

NEAO GMT HARDWARE ENTERPRISE CO., LTD.

TEST REPORT

SCOPE OF WORK

EN 1634-1:2014+A1:2018 TESTING ON Floor Spring w/o Oil, MODEL OF NF-168

REPORT NUMBER

190201002SHF-001-R1

ISSUE DATE

05/06/19

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05/06/19

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2019/5/6

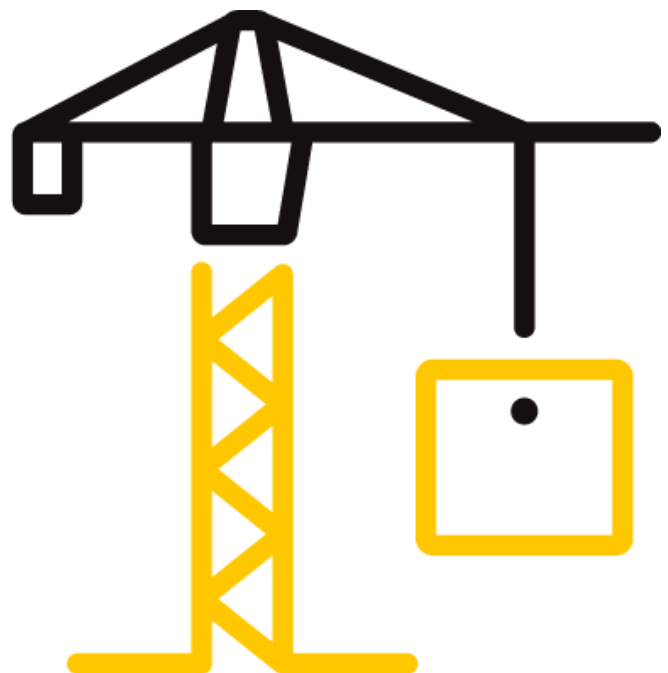
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REPORT ISSUED TO

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SECTION 1

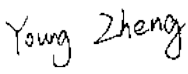
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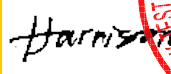
Intertek has conducted an evaluation for Neao GMT Hardware Enterprise Co., Ltd. to determine the fire resistance characteristics of Floor Spring w/o Oil, Model of NF-168. This evaluation began on February 25, 2019 and was completed on May 06, 2019. The test was conducted on April 24, 2019.

The test was conducted in accordance with EN 1634-1:2014+A1:2018, Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and openable windows.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

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SECTION 2 TEST RESULTS

Product Name: Floor Spring w/o Oil
Series/Model: NF-168

The test assembly satisfied the performance requirements for the following periods:

PERFORMANCE CRITERIA	RESULTS
Integrity	Sustained flaming 260 minutes
	Gap gauge 260 minutes
	Cotton pad 260 minutes
Insulation	19 minutes

The test was discontinued after a period of 260 minutes at the request of the sponsor.

SECTION 3 TEST METHOD

The specimen was evaluated in accordance with the following:

EN 1634-1:2014+A1:2018, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and openable windows*

EN 1363-1:2012, *Fire resistance test – Part 1: General Requirements*

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SECTION 4

MATERIAL SOURCE/INSTALLATION

A description of the test assembly is given in the table below. The description of the specimen is based on a survey of the specimen and information provided by the sponsor of the test. All values quoted below are nominal, unless tolerances are given.

Door	Type	Single Leaves Single Action Swing Steel Fire Door Assembly					
	Nominal Size	838mm wide by 2055 mm high by 50 mm thick					
	Facing	Material	1.2mm Q235A Galvanized steel sheet				
	Stiffener	Steel stiffener:	22 mm wide, 1.4 mm thick Q235A steel, Spacing: 155 mm				
		Edge Channel Steel:	22 mm x 3 mm, Q235A galvanized steel sheet				
	Core	Material:	Aluminum silicate wool				
		Density:	120kg/m ³				
Frame	Nominal Size		942 mm wide	2117 mm high	150 mm thick		
	Material		1.4mm thick Q235A Galvanized steel sheet				
Hardware	Lock	Lock type:	OT-LZ				
		Lock case size:	235mm x 85.5mm x 20mm				
		Backset:	55mm	Latch throw:	12mm		
		Latch Operation:	Latch:	Engaged	Dead Bolt:	Disengaged	
	Floor spring w/o oil	model:	NF-168				
		Manufacturer:	Neao International Co., Ltd				
		Manufacture address:	5F. GIFC II, No. 1438, Hongqiao Road, Changing District, Shanghai 201103, China				
		Brand Name:	Neao				

The sample ID number assigned by the test lab is S190201002SHF.001.

The drawings of fire door assembly, hardware and test wall construction can be found in Section 6, 7 and 8 respectively.

The test assembly was installed in a steel restraint frame. The test door was built into a concrete masonry unit partition, with fully mortared joints. The test assembly was moved in front of the furnace for the fire exposure. Prior to the commencement of the EN 1634-1 fire test, the specimen to be test was checked for operability in the fire test frame by operating from fully closed to fully open, for 25 cycles. The test measurement data was shown in Section 9.

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The test door can either open away from or into the furnace.

The nominal dimensions of the test wall were 3 m high by 2 m wide.

After positioning the assembly frame over the furnace opening, the burners were ignited, and the timer was started. Temperatures within the furnace were monitored using thermocouples and the data was recorded. The burners were controlled to keep the furnace temperatures within the allowable limits specified in the test standards. After 5 minutes, the furnace pressure was adjusted so that the neutral plane was established at a maximum of 500 mm above notional floor level. Periodic observations were made of the surfaces of the test assembly during the fire resistance test.

Door deflection relative to the frame, where applicable, was monitored throughout the test. Position for measurement of deflection and unexposed temperature was presented in the drawing of Section 9

SECTION 5 TEST RESULTS

Integrity

The assembly withstood the fire resistance test without passage of flame or gases hot enough to ignite cotton waste for 260 minutes. No through openings or penetrations were evident on assembly at this 260-minute fire exposure portion of the test and the door latch remained engaged to the strike. During this 260-minute fire exposure period no significant flaming was observed on the unexposed face of the assembly.

After exposed to the fire for a period of 260 minutes, the test was discontinued at the request of the sponsor.

This assembly therefore met the criteria of the test standards for integrity performance of 260 minutes.

Insulation

Transmission of heat through the assembly during the fire resistance test of 19 minutes did not raise the average temperature on the unexposed surface by more than 140°C above its initial value and did not raise the maximum temperature on the unexposed surface by more than 180°C above the initial mean unexposed face temperature. In addition, the transmission of heat through

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the assembly did not raise the maximum temperature of the unexposed surface of the frame by more than 360°C for 19 minutes.

After exposed to the fire for a period of 19 minutes, the mean temperature on unexposed surface increased by more than 140°C, insulation failure was deemed to occur.

This assembly therefore met the criteria of the test standards for insulation performance of 19 minutes.

A full set of test data is included in Section 10, and photographs have been presented in Section 11.

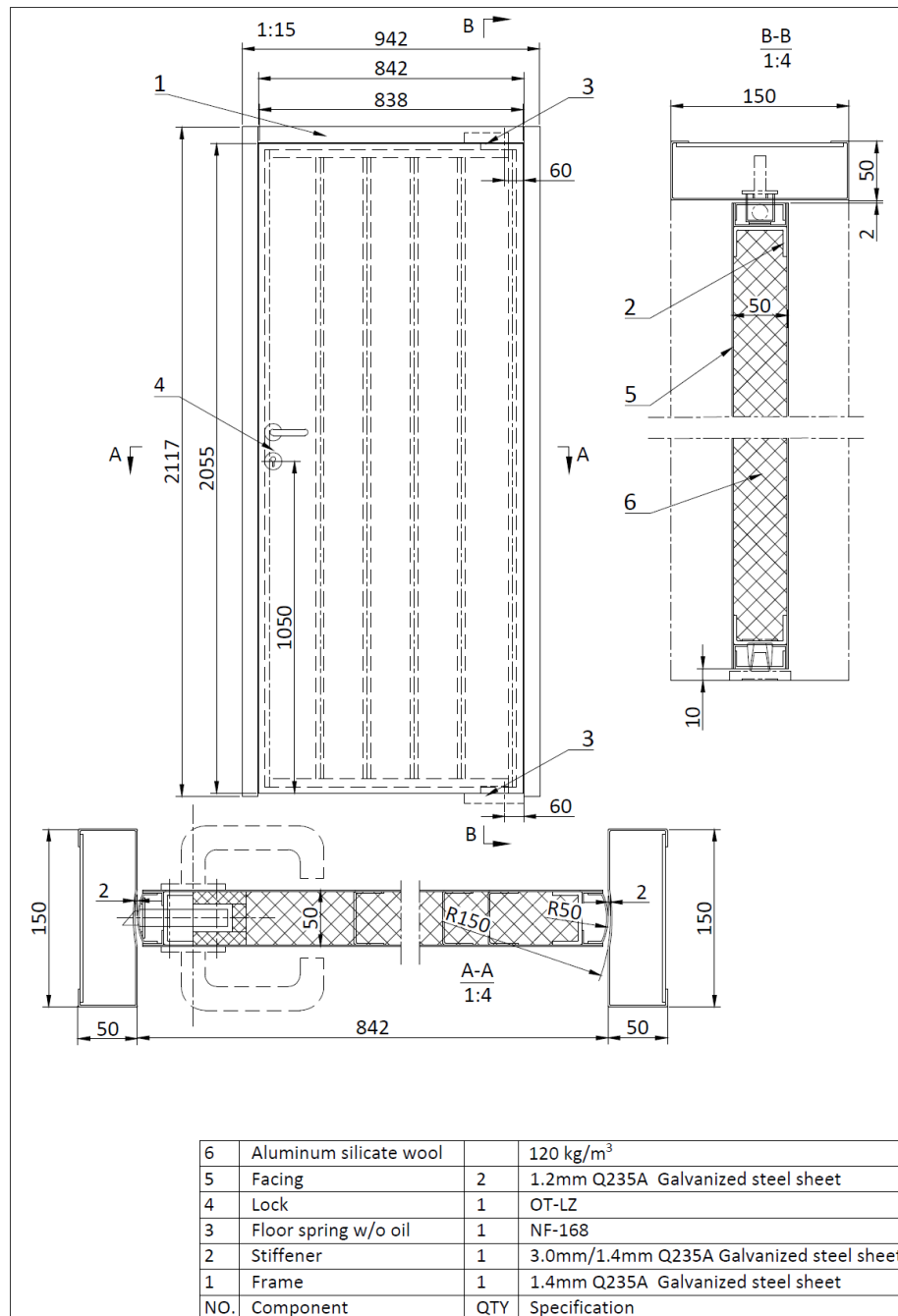
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SECTION 6

FIRE DOOR ASSEMBLY DRAWING



Drawing of Double Action Swing Steel Fire Door

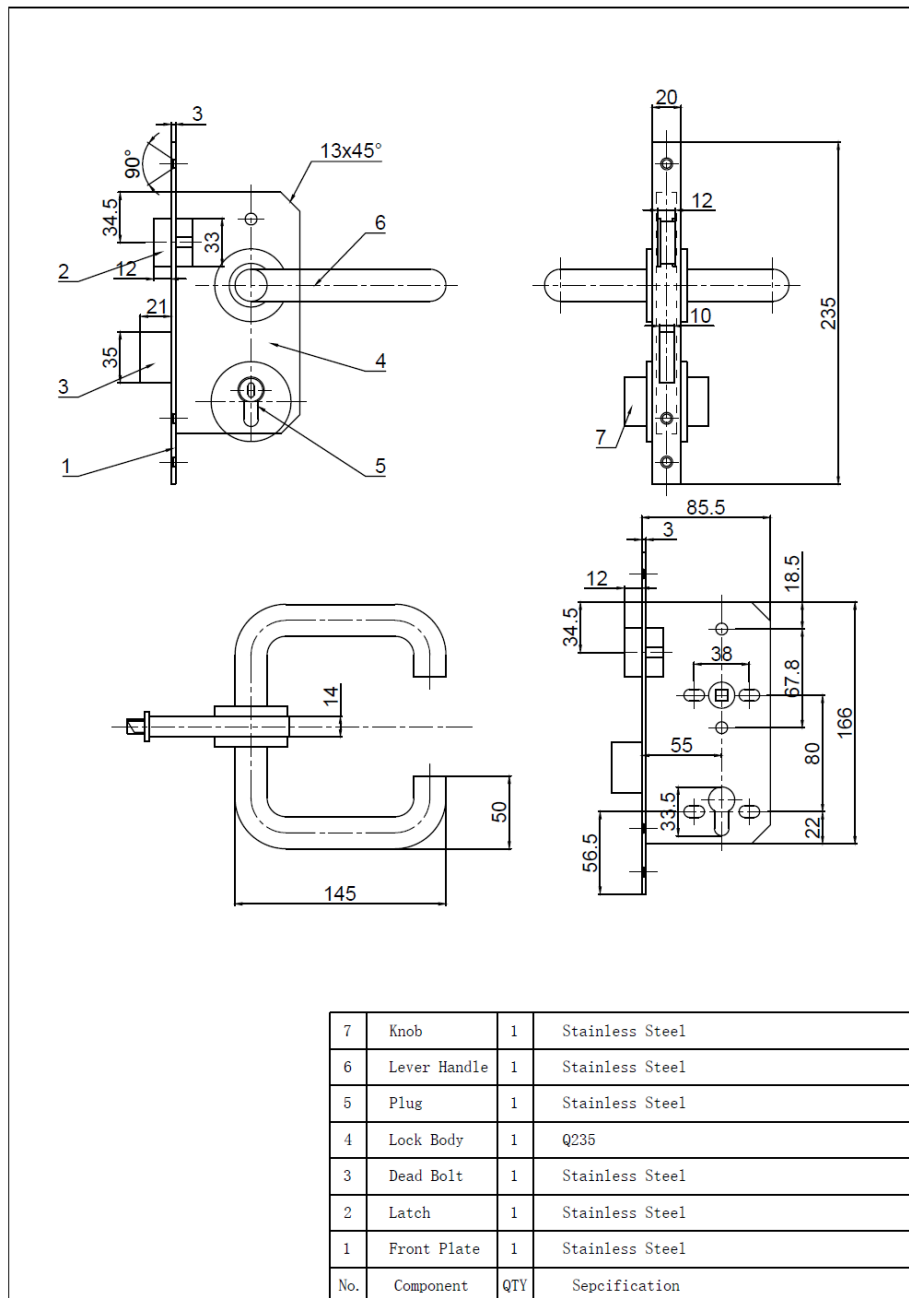
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SECTION 7

HARDWARE DRAWING

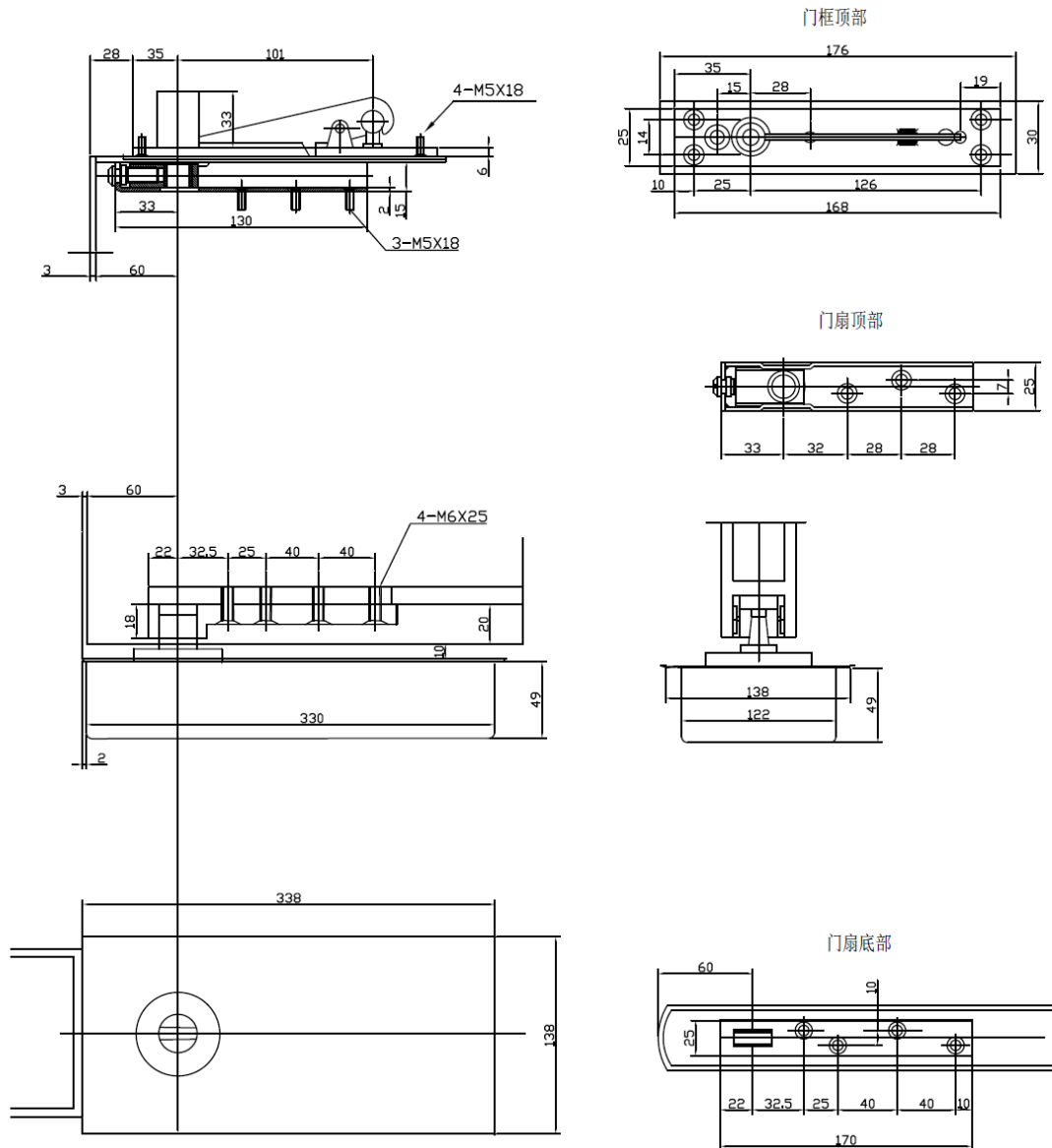


Drawing of Mortise Lock, model of OT-LZ

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Drawing of the Floor spring w/o oil, model of NF-168

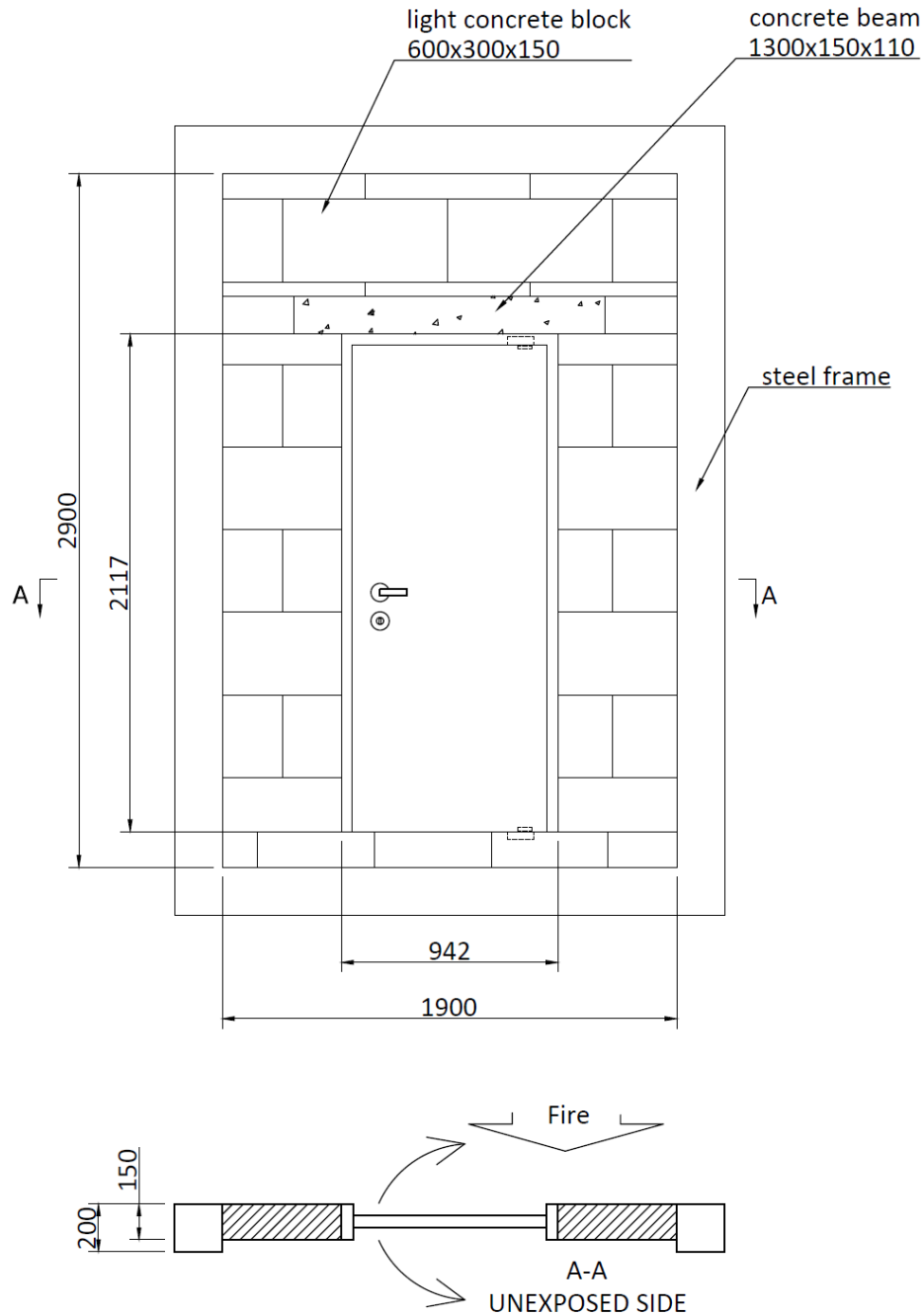
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SECTION 8

THE WALL CONSTRUCTION



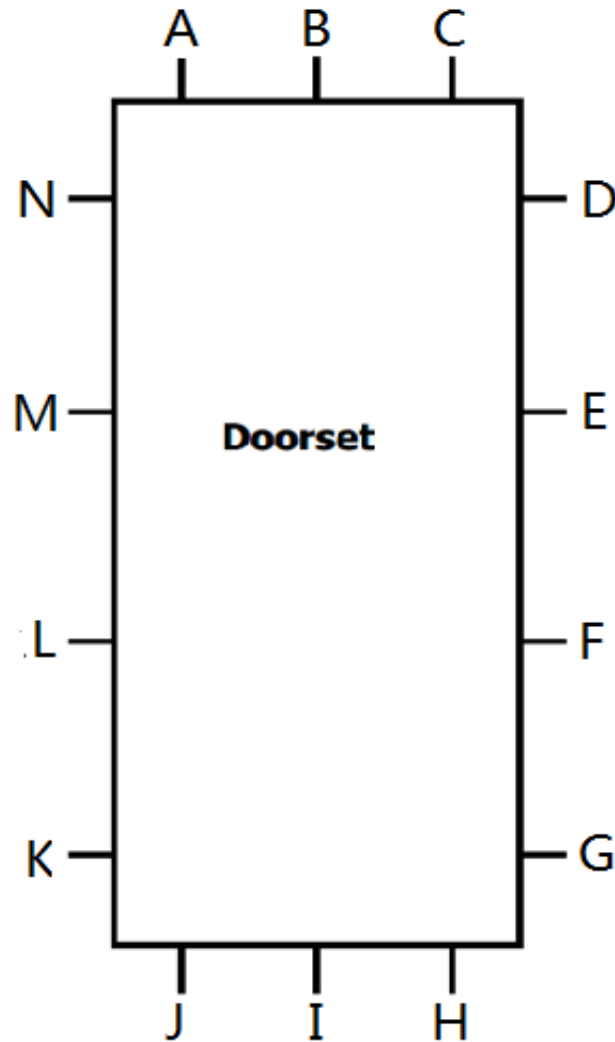
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SECTION 9

TEST MEASUREMENT DATA



EXPOSED SIDE

Clearance dimension in mm at each position						
A	B	C	D	E	F	G
4.6	5.7	5.8	6.0	4.8	5.5	5.5
H	I	J	K	L	M	N
7.0	6.0	10.0	5.8	4.8	4.0	4.2

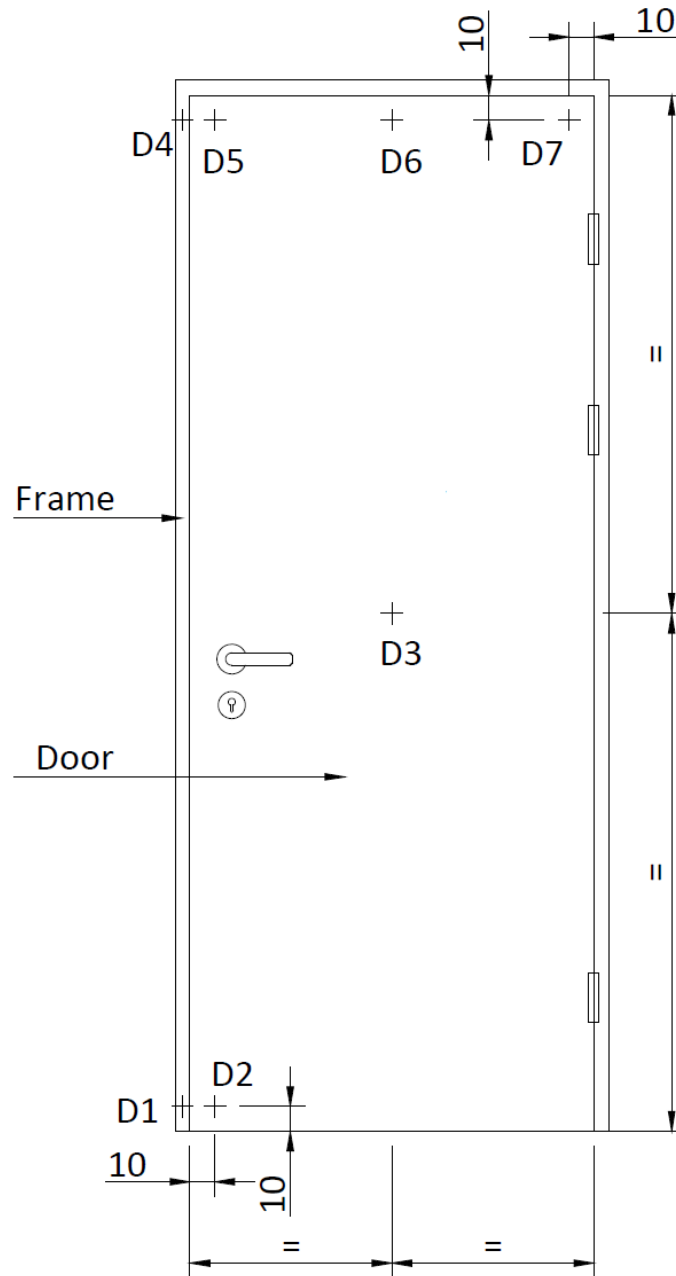
DO NOT SCALE

DOOR ASSEMBLY INITIAL CLEARANCES

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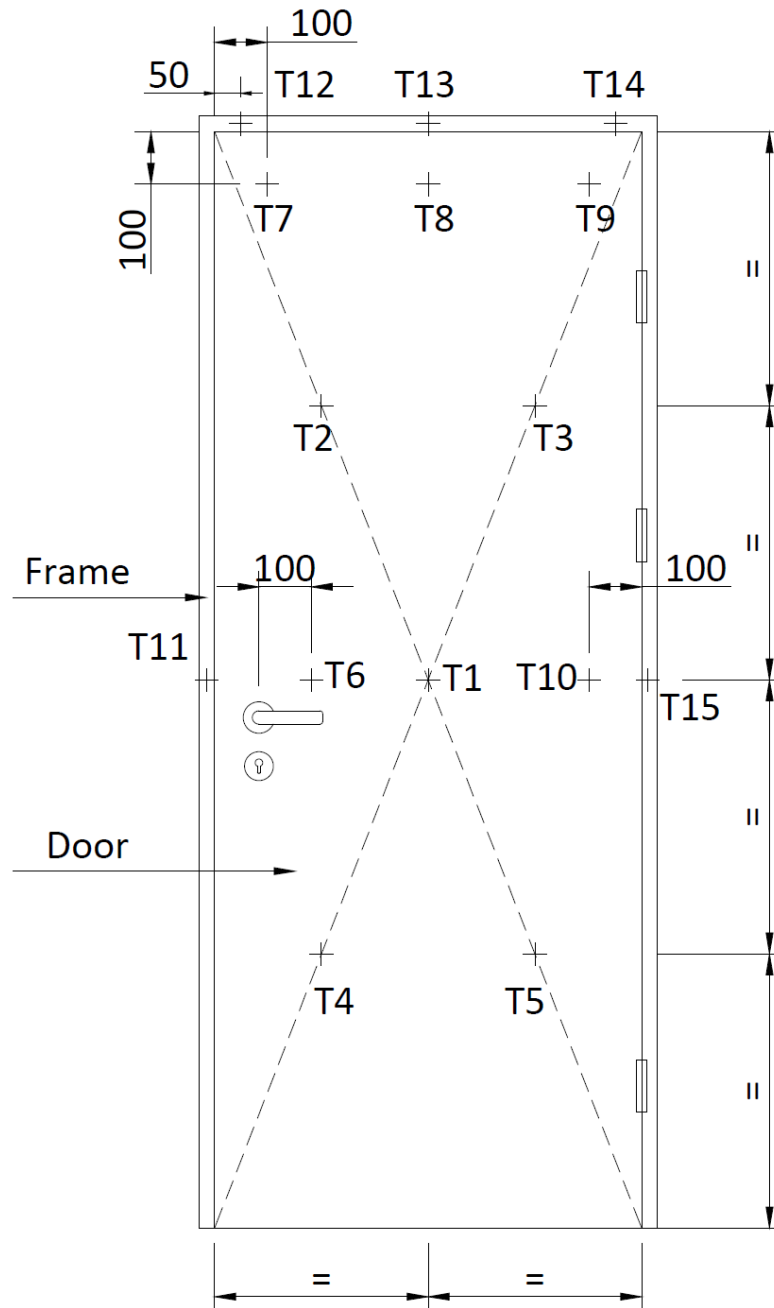
UNEXPOSED SIDE

POSITION FOR MEASUREMENT OF HORIZONTAL DEFLECTION

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POSITION FOR MEASUREMENT OF UNEXPOSED TEMPERATURE

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SECTION 10

TEST DATA

Standards: EN 1634-1:2014+A1:2018, Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware – Part 1: Fire resistance test for door and shutter assemblies and openable windows

Procedure: Part 1: Fire resistance test for doors, shutters and openable windows

Conditioning: According to EN1363-1, Section 8

Equipment:

ITEM	ID
Vertical furnace	SH1098
Furnace pressure gauge	SH1097-15
Test Clock	SH1042
Furnace thermocouple	SH1097-4~6
Ambient temperature gauge	SH1097-11
Unexposed thermocouple	SH1097-12~14
Clearance Measurements	SH1057-1
Displacement Measurements	SH1163
Force Gauge	SH1066

Heating Conditions: According to EN 1363-1, Section 5.1

Pressure Conditions: According to EN1363-1, Section 5.2

Ambient Conditions: 10~40°C according to EN 1363-1, Section 5.6

Test Specimen: According to EN 1634-1, Section 6

Installation of test specimen: According to EN 1634-1, Section 7

Furnace Thermocouples: According to EN 1634-1, Section 9.1.1

Unexposed Face Thermocouples: According to EN 1634-1, Section 9.1.2

Thermocouples:

Thermocouple Pads: Length and width 30 mm, thickness 2.0 ± 0.5 mm, dry density 900 ± 90 kg/m²

Pressure Measurements: According to EN 1634-1, Section 9.2

Deflection Measurements: According to EN 1634-1, Section 9.3

Pre-test Examination: According to EN 1634-1, Section 10.1

Test Procedure: According to EN 1634-1, Section 10.2

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Test Observations:

Time		All observations are from the unexposed face unless noted otherwise.
Mins	Secs	
00	00	Test starts.
05	57	No significant change.
11	56	Smoke issues from left top of door leaf.
22	24	Welding spot of stiffener discolours to dark.
45	06	Discoloration is observed at top and both side edges of the door leaf.
60	00	All thermocouples are removed from unexposed surface of door set due to high radiation.
87	48	No significant change.
95	18	Flame in the furnace is observed from bottom right gap between door leaf and frame.
200	00	No significant change.
260	00	Test is discontinued at the request of sponsor.

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Temperature Data:

Mean furnace temperature together with temperature-time relationship specified in the standard

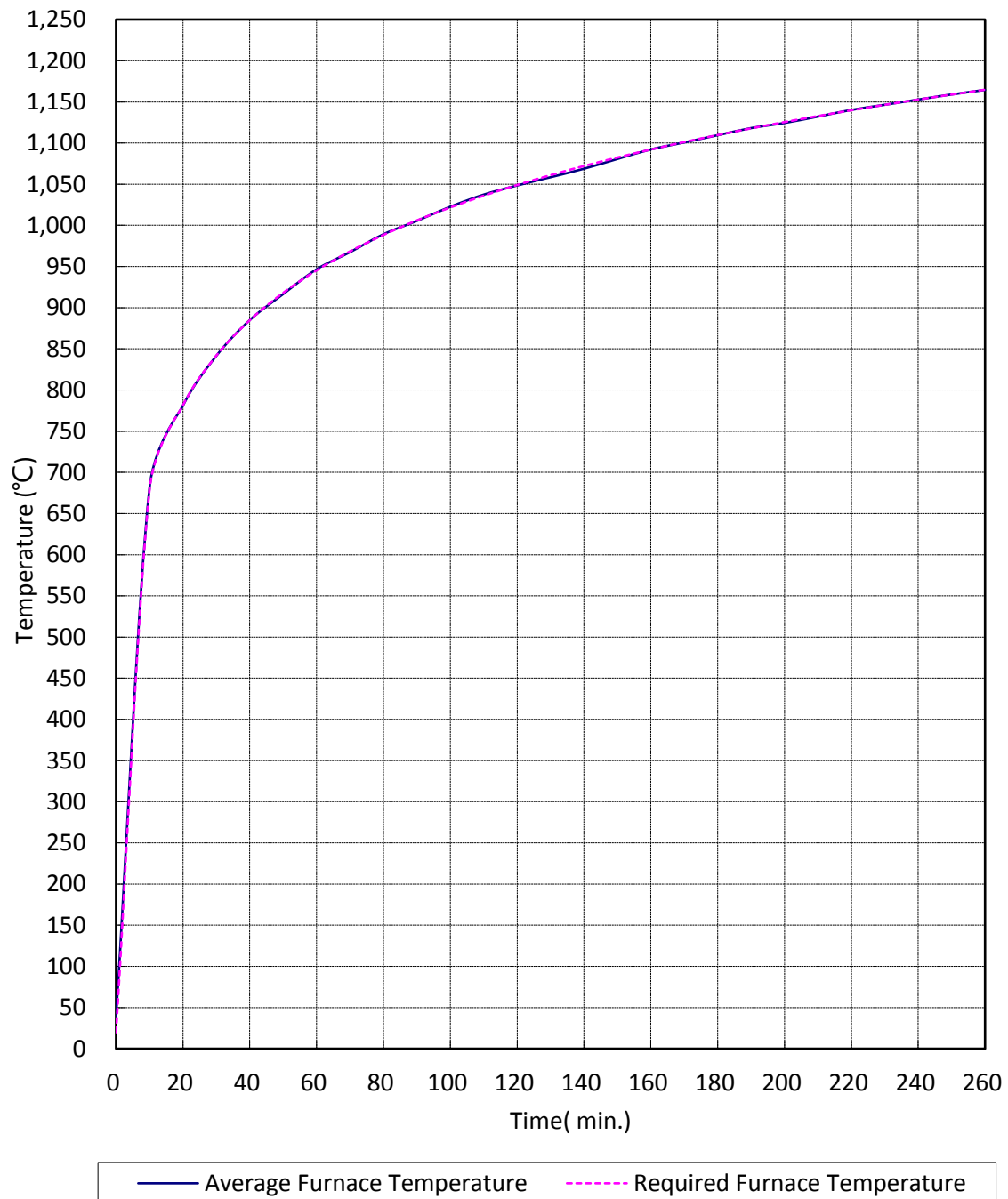
Time Mins	Specified Furnace Temperature/ °C	Furnace mean Temperature/ °C
0	20	39
10	678	681
20	781	781
30	842	842
40	885	885
50	918	917
60	945	947
70	968	967
80	988	989
90	1006	1005
100	1022	1023
110	1036	1037
120	1049	1048
130	1061	1058
140	1072	1069
150	1082	1081
160	1092	1092
170	1101	1101
180	1110	1110
190	1118	1118
200	1126	1124
210	1133	1132
220	1140	1140
230	1146	1146
240	1153	1153
250	1159	1159
260	1165	1165

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Graph for mean furnace temperature and temperature-time curve specified in the standard



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Unexposed surface temperatures

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	Mean temperature (°C)
0	23	23	23	23	23	23
3	24	25	27	24	26	25
6	31	38	43	32	43	37
9	46	59	67	47	74	59
12	67	89	98	67	108	86
15	92	123	132	90	135	115
18	123	159	167	116	164	146
19	134	171	179	126	173	156
20	144	183	189	134	183	167
21	154	195	201	143	192	177
24	183	225	232	165	220	205
27	209	250	257	186	244	229
30	230	273	279	205	261	250
33	249	300	304	219	274	269
36	266	317	324	231	288	285
39	277	326	335	242	301	296
42	284	332	350	251	310	306
45	289	336	353	259	319	311
48	293	339	356	267	328	316
51	296	341	357	275	335	321
54	300	344	359	280	342	325
57	303	347	363	284	349	329
59	306	353	367	287	353	333

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Time Mins	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)	T10 (°C)	T11 (°C)	T12 (°C)	T13 (°C)	T14 (°C)	T15 (°C)
0	23	23	24	24	23	22	23	23	22	23
3	25	30	29	33	25	23	33	32	33	24
6	40	52	50	58	37	24	47	40	44	25
9	62	74	77	87	56	25	59	45	53	27
12	84	94	106	116	78	29	70	50	61	30
15	103	115	140	146	105	35	83	65	68	34
18	134	136	174	176	132	42	95	85	75	40
19	144	142	186	186	142	44	96	95	78	43
20	153	149	197	195	152	47	97	96	82	45
21	162	156	209	204	161	49	98	96	86	48
24	191	172	241	228	189	58	103	99	98	59
27	216	188	269	247	214	68	108	104	104	77
30	242	205	291	263	235	81	115	110	109	87
33	266	223	313	280	253	95	123	118	114	89
36	287	238	325	298	270	96	131	127	120	91
39	308	243	335	315	284	98	139	137	125	94
42	334	289	344	329	293	100	146	146	131	97
45	352	294	349	338	299	103	154	155	136	100
48	365	300	352	344	305	106	162	164	141	104
51	372	302	355	349	310	111	169	172	146	109
54	379	304	358	353	314	117	177	180	151	114
57	386	306	361	357	318	124	183	187	157	120
59	390	315	362	360	321	129	188	192	160	124

Note: All thermocouples are removed from unexposed surface of doorset at 60min.

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Horizontal Deflection (Positive values indicate movement into the furnace)

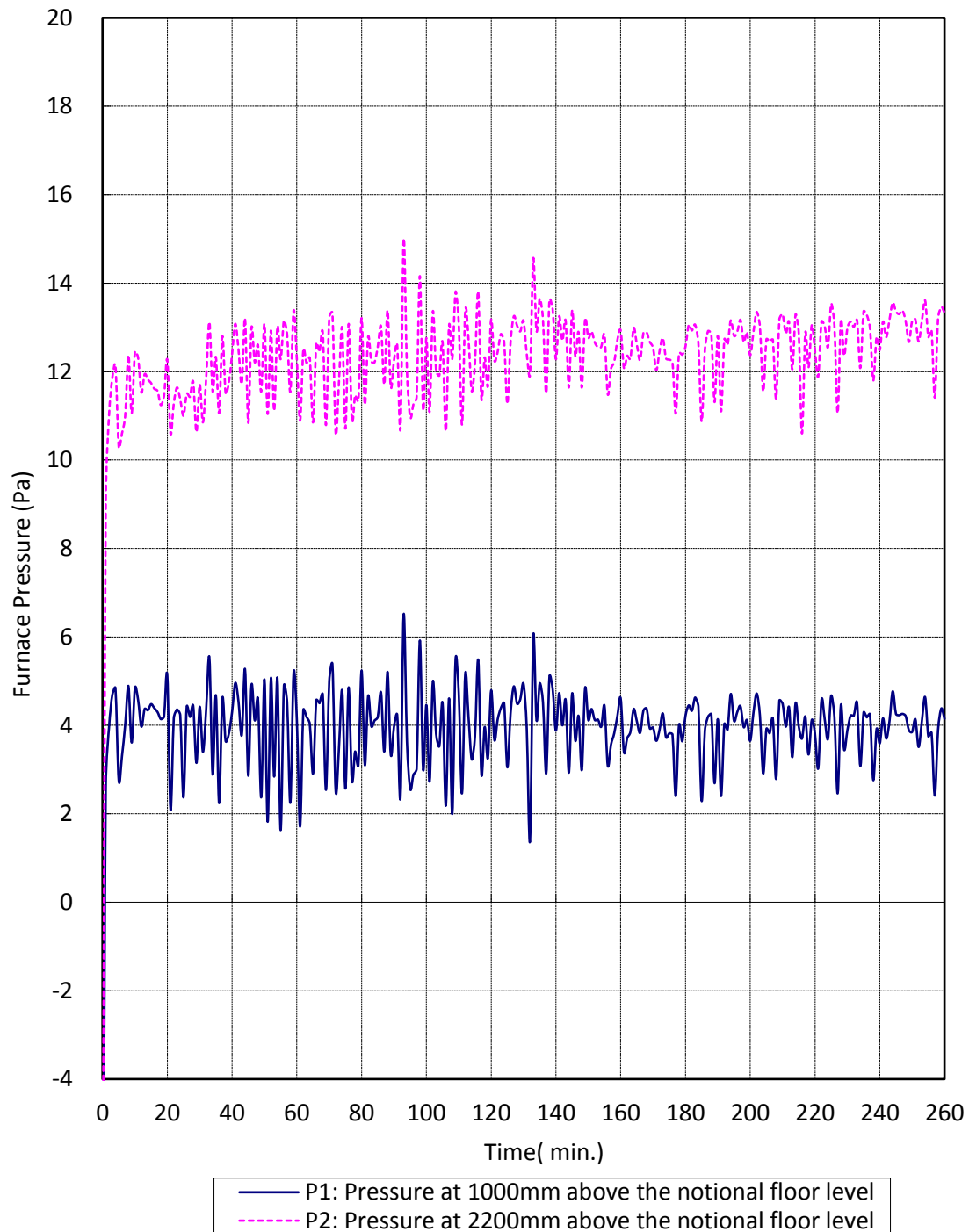
Time Mins	D1 (mm)	D2 (mm)	D3 (mm)	D4 (mm)	D5 (mm)	D6 (mm)	D7 (mm)
0	0	0	0	0	0	0	0
10	0	-20	19	0	-20	-7	-1
20	0	-24	6	0	-22	-8	-2
30	0	-25	-4	0	-22	-8	-1
40	0	-25	-11	1	-22	-8	-5
50	0	-26	-13	1	-24	-7	-4
60	0	-27	-15	1	-24	-7	-3
75	0	-29	-17	1	-24	-7	-5
90	0	-28	-17	1	-24	-7	-5
100	0	-28	-17	1	-23	-7	-7

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Furnace pressure



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SECTION 11 PHOTOGRAPHS



Fig. 1 Unexposed Side Prior to the Fire Test



Fig. 2 Exposed Side Prior to the Fire Test

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Fig. 3 Unexposed Side after 10 Minutes



Fig. 4 Unexposed Side after 20 Minutes

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Fig. 5 Unexposed Side after 30 Minutes



Fig. 6 Unexposed Side after 40 Minutes

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Fig. 7 Unexposed Side after 50 Minutes



Fig. 8 Unexposed Side after 60 Minutes

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Fig. 9 Unexposed Side after 70 Minutes



Fig. 10 Unexposed Side after 80 Minutes

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Fig. 11 Unexposed Side after 90 Minutes



Fig. 12 Unexposed Side after 100 Minutes

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Fig. 13 Unexposed Side after 110 Minutes



Fig. 14 Unexposed Side after 120 Minutes

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Fig. 15 Unexposed Side after 130 Minutes



Fig. 16 Unexposed Side after 140 Minutes

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Fig. 17 Unexposed Side after 150 Minutes



Fig. 18 Unexposed Side after 160 Minutes

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Fig. 19 Unexposed Side after 170 Minutes



Fig. 20 Unexposed Side after 180 Minutes

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Fig. 21 Unexposed Side after 190 Minutes



Fig. 22 Unexposed Side after 200 Minutes

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Fig. 23 Unexposed Side after 220 Minutes



Fig. 24 Unexposed Side after 240 Minutes

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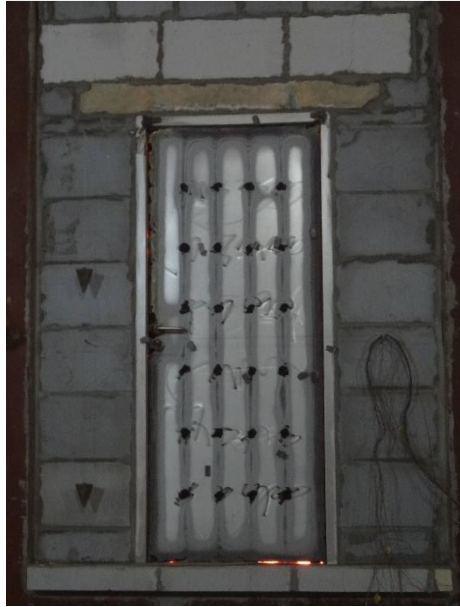


Fig. 25 Unexposed Side after 260 Minutes



Fig. 26 Exposed Side after 260 Minutes

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SECTION 12 REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	2019/5/6	N/A	Original Report Issue
1	2019/5/6	7	Corrected the title of fire door assembly drawing and supersede report 190201002SHF-001.