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EVERPINE GROUP CO., LTD.
TEST REPORT

SCOPE OF WORK
UL 10C-2016 (R2021) TESTING ON VISION LITE FRAME, MODEL VP660X1676 IN A STEEL DOOR

REPORT NUMBER
230330002SHF-001

TEST DATE
2023-08-21

ISSUE DATE
2023-09-11

PAGES
26

DOCUMENT CONTROL NUMBER
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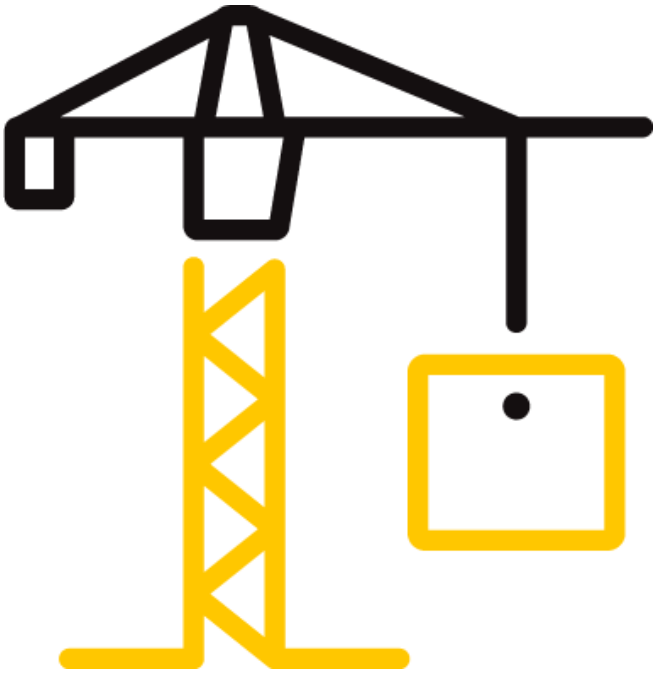

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Issue Date: 2023-09-11 Intertek Report No.: 230330002SHF-001

REPORT ISSUED TO

EVERPINE GROUP CO., LTD.
Room 3308, Central Business District, Vanke Blue-Mountain Community, Binhu New District, Hefei, Anhui, 230601, China

SECTION 1

SCOPE

Intertek has conducted an evaluation for EVERPINE GROUP CO., LTD. to determine the fire resistance characteristics of Vision Lite Frame, model VP660x1676 in a steel door for a 90-minute exposure period with hose stream. This evaluation began on March 30, 2023 and was completed on September 11, 2023. The test was conducted on August 21, 2023.

The test was conducted in accordance with UL 10C-2016 (R2021) under positive furnace pressure.

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

Intertek B&C will service this report for the entire test record retention period. The test record retention period ends six years after the test date. Test records, such as detailed drawings, datasheets or other pertinent project documentation will be retained for the entire test record retention period.

For INTERTEK B&C:

COMPLETED BY:	Adolph Chen	**REVIEWED BY:**	Jason Xu
TITLE:	Project Engineer – Building & Construction	**TITLE:**	Operation Supervisor – Building & Construction
SIGNATURE:	Adolph Chen	**SIGNATURE:**	Jason Xu
DATE:	2023-09-11	**DATE:**	2023-09-11

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SECTION 2
SUMMARY OF TEST RESULTS

Product Name: Vision Lite Frame
Series/Model: VP660x1676

TEST RESULT:

TITLE	RESULTS
Fire resistance with hose stream test	Met the requirements for a 90-minute exposure period with hose stream

SECTION 3
TEST METHOD

The specimen was evaluated in accordance with the following:

UL 10C-2016 (R2021), *Standard for Positive Pressure Fire Tests of Door Assemblies*

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SECTION 4
MATERIAL SOURCE/INSTALLATION

Test specimen was provided by the client and was not independently selected for testing. Test specimen was received at the Evaluation Center on August 4, 2023.

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.

TESTED ASSEMBLY DESCRIPTION		
Door	Type	Single Leaf Single Action Swing Steel Fire Door
	Nominal size	924 mm wide by 2134 mm high by 45 mm thick
	Facing	1.2 mm thick galvanized steel Q235
	Core	42.6 mm thick aluminum silicate wool
	Stiffener	3 mm thick U-profile galvanized steel Q235
	Edge Channel	1.2 mm thick U-profile galvanized steel Q235
	Astragal:	1.2 mm thick galvanized steel Q235
	Glazing assembly	Glass type: Fire Protection Glazing Glass size: 631 mm wide by 1647 mm high by 5 mm thick Visible size: 613 mm wide by 1629 mm high Vision Lite Frame: 1.2 mm thick Cold Formed Steel Sealing Strip: 3 mm thick aluminum silicate wool pad surround with the perimeter and both sides between the glass and vision lite frame Installation: Two pieces frame member were screwed by M4×50 mm self-tapping screw on unexposed side
Frame	Nominal size	1030 mm wide by 2212 mm high by 150 mm deep
	Material	1.4 mm thick galvanized steel Q235
	Installation	Cement mortar grouted and mounted to light concrete block by anchor
Threshold	Material:	1.4 mm thick galvanized steel Q235
	Installation:	Cement mortar grouted
Hardware	Hinge	Material: Stainless steel hinge, Model: OT H012 Size: 4.5''×4.0''×3.4mm Quantity: 4 pcs
	Lock	Mortise Lock, Model: OT 720 Latch throw length: 19 mm

The sample ID number assigned by the test lab is S230330002SHF.001.

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The specimen is described by the client as Vision Lite Frame, model VP660x1676. The drawings of the test Vision Lite Frame and test wall construction can be found in Section 6 and 7 respectively.

The test assembly was installed in a moveable restraint frame and the hardware were installed by the client. The test assembly was placed in front of the furnace for the fire exposure, and was moved away from the furnace for the hose stream test. The test door was built into a concrete masonry unit partition, with fully mortared joints. The door clearances were adjusted so that they complied with installation instruction provided by the customer. The test measurement data was shown in Section 8.

The test door was mounted so as to open into the furnace chamber.

The nominal dimensions of the test wall were 3 m high and 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 approximate 40 in. (1016mm) above the bottom of the door as specified in the applicable positive pressure test standards. Periodic observations were made of the surface of the test assembly during the fire endurance test.

Immediately after the Fire Endurance Test, the assembly frame was moved into position for the Hose Stream Test. The exposed surface of the test assembly was subjected to the impact, erosion, and cooling effects of a hose stream described in the test standards.

Door deflection relative to the frame, where applicable, was monitored throughout the test. Position for measurement of deflection and unexposed temperature is presented in the drawing of Section 8.

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SECTION 5
TEST RESULTS

Fire Endurance Test

The measured deflection did not exceed the allowable deflection limit of one time the door thickness during the 90 minutes fire endurance test. The edge adjacent to the door frame did not move from its original position in a direction perpendicular to the plane of the door for a distance greater than the door thickness during the 90 minutes fire test. The actual measurements are presented in test data in Section 9.

During the 90 minutes fire exposure period no flaming was observed on the unexposed face of the assembly. This assembly therefore met the criteria of the test standards for flaming. No through openings or penetrations were evident at the conclusion of the fire exposure portion of the test.

The glazing assembly remained in the opening of door leaf without any separation and glass breakage and did not loosen from its fastenings.

This assembly therefore met the criteria of the fire endurance test for 90 minutes.

Hose Stream Test

According to test methods, hose stream test should be conducted for 35.2 seconds based on a total assembly area of 2.2 square meters and a required duration of 16 seconds per square meter of assembly area. The hose stream water pressure was 207 KPa.

After the hose stream, no through openings were apparent and the door latch remained engaged to the strike. The measured deflection of the edge adjacent to the door frame neither exceed the allowable deflection limit of 1-1/2 times the door thickness, nor more than 67.5 mm after the hose stream test.

The glazing assembly remained in the opening of door leaf without any separation and glass breakage and did not loosen from its fastenings.

This assembly therefore met the hose stream portion of the test.

A full set of test data is included in Section 9, and photographs have been presented in Section 10.

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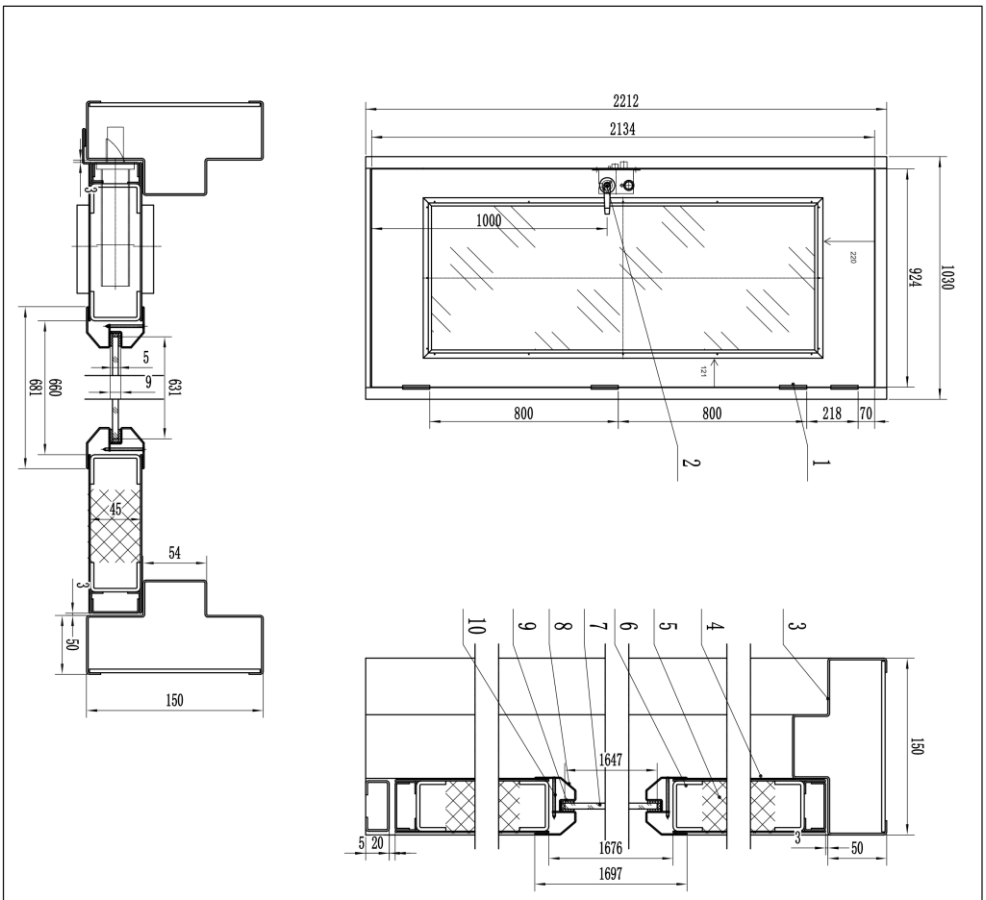
SECTION 6

FIRE DOOR ASSEMBLY DRAWING



No.	Component	QTY	Specification
1	Hinge	4	OT H012
2	Lock	1	OT 720
3	Frame		1.4mm Galvanized steel sheet
4	Face		1.2mm Galvanized steel sheet
5	Core		Aluminum silicate wool
6	Stiffener		3.0mm Galvanized steel sheet
7	Glass	1	1647*631*5
8	Vision Lite Frame		
9	Glass pad		Aluminum silicate wool t=3mm
10	Self-tapping screw	16	

The drawing of the door assembly

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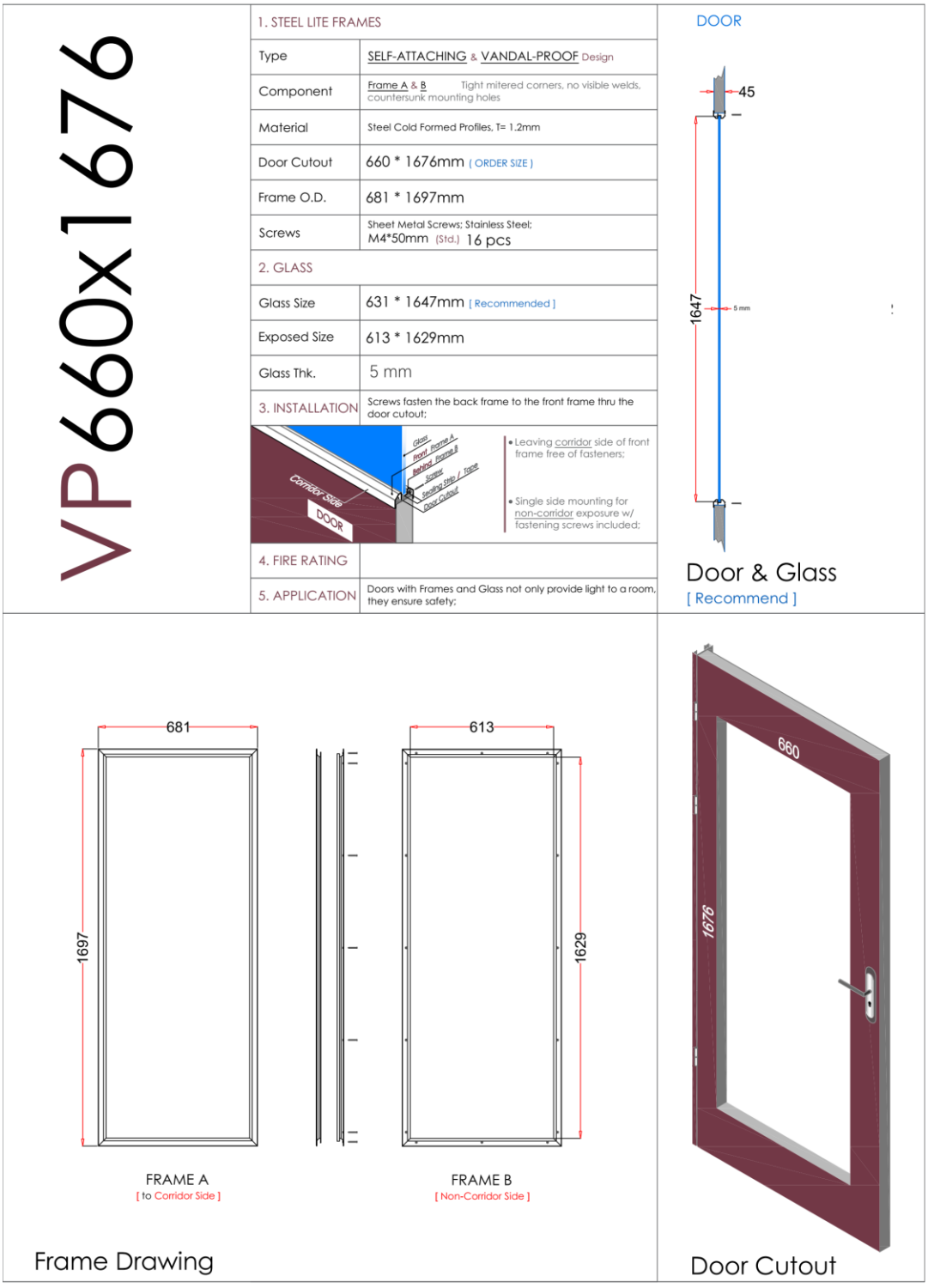

The drawing of the Vision Lite Frame

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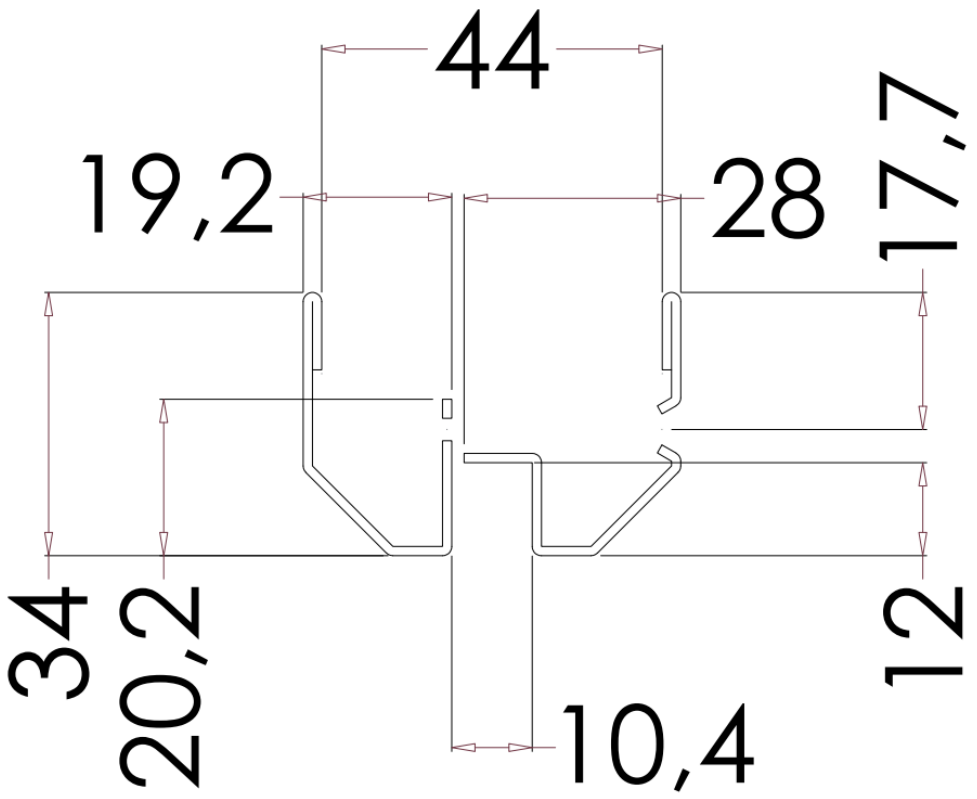

Section drawing of the Vision Lite Frame

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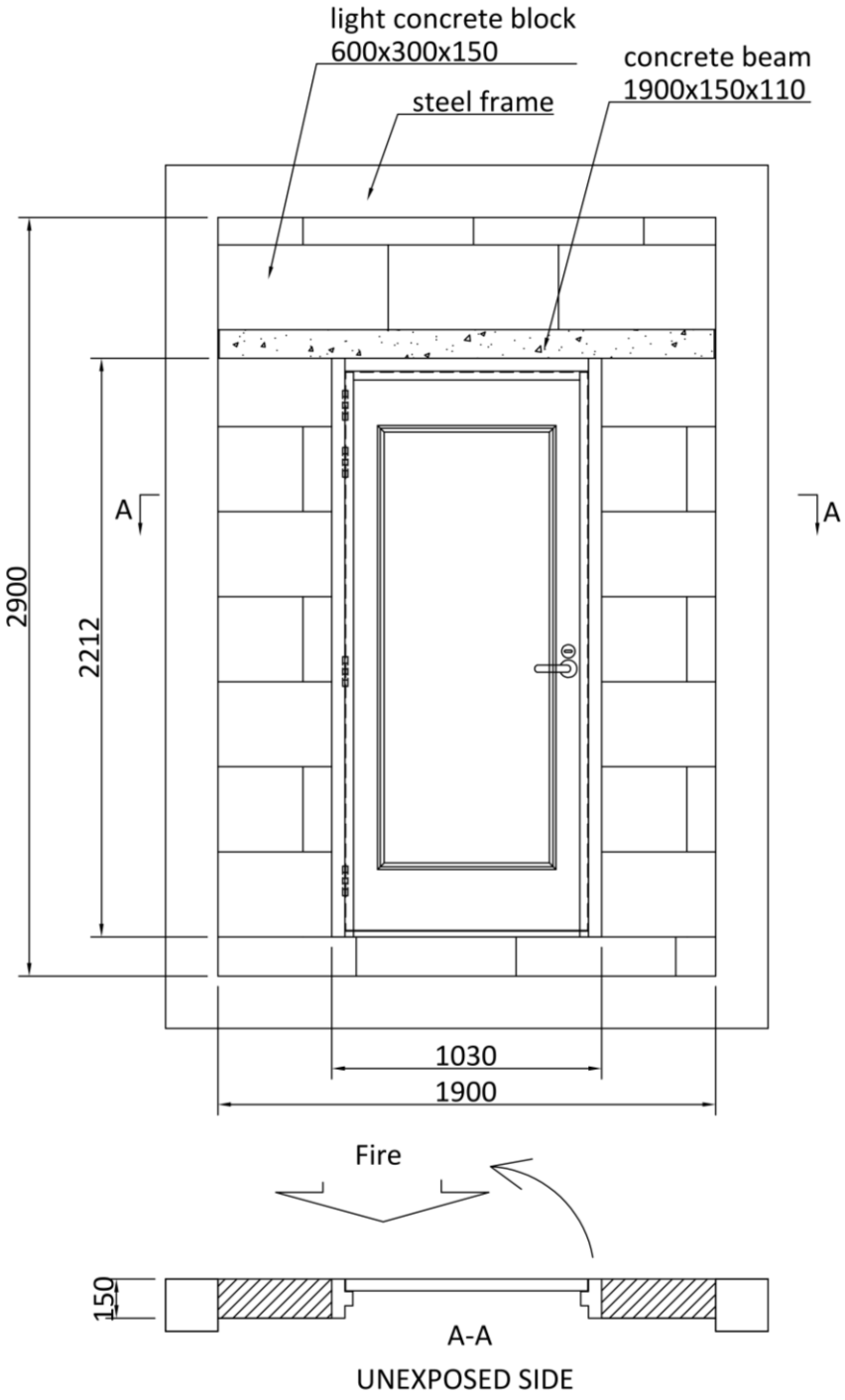
SECTION 7
TEST WALL CONSTRUCTION



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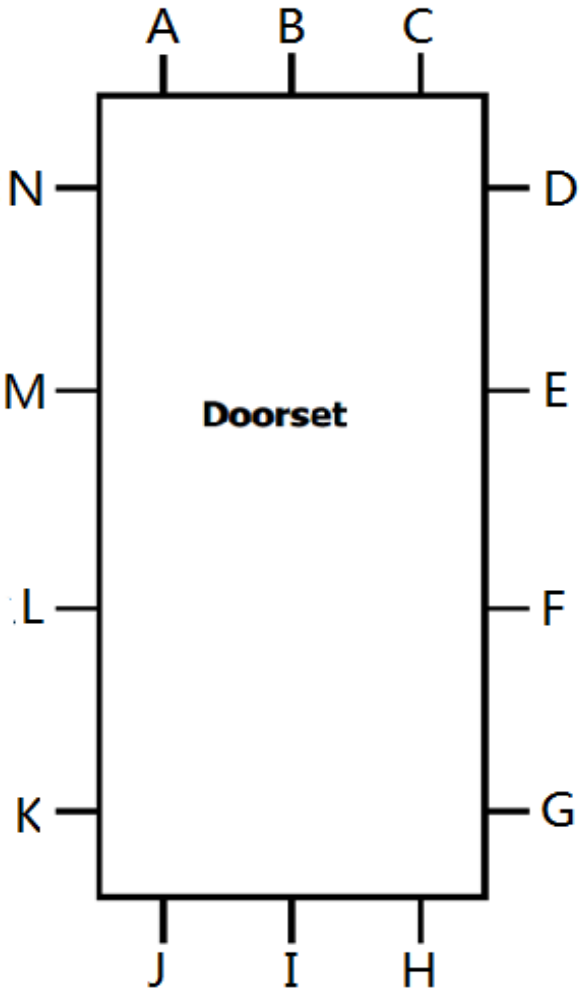
SECTION 8

TEST MEASUREMENT DATA



EXPOSED SIDE

Clearance dimension in mm at each position													
A	B	C	D	E	F	G	H	I	J	K	L	M	N
3.0	2.5	1.8	0.2	1.2	1.5	0.9	5.2	3.8	3.3	2.7	3.3	3.9	4.0

DO NOT SCALE

DOOR ASSEMBLY INITIAL CLEARANCES

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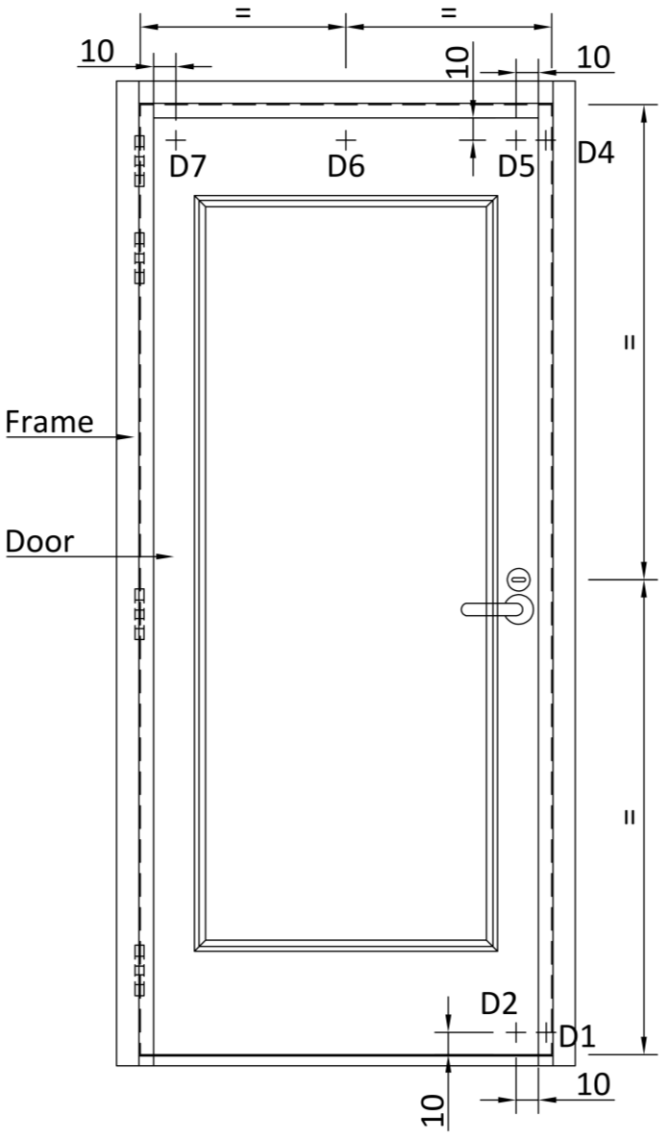

UNEXPOSED SIDE

POSITION FOR MEASUREMENT OF HORIZONTAL DEFLECTION

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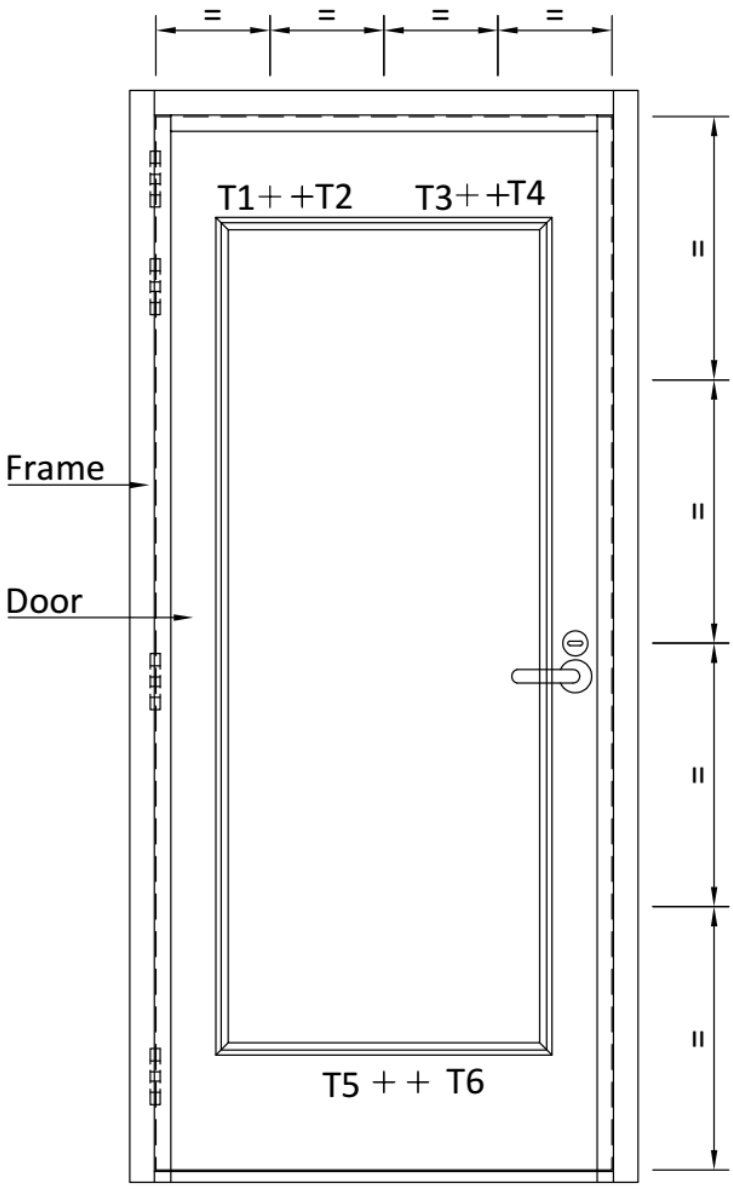

POSITION FOR MEASUREMENT OF UNEXPOSED TEMPERATURE
(Note: T1, T3 and T5 were for reference only)

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SECTION 9
TEST DATA

Standards: UL 10C-2016(R2021) Positive Pressure Fire Tests of Door Assemblies

Equipment:

ITEM	ID
Vertical furnace	SH1098
Furnace pressure gauge	SH1097-15-4 & SH1348
Test Clock	SH1042
Furnace thermocouple	SH1097-1 & SH1097-1-1~5
Ambient temperature gauge	SH1097-11
Unexposed thermocouple	SH1097-12 & SH1097-12-1~5
Clearance Measurements	SH1057-1
Displacement Measurements	SH1377-1~7
Oxygen Analyzer	SH1318

Temperature-Time Curve:	According to UL 10C, Section 4
Furnace Temperatures:	According to UL 10C, Section 5
Unexposed Temperatures:	According to UL 10C, Section 6, measured in the first 30 minutes
Thermocouple Pads:	Length and width 30 ± 0.5 mm, thickness 2 ± 0.5 mm, density of 900 ± 100kg/m³, conductivity 0.053 W/mK at 66°C, modified Brinnell hardness (on soft face) of 2.25 to 4.5
Furnace Pressure:	According to UL 10C, Section 7
Construction and Size:	According to UL 10C, Section 8
Mounting:	According to UL 10C, Section 9
Clearances:	According to UL 10C, Section 9.3
Fire Endurance Test:	According to UL 10C, Section 11
Hose Stream:	According to UL 10C, Section 12

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Fire Endurance Test Observations:

Time		All observations are from the unexposed face unless noted otherwise.
Mins	Secs	
00	00	Test started.
02	55	Smoke issued from the leading edge of the door leaf.
09	43	The cotton pad of T1 fell down.
13	56	The cotton pad of T3 fell down.
20	00	Discoloration was observed on the top of the door leaf.
25	00	The paint of the top left vision lite frame started to fall off.
28	38	The cotton pad of T5 fell down.
50	00	The paint of the vision lite frame continued to fall off.
60	00	No significant change.
90	00	Fire endurance test was discontinued at the request of the sponsor. The glazing assembly remained in the opening of door leaf without any separation and glass breakage and did not loosen from its fastenings. Test assembly was to be moved into the position for hose stream test.

Hose Stream Test Observations:

Time		All observations are from the unexposed face unless noted otherwise.
Mins	Secs	
92	00	Hose stream test started.
92	35	Hose stream was discontinued. No through openings developed that permitted a projection of water from the stream beyond the unexposed surface during the time of the hose stream. The glazing assembly remained in the opening of door leaf without any separation and glass breakage and did not loosen from its fastenings.

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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	30
3	331	201
6	571	603
9	671	653
12	726	727
15	760	759
18	781	778
21	800	800
24	816	813
27	830	829
30	843	840
33	854	854
36	865	863
39	875	874
42	884	882
45	892	889
48	900	898
51	907	906
54	914	913
57	920	919
60	927	925
63	933	932
66	939	937
69	944	942
72	950	948
75	955	953
78	960	958
81	965	963
84	969	967
87	974	968
90	978	970

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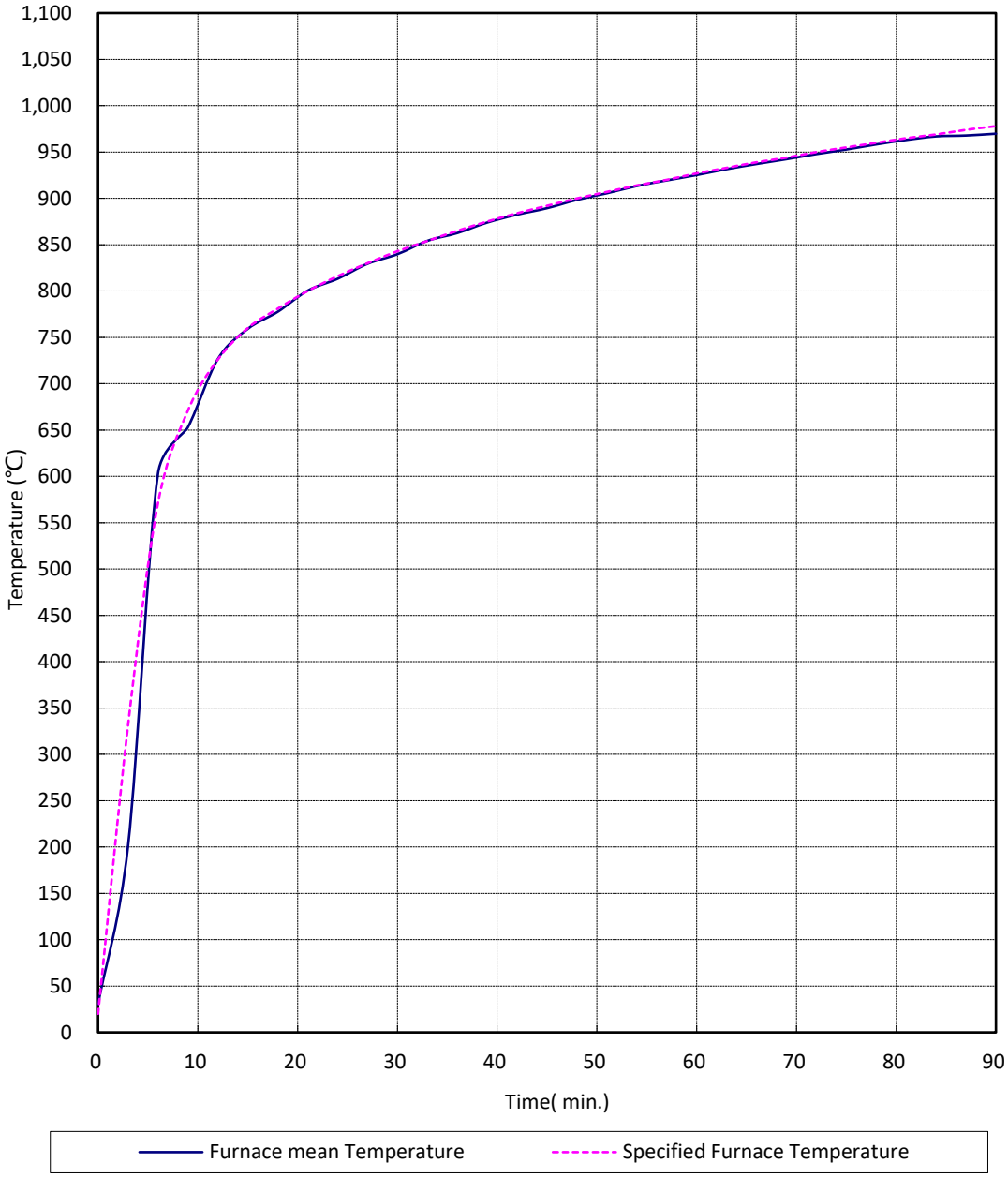
Graph for mean furnace temperature and temperature-time curve specified in the standard



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Unexposed surface temperatures:

Time Mins	T2 (°C)	T4 (°C)	T6 (°C)
0	33	33	33
3	55	56	36
6	131	135	60
9	235	249	99
12	307	324	152
15	330	363	231
18	377	406	304
21	429	466	348
24	446	489	391
27	466	505	437
30	400	521	479
33	406	534	482
36	417	548	493
37	417	551	498
38	535	556	500
39	538	560	504
42	541	573	512
45	547	580	521
48	552	591	527
51	557	601	537
54	563	609	544
57	567	606	549
60	572	606	557
63	579	609	564
66	581	618	571
69	583	623	577
72	584	626	582
75	581	629	587
78	578	633	594
81	580	635	597
84	582	638	602
87	584	638	605
90	586	640	607

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Horizontal Deflection (Positive values indicate movement into the furnace)

Time (Mins)	Door Frame Separation at Latch for Single Door (mm)	Maximum Pair Meeting Edge Displacement (mm)	Maximum Perpendicular Displacement where a positive measurement indicates movement towards the furnace (mm)					
			D1	D2	D4	D5	D6	D7
Initial	< 12.7	NA	0	0	0	0	0	0
10	< 12.7	NA	1	-2	3	3	5	3
20	< 12.7	NA	1	-1	8	7	11	8
30	< 12.7	NA	2	-1	10	8	14	9
40	< 12.7	NA	2	-2	11	10	15	10
50	< 12.7	NA	2	-3	13	12	18	10
60	< 12.7	NA	2	-2	13	11	17	10
70	< 12.7	NA	2	-4	13	11	17	10
80	< 12.7	NA	1	-3	12	12	17	9
87	< 12.7	NA	1	-4	12	12	16	8
Requirement	< 12.7	NA	Any portion of the edges adjacent to door frame shall not move more than the thickness of the door.					
Hose Stream	< 12.7	NA	< 67.5					
Requirement	< 12.7	NA	Any portion of the edges adjacent to door frame shall not move more than 1-1/2 times the door thickness.					

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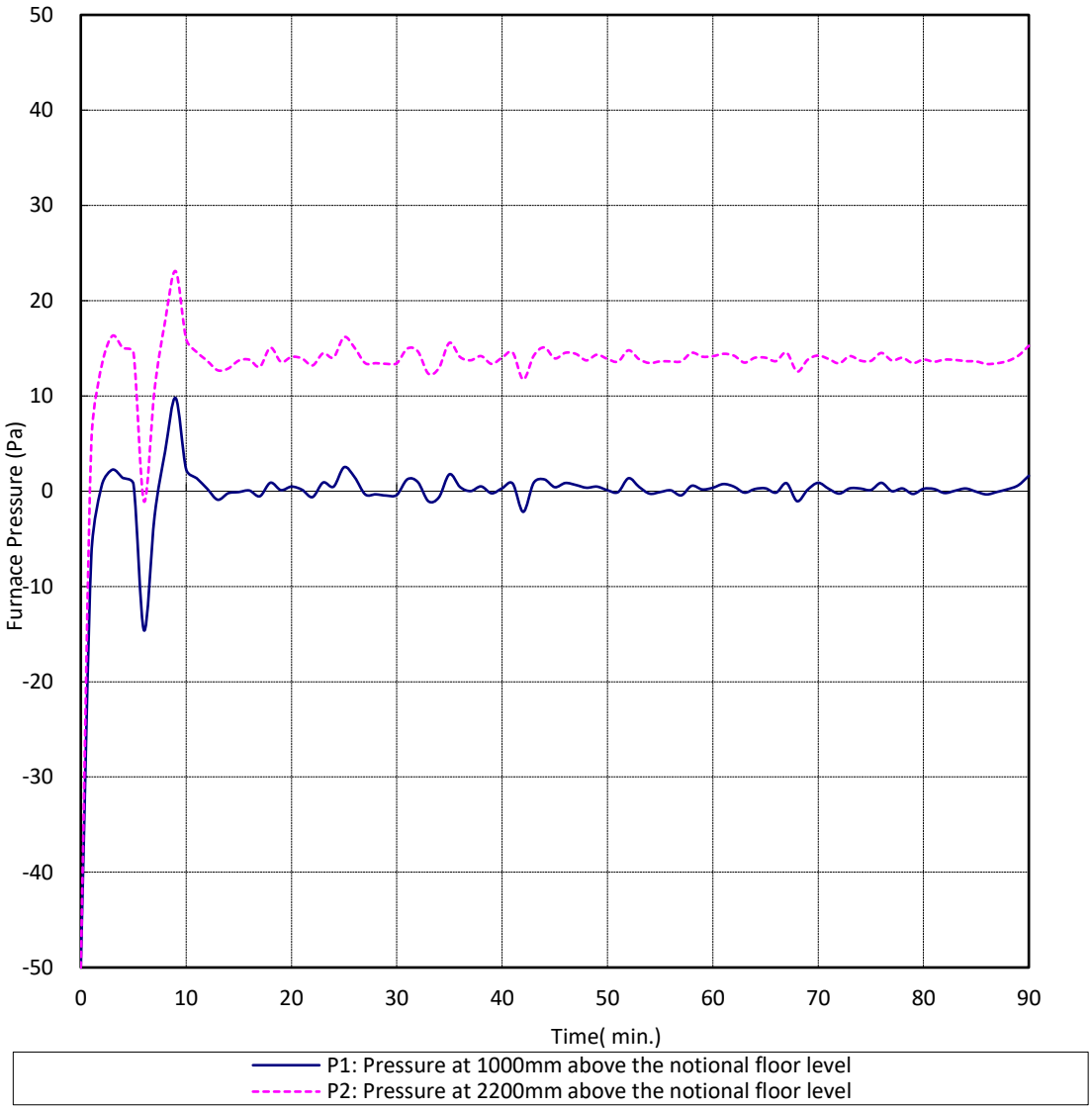
Graph for furnace pressure



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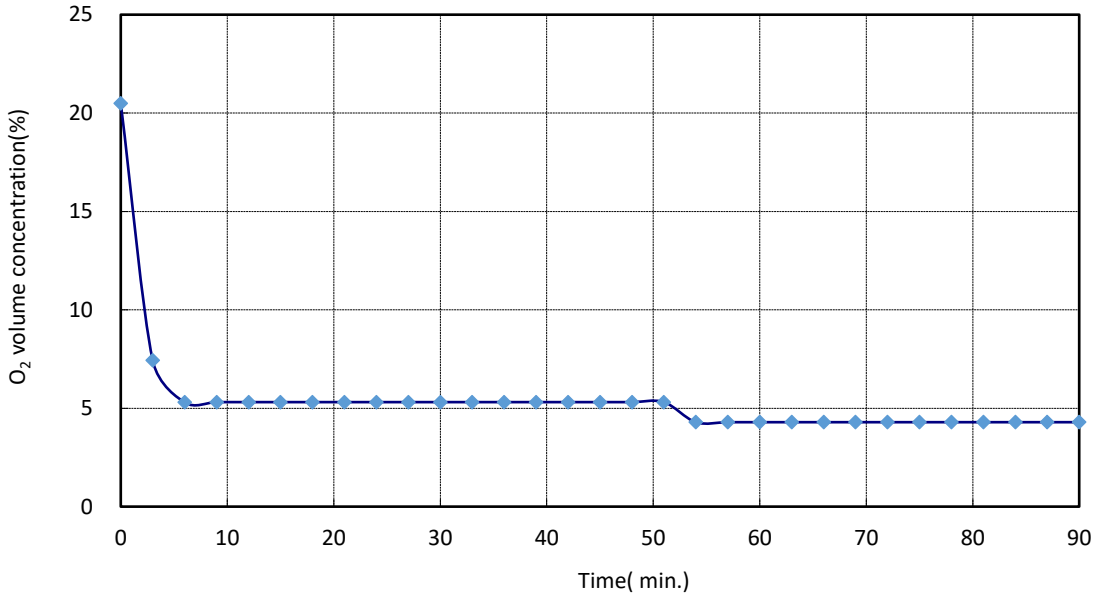
Graph for oxygen concentration inside furnace



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SECTION 10
PHOTOGRAPHS

Fig. 1 Exposed Side Prior to the Fire Test

Fig. 2 Unexposed Side Prior to the Fire Test

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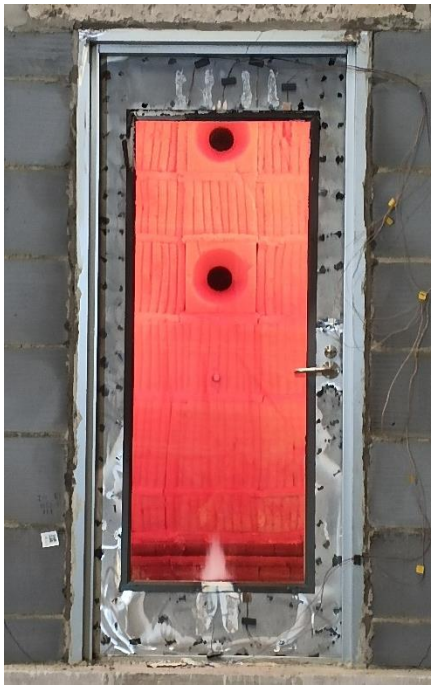

Fig. 3 Unexposed Side after 30 Minutes

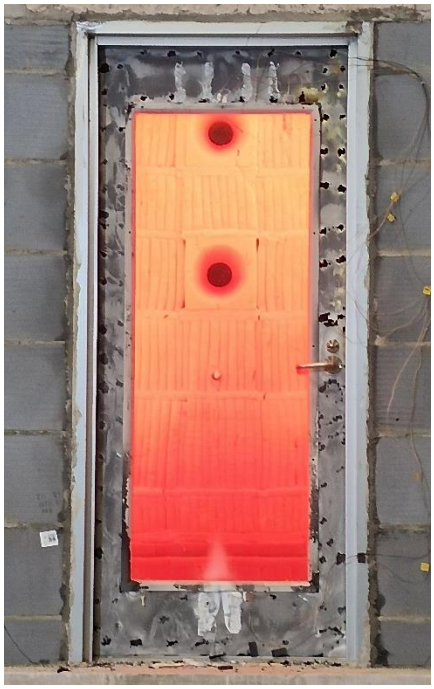

Fig. 4 Unexposed Side after 60 Minutes

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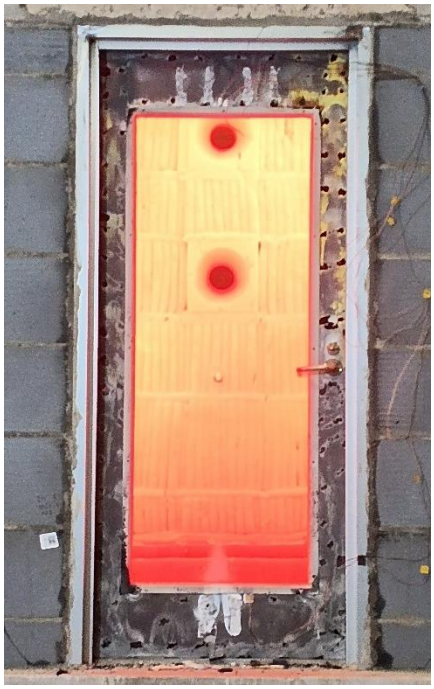

Fig. 5 Unexposed Side after 90 Minutes

Fig. 6 Exposed Side after 90 Minutes

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Fig. 7 Unexposed Side after Hose Stream Test

Fig. 8 Exposed Side after Hose Stream Test

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SECTION 11
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	2023-09-11	N/A	Original Report Issue