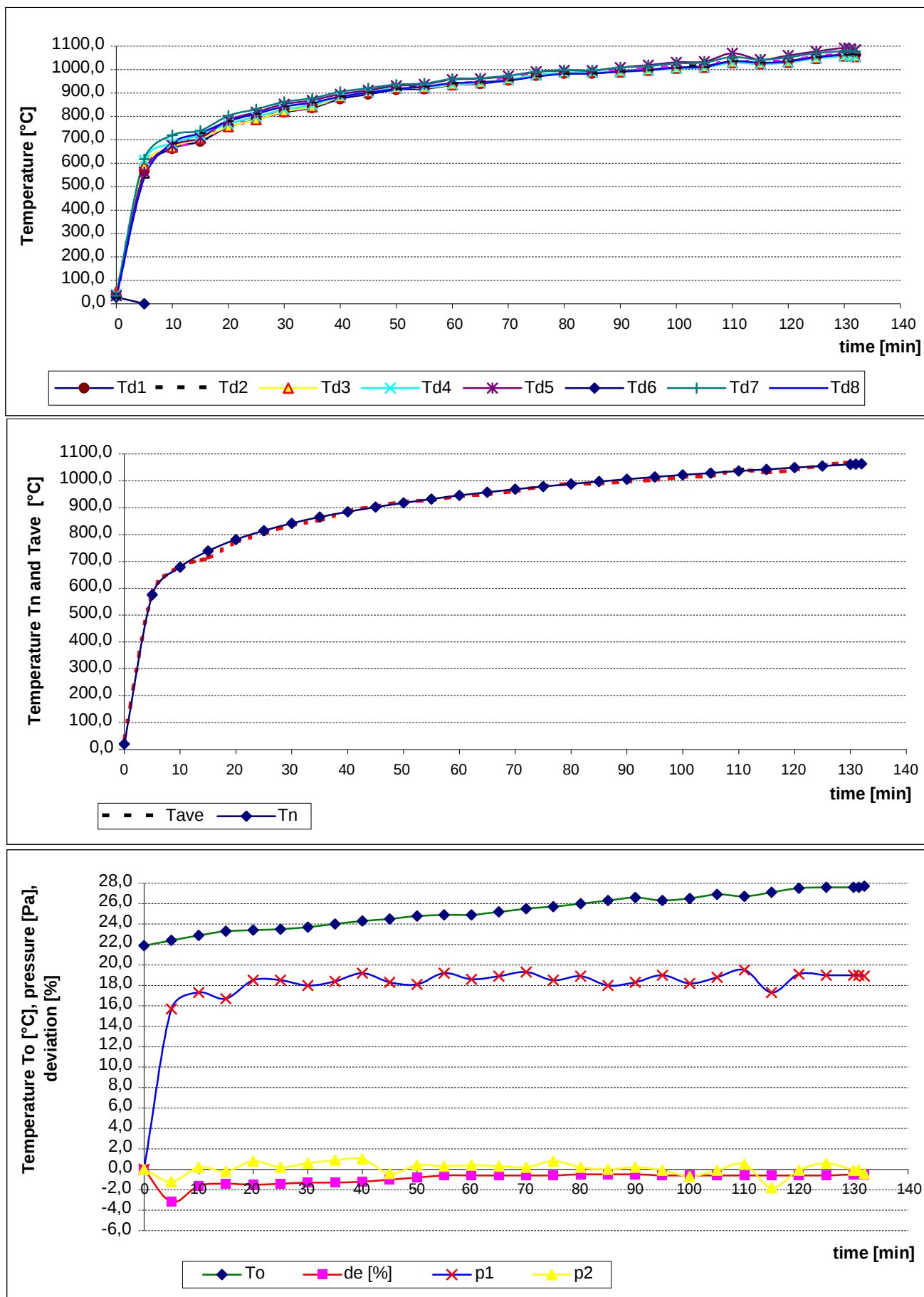
p1 Pressure inside the test furnace measured under the ceiling of test furnace

p2 Pressure inside the test furnace at the height of neutral pressure level 500 mm above test furnace floor

Layout of measuring points in the test furnace:



Measured values inside the test furnace / graph



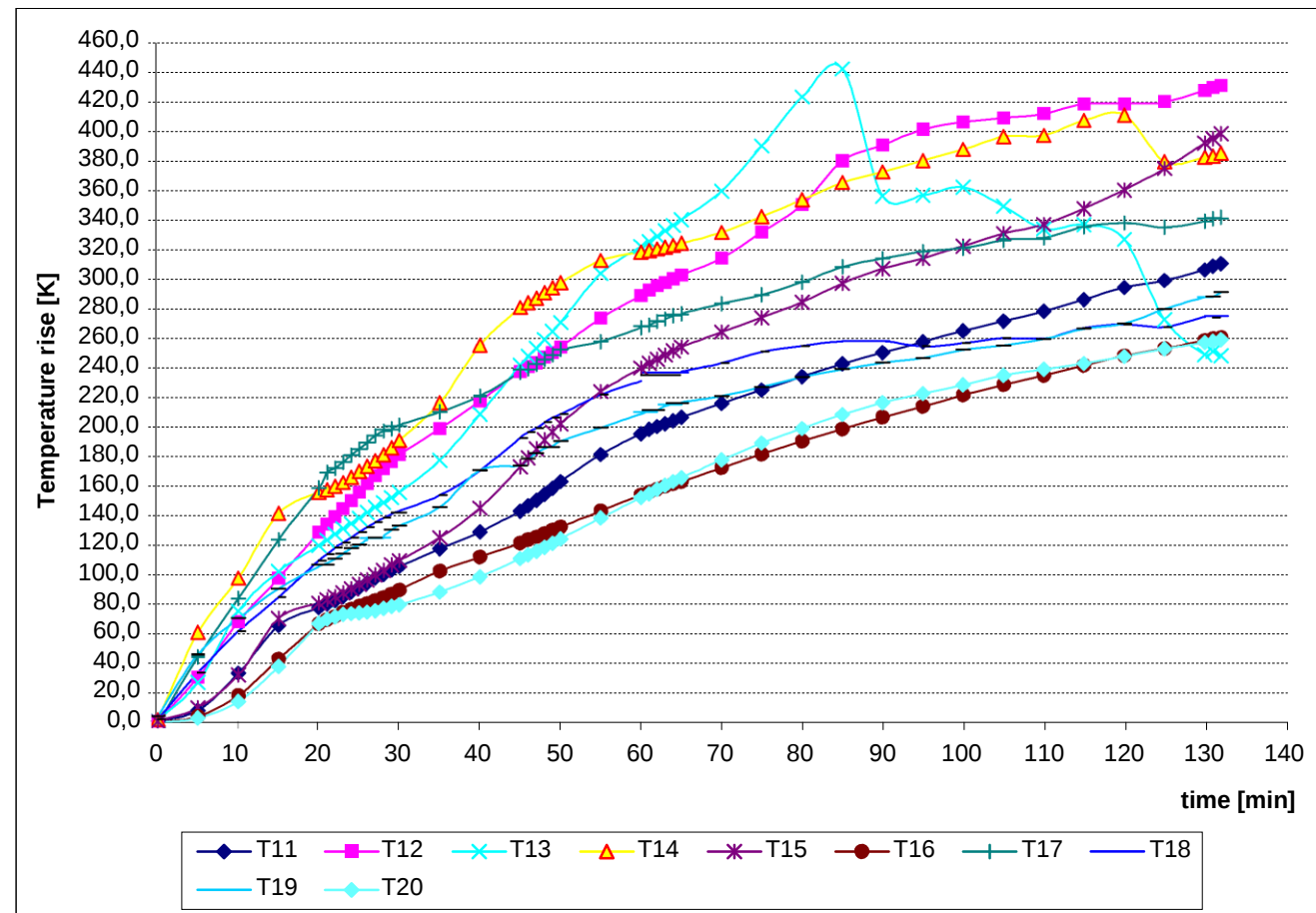
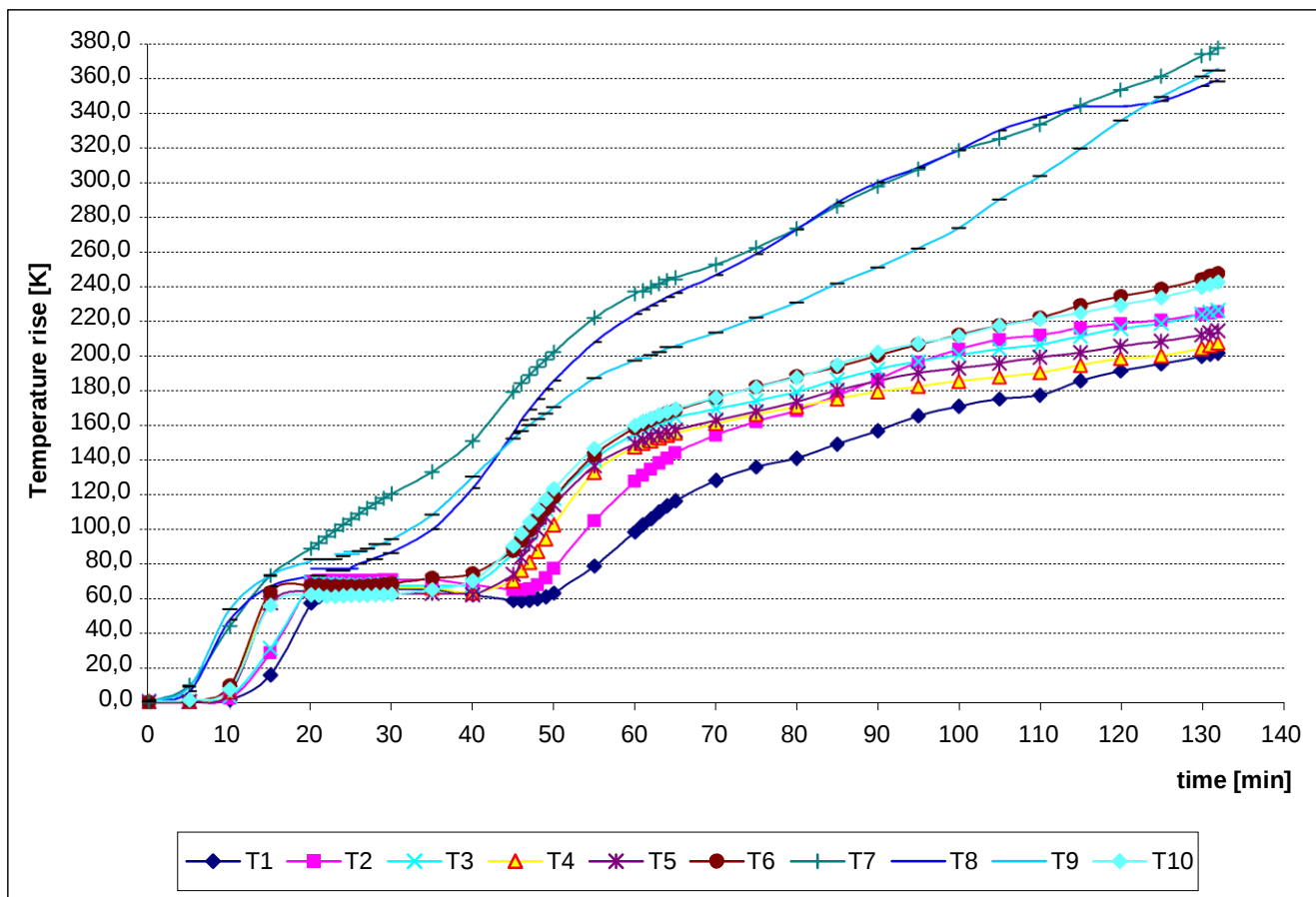
Measured values on the unexposed specimen surfaceThe initial average temperature of the unexposed specimen surface: **22,1 °C**

Time t [min]	Temperature rise [K]																			
	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20
0	0,3	0,4	0,7	0,5	0,2	0,0	0,0	1,1	0,3	-0,1	0,3	0,0	0,4	1,0	-0,1	-0,9	-1,7	1,3	3,3	-0,9
5	0,4	0,4	0,7	0,6	0,2	0,8	9,7	6,2	9,1	1,2	7,3	29,8	26,5	60,4	9,1	3,2	43,7	33,0	45,5	2,2
10	1,4	2,3	3,5	5,9	5,5	9,6	44,1	47,7	53,8	7,5	32,7	67,7	74,9	97,5	31,5	17,5	83,5	61,3	69,9	13,4
15	15,9	28,6	31,2	63,7	57,5	63,7	73,4	67,2	73,5	56,0	65,2	97,4	101,9	141,3	70,0	42,3	123,7	84,5	90,2	37,2
20	57,5	70,1	69,2	67,5	64,5	67,5	89,1	72,9	81,8	62,4	77,2	128,5	119,4	155,7	80,3	66,2	158,6	109,3	105,1	66,5
21	61,0	70,9	69,0	67,3	64,2	67,5	92,4	74,0	82,2	62,0	79,7	133,9	123,2	157,4	82,7	69,1	169,2	113,7	107,5	69,5
22	62,5	70,8	68,7	66,8	63,7	67,2	96,0	74,8	82,7	61,2	82,3	138,9	127,2	159,8	84,6	71,3	172,2	118,0	110,5	70,9
23	63,4	70,9	68,4	66,7	63,6	67,1	99,4	75,8	83,8	61,3	84,9	144,5	131,0	162,4	87,3	74,0	176,2	121,5	113,8	72,7
24	64,0	70,8	68,2	66,4	63,4	67,1	102,9	77,0	84,7	61,7	88,0	150,0	134,5	165,8	90,0	76,2	180,9	124,9	117,8	73,1
25	64,4	70,7	67,9	66,1	63,2	67,0	106,1	78,4	86,2	62,0	91,2	155,8	138,1	169,9	93,0	78,2	185,0	128,5	119,9	73,7
26	64,8	70,6	67,8	65,9	63,2	67,1	109,3	80,2	87,5	61,8	94,2	161,7	142,0	173,4	96,2	79,8	189,7	132,0	123,3	74,3
27	65,5	70,9	67,9	65,8	63,2	67,3	112,5	81,9	89,0	62,0	97,4	167,2	145,6	177,1	99,6	82,0	194,2	135,2	124,6	75,2
28	65,5	70,9	68,2	66,0	63,5	67,6	115,5	83,7	90,8	62,4	100,0	171,8	148,8	181,2	102,7	84,2	197,4	138,4	125,9	76,8
29	65,7	71,0	68,5	66,4	63,2	68,1	118,2	85,4	92,4	62,1	103,0	176,7	152,2	185,9	106,4	86,6	198,9	141,0	130,2	78,2
30	65,7	71,1	68,6	66,7	63,8	68,8	120,8	87,1	94,4	62,6	105,3	181,2	155,6	190,9	109,3	89,1	201,6	143,0	133,2	79,3
35	65,3	71,1	67,8	66,2	63,1	72,0	133,5	100,1	108,7	65,3	117,4	198,9	177,4	216,6	124,9	102,1	210,5	153,6	145,6	87,9
40	62,2	68,0	67,9	63,4	62,3	74,6	151,4	124,1	130,6	70,4	128,7	217,8	208,8	255,8	145,0	111,8	221,2	170,5	170,9	98,3
45	59,0	65,1	86,4	70,2	74,2	87,8	179,9	156,1	152,7	90,6	142,8	237,8	242,3	281,5	172,9	121,3	237,5	192,6	173,8	110,6
46	58,7	65,1	92,1	76,4	83,9	93,6	185,0	163,6	156,9	97,8	146,6	241,1	248,4	284,7	179,3	123,3	239,9	196,5	178,5	113,3
47	59,1	65,7	98,3	81,1	91,7	99,7	189,7	169,8	160,4	104,4	150,2	243,7	253,6	287,7	185,3	125,3	242,9	199,4	182,3	115,6
48	59,9	68,1	105,3	87,4	99,9	106,3	194,3	175,7	164,1	111,6	154,4	247,6	259,6	291,5	191,3	127,5	246,1	203,2	185,6	118,5
49	61,1	72,2	111,8	94,6	107,1	112,4	198,6	181,3	167,2	117,5	158,5	250,6	265,2	294,9	196,8	130,0	249,2	206,5	187,3	121,1
50	63,3	77,6	118,2	102,9	114,3	118,8	202,9	186,5	171,0	123,8	162,9	254,5	271,3	298,4	202,3	132,1	252,8	208,8	190,4	124,0
55	79,0	105,1	140,9	133,1	137,1	143,3	222,8	208,6	187,7	147,1	181,5	274,1	304,6	313,4	224,3	143,1	258,2	222,1	199,6	138,3
60	98,6	128,1	155,7	147,9	150,0	159,0	236,6	224,8	198,2	160,5	195,5	289,6	323,0	319,0	240,3	153,9	267,8	231,5	209,1	152,1
61	102,9	131,7	158,1	149,9	152,2	161,4	238,6	227,4	199,6	162,9	198,4	293,3	326,2	320,2	243,5	155,8	269,4	232,9	211,2	154,7
62	106,3	135,1	159,8	151,6	153,9	163,6	240,6	230,1	201,1	164,8	200,4	296,3	329,8	321,3	246,1	157,9	271,8	234,7	211,8	157,7
63	110,4	138,7	161,8	153,3	155,1	165,7	242,5	232,5	203,0	166,6	202,4	298,4	333,5	322,6	249,2	159,8	273,6	235,3	214,3	160,4
64	113,9	141,5	163,5	154,5	156,7	167,5	244,2	234,8	205,2	168,4	204,4	300,9	337,3	323,6	251,9	161,4	275,7	236,5	216,0	163,0
65	116,8	144,6	165,1	156,0	157,8	169,2	246,0	237,2	206,6	170,0	206,7	303,4	341,1	325,1	254,5	163,0	277,4	237,8	216,8	165,5
70	128,5	155,0	170,1	161,5	163,5	176,5	253,7	247,5	214,2	176,6	216,3	314,9	360,7	332,6	264,7	172,3	284,0	243,5	221,3	177,8
75	136,3	162,7	174,7	166,8	168,4	182,7	263,5	259,8	222,8	182,4	225,4	332,7	391,4	343,4	274,5	181,6	290,1	251,3	227,4	189,3
80	141,5	169,1	179,9	171,2	174,1	188,7	274,4	274,0	231,7	188,1	234,5	351,4	424,7	354,8	285,1	190,5	298,7	255,3	234,1	199,2
85	149,6	177,8	186,8	175,8	180,7	194,5	287,5	289,7	242,7	195,8	243,2	381,3	443,8	366,5	297,9	198,8	309,2	258,4	239,4	208,7
90	157,4	187,2	192,9	180,0	186,4	200,9	299,0	301,2	252,0	203,0	250,6	391,9	357,1	373,6	307,9	206,7	314,8	258,6	243,7	216,6
95	166,0	197,1	197,4	182,9	190,7	207,3	308,9	309,9	263,0	208,1	258,1	402,6	357,9	381,4	314,9	214,0	319,5	255,0	247,0	223,0
100	171,6	204,6	201,2	186,1	193,6	212,8	319,9	320,0	274,8	212,4	265,7	407,7	363,3	389,0	323,1	221,9	321,8	257,2	252,7	228,9
105	175,8	210,2	204,7	188,6	196,5	218,4	326,5	331,4	291,5	218,2	272,2	410,5	350,2	397,6	331,9	228,8	327,0	260,6	255,6	235,2
110	178,0	212,7	207,1	191,1	199,9	222,9	334,8	338,9	305,0	222,0	278,8	413,2	334,8	398,5	337,9	235,1	328,8	260,1	260,0	239,4
115	186,3	216,9	212,2	195,4	202,8	230,0	346,1	345,1	320,8	225,6	286,9	419,9	337,7	408,7	348,7	242,1	336,5	267,5	267,0	243,3
120	192,1	219,6	216,6	199,2	206,5	235,2	355,0	345,3	337,0	230,2	295,1	419,7	327,7	412,4	361,2	248,5	338,9	269,9	270,5	248,0
125	196,0	221,5	219,6	200,8	209,1	239,4	362,9	348,5	350,8	234,5	299,9	421,4	273,2	380,6	376,1	253,5	336,0	268,1	280,3	253,3
130	200,5	224,8	224,9	205,2	212,9	245,1	374,6	357,2	362,6	240,6	307,0	429,0	249,4	383,6	393,4	258,9	340,0	275,1	288,6	257,5
131	201,7	225,5	226,2	206,8	214,1	247,0	376,4	359,0	365,1	242,1	309,6	430,9	251,5	384,4	396,4	260,1	341,7	274,8	288,9	258,5
132	202,4	226,3	227,3	208,3	215,2	248,4	379,3	360,9	367,0	243,5	311,3	432,5	248,8	386,3	399,6	261,0	342,8	276,1	291,8	259,5

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

Layout of the measuring points on the specimen surface is in the appendix 13.

Measured values on the unexposed specimen surface / graph



Calculated values from the measured values on the unexposed specimen surface, radiation and specimen deflection

The initial average temperature of the unexposed specimens surface: **22,1 °C**

Time t [min]	Temperature rise [K]				Radiation [kW.m ⁻²]	Time t [min]	Deflection [mm]						
	TRave1	TRmax1	TRmax-S1	TRmax-F1			D1	D2	D3	D4	D5	D6	D7
0	0,4	1,1	3,3	3,3	0,0	0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
5	0,5	9,7	60,4	45,5	0,0	5	-13,0	14,4	10,3	13,0	16,0	12,0	-12,0
10	3,7	53,8	97,5	83,5	0,1	10	-14,6	9,6	14,0	--	--	--	--
15	39,4	73,5	141,3	123,7	0,2	15	-17,4	7,6	14,1	16,0	17,0	13,0	-10,0
20	65,8	89,1	158,6	158,6	0,2	20	-20,4	-0,3	14,0	--	--	--	--
21	66,5	92,4	169,2	169,2	0,2	25	-24,6	-2,7	14,0	--	--	--	--
22	66,5	96,0	172,2	172,2	0,3	30	-27,9	-4,8	14,0	16,0	17,0	13,0	-12,0
23	66,6	99,4	176,2	176,2	0,3	35	-30,4	-6,6	14,0	--	--	--	--
24	66,6	102,9	180,9	180,9	0,3	40	-32,2	-8,1	14,0	--	--	--	--
25	66,5	106,1	185,0	185,0	0,3	45	-34,3	-10,1	14,0	16,0	21,0	13,0	-18,0
26	66,5	109,3	189,7	189,7	0,3	50	-35,0	-11,5	14,0	--	--	--	--
27	66,7	112,5	194,2	194,2	0,3	55	-35,1	-13,1	14,6	--	--	--	--
28	66,8	115,5	197,4	197,4	0,3	60	-35,1	-13,1	14,9	18,0	21,0	15,0	-19,0
29	67,0	118,2	198,9	198,9	0,3	65	-35,1	-13,1	15,3	--	--	--	--
30	67,2	120,8	201,6	201,6	0,3	70	-35,2	-13,1	16,4	--	--	--	--
35	66,7	133,5	216,6	210,5	0,3	75	-35,6	-13,2	17,3	--	--	--	--
40	64,8	151,4	255,8	221,2	0,3	80	-36,2	-14,1	17,9	--	--	--	--
45	71,0	179,9	281,5	237,5	0,3	85	-36,8	-14,5	18,2	--	--	--	--
46	75,2	185,0	284,7	239,9	0,3	90	-37,3	-14,6	18,4	19,0	22,0	18,0	-21,0
47	79,2	189,7	287,7	242,9	0,3	95	-37,8	-14,5	19,0	--	--	--	--
48	84,1	194,3	291,5	246,1	0,4	100	-38,5	-14,6	19,2	--	--	--	--
49	89,4	198,6	294,9	249,2	0,5	105	-39,0	-14,6	19,4	--	--	--	--
50	95,3	202,9	298,4	252,8	0,6	110	-39,5	-14,6	19,8	--	--	--	--
55	119,0	222,8	313,4	258,2	0,8	115	-40,0	-14,6	20,1	--	--	--	--
60	136,1	236,6	323,0	267,8	0,8	120	-40,2	-14,7	20,1	22,0	23,0	18,0	-21,0
61	139,0	238,6	326,2	269,4	0,8	125	-40,8	-14,7	20,7	--	--	--	--
62	141,3	240,6	329,8	271,8	0,8	130	-41,6	-14,7	20,9	22,0	23,0	18,0	-21,0
63	143,9	242,5	333,5	273,6	0,8	131	-41,7	-14,7	20,9	--	--	--	--
64	146,0	244,2	337,3	275,7	0,9	132	-41,7	-14,7	20,9	--	--	--	--
65	148,1	246,0	341,1	277,4	0,9								
70	155,7	253,7	360,7	284,0	1,0								
75	161,8	263,5	391,4	290,1	1,1								
80	167,2	274,4	424,7	298,7	1,2								
85	174,1	289,7	443,8	309,2	1,3								
90	180,8	301,2	391,9	314,8	1,3								
95	186,8	309,9	402,6	319,5	1,3								
100	191,4	320,0	407,7	321,8	1,4								
105	195,2	331,4	410,5	327,0	1,4								
110	197,8	338,9	413,2	328,8	1,4								
115	202,7	346,1	419,9	336,5	1,6								
120	206,8	355,0	419,7	338,9	1,6								
125	209,4	362,9	421,4	336,0	1,6								
130	213,7	374,6	429,0	340,0	1,7								
131	214,9	376,4	430,9	341,7	1,7								
132	215,9	379,3	432,5	342,8	1,7								

TRave1 average temperature rise above initial average temperature calculated from T1 to T5

TRmax1 maximum temperature rise above initial average temperature calculated from T1 to T10

TRmax-S1 maximum temperature rise above initial average temperature calculated from T1 to T20 - supplementary procedure

TRmax-F1 maximum temperature rise above initial average temperature calculated from T16 to T20 - door frame

Radiation [kW.m⁻²] Radiation measured 500 mm from the centrum of unexposed door surface

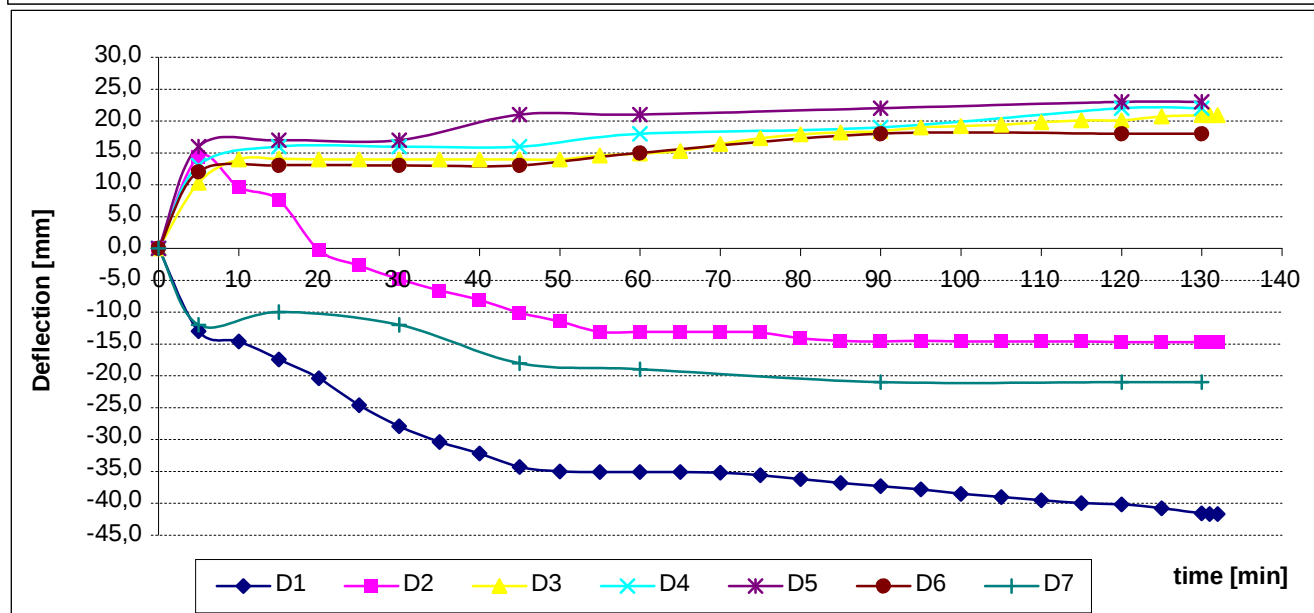
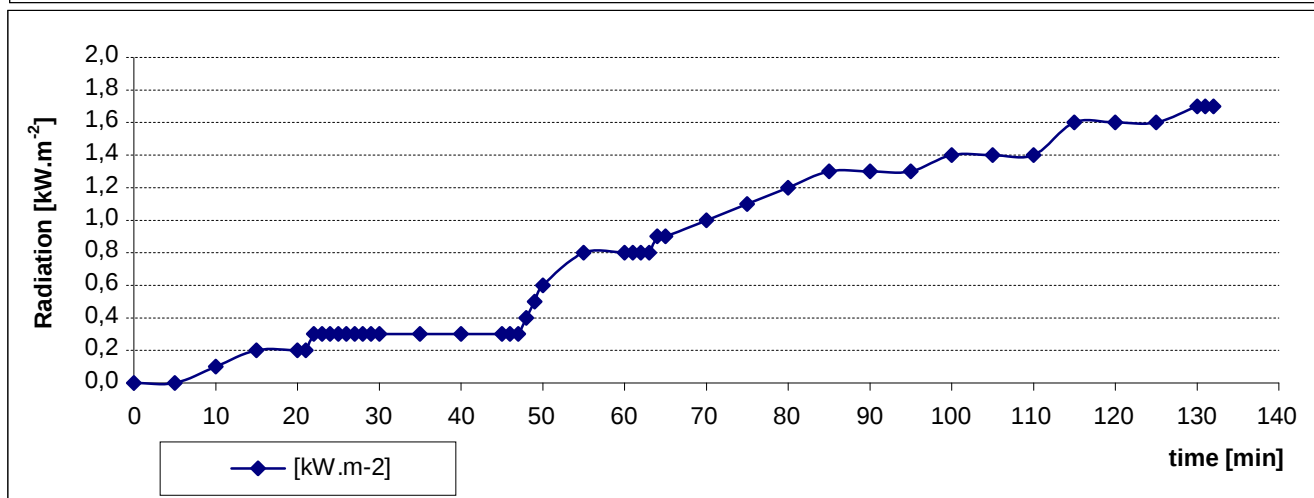
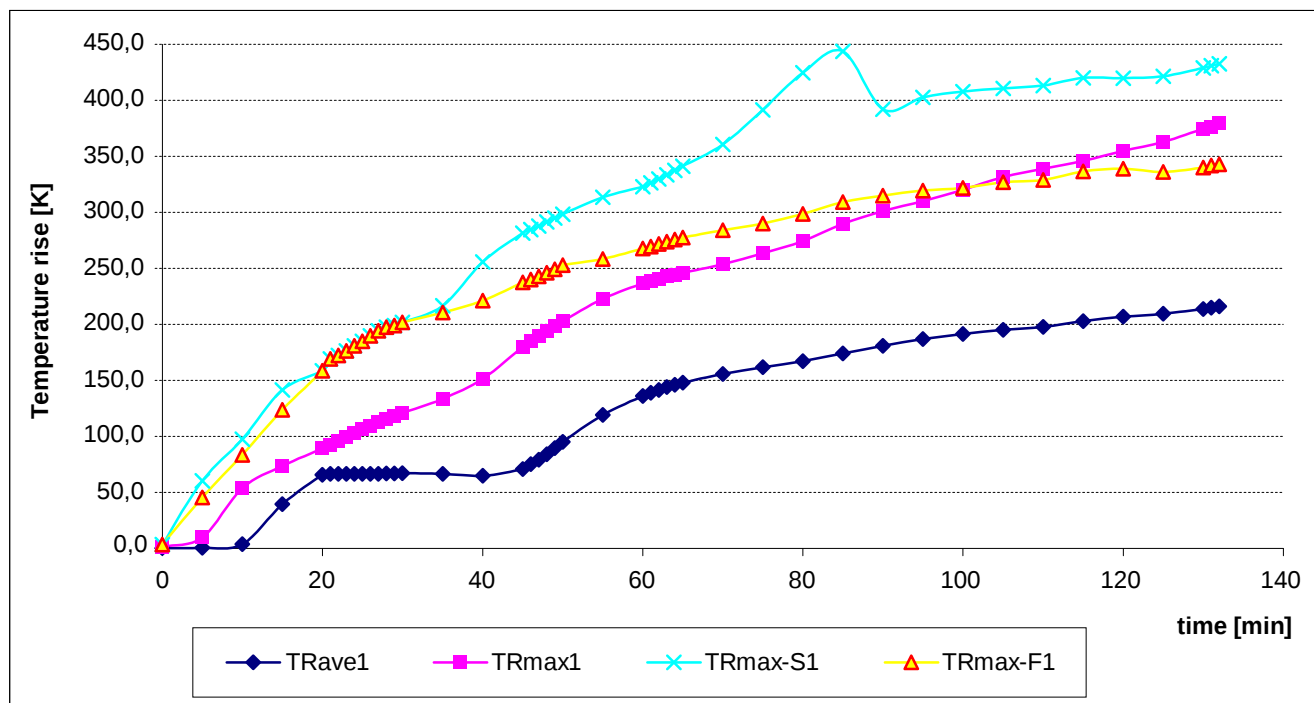
Deflection [mm] of the specimen

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

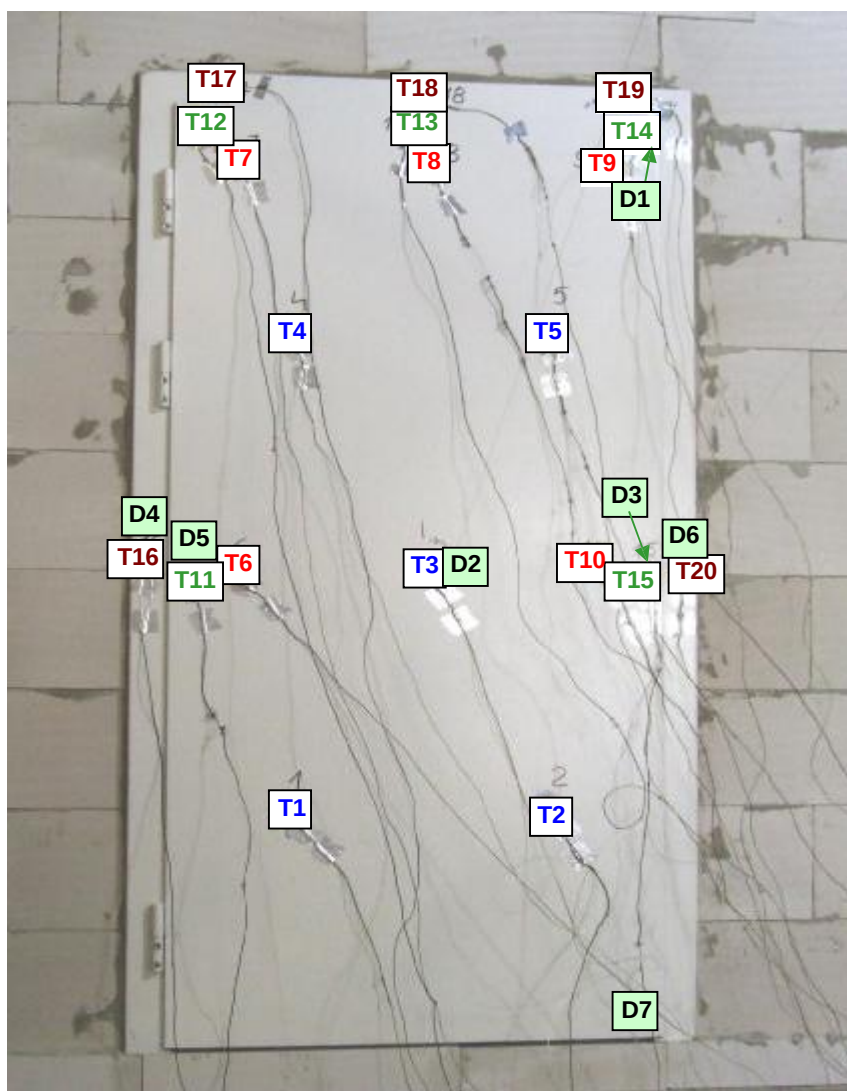
Positive values of deflection represent deflection to the heat stress.

Negative values of deflection represent deflection from the heat stress

Calculated values from the measured values on the unexposed specimen surface, radiation and specimen deflection / graph



Layout of the measuring points on the specimen surface



- Thermocouples attached for the average and maximum temperature rise evaluation
- Thermocouples attached 100 mm from door edges for the maximum temperature rise evaluation
- Thermocouples attached 25 mm from door edges for the maximum temperature rise evaluation (supplementary procedure)
- Thermocouples attached for the maximum temperature rise evaluation (on the door frame)
- D Measuring points of specimen deflection

Photos taken during the course of the fire test and after the termination of the test



Photos of the exposed door face before the fire test.



PE gasket

Intumescent tape.



Door hinge



1st minute of the test



15th minute of the test



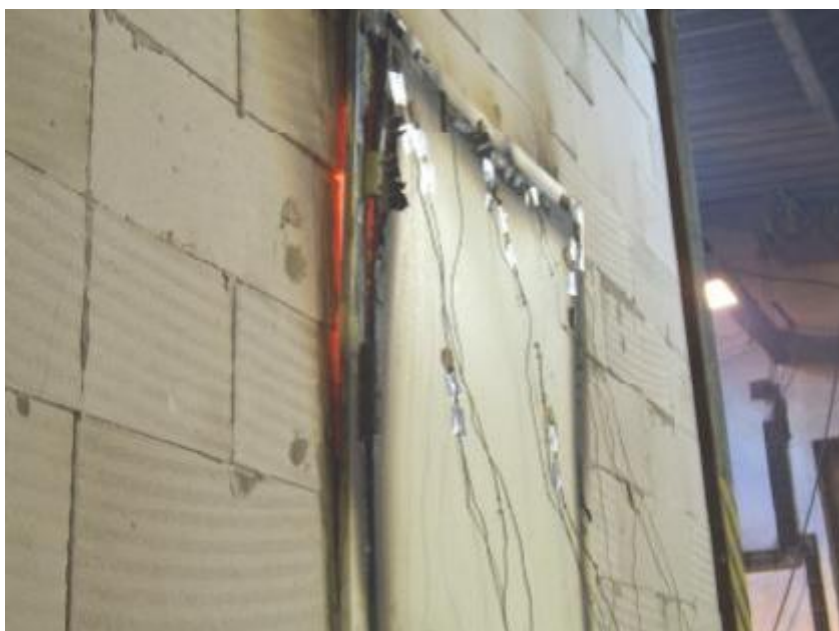
15th minute of the test
Exposed door face – lock.



40th minute of the test



95th minute of the test



95th minute of the test
View of the door deflection. No gap to the test furnace was created, only steel sheets were glowing.



111th minute of the test



133rd minute of the test
Termination of the test.



Exposed door face after the
termination of the test.



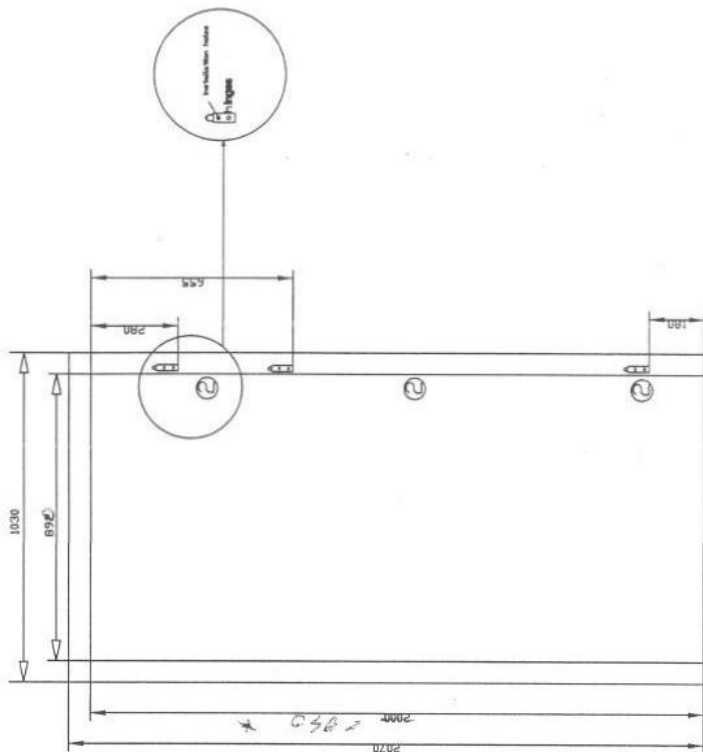
Exposed door face after the termination of the test – lock.



Core of the door leaf after removing of steel sheet from the unexposed door face.

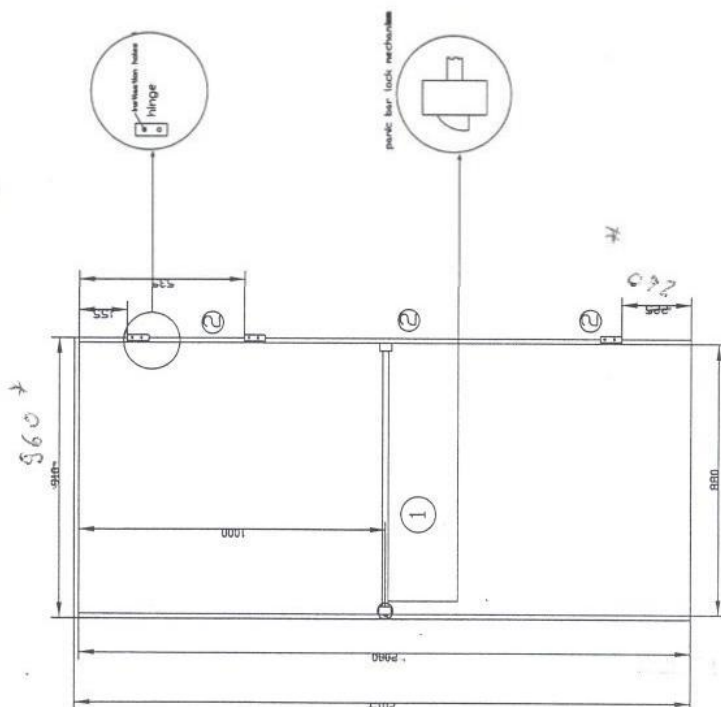


FIRE EXIT DOOR FRAME



② HINGES

FIRE EXIT DOOR LEAF



① PANIC BAR

② HINGES

	Dátum/Date 22.08.2008
	Podpis/Signature <i>[Signature]</i>
Dokument č. FIRES-FR-197-08-AWE	
Príloha č./Appendix Nb. 13	

