JINCHENG HARDWARE INDUSTRY CO.,LTD.

TEST REPORT

SCOPE OF WORK
EN 1634-1:2014+A1:2018 TESTING ON HINGE IN SINGLE LEAF SINGLE ACTION TIMBER COMPOSITE FIRE DOORSET

REPORT NUMBER
250521001SHF-001

TEST DATE
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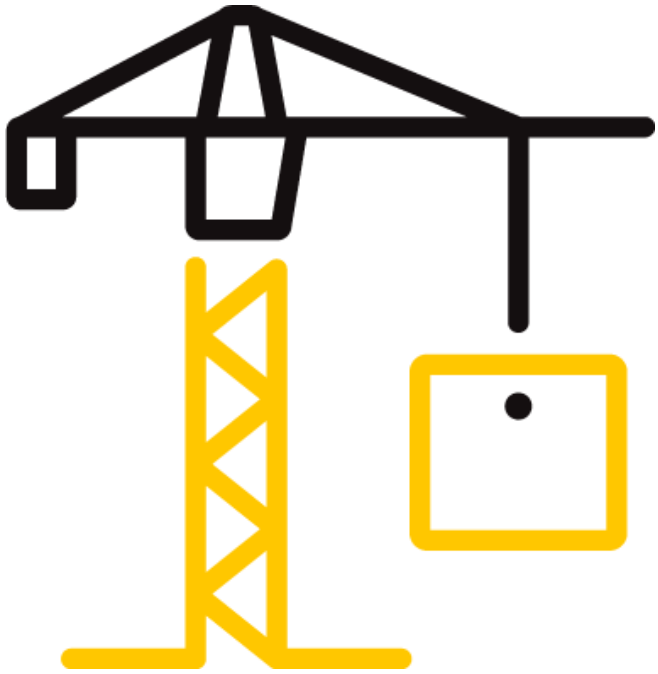

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Issue Date: 2025-06-24 Intertek Report No.: 250521001SHF-001

REPORT ISSUED TO

JINCHENG HARDWARE INDUSTRY CO.,LTD.
No.191,Wudong Industrial Zone, Lile Town, Jianghai Dist, Jiangmen, Guangdong, China 529060.

SECTION 1

SCOPE

Intertek has conducted an evaluation for JINCHENG HARDWARE INDUSTRY CO.,LTD. to determine the fire resistance characteristics of the Hinge, Model 5X4.5X3 in Single Leaf Single Action Timber Composite Fire Doorset. This test was designed to demonstrate evaluation on the Hinge of ten types including model 4X3X3, 4X3.5X3, 4X4X3, 4.5X3X3, 4.5X3.5X3, 4.5X4X3, 4.5X4.5X3, 5X3X3, 5X3.5X3 and 5X4X3. This evaluation began on May 23, 2025 and was completed on June 24, 2025. The test was conducted on June 3, 2025.

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.

Intertek B&C will service this report for the entire test record retention period. The test record retention period ends ten years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens (where required by Certification or Accreditation bodies), or other pertinent project documentation, will be retained for the entire test record retention period.

For INTERTEK B&C:

COMPLETED BY:	Joke Que	**REVIEWED BY:**	Jason Xu
TITLE:	Engineer - Building & Construction	**TITLE:**	Operation Supervisor - Building & Construction
SIGNATURE:	Joke Que	**SIGNATURE:**	Jason Xu
DATE:	2025-06-24	**DATE:**	2025-06-24

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SECTION 2
SUMMARY OF TEST RESULTS

Product Name	Series/Model
Hinge	4X3X3, 4X3.5X3, 4X4X3, 4.5X3X3, 4.5X3.5X3, 4.5X4X3 4.5X4.5X3, 5X3X3, 5X3.5X3, 5X4X3, 5X4.5X3

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

PERFORMANCE CRITERIA	RESULTS	
Integrity	Sustained flaming	172 minutes
	Gap gauge	180 minutes, no failure
	Cotton pad	172 minutes
Insulation		172 minutes

The test was discontinued after a period of 180 minutes at the request of the sponsor.

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. 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 fire resistance testing and the 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.

SECTION 3
TEST METHODS

The specimens were 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 1363-1:2020, *Fire resistance tests - Part 1: General requirements*

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SECTION 4
MATERIAL SOURCE/INSTALLATION

The specimens were randomly selected by Intertek B&C personnel Seven Song at JINCHENG HARDWARE INDUSTRY CO.,LTD.'s factory, located at No.191,Wudong Industrial Zone, Lile Town, Jianghai Dist, Jiangmen, Guangdong, China 529060. The subject test specimens are traceable samples selected from the manufacturer's facility warehouse and signed prior to shipment on May 13, 2025. Intertek had verified the composition, manufacturing techniques and quality assurance procedures. Test specimens were received at the Evaluation Center on May 21, 2024.

A description of the test assembly is given in the table below. All values quoted below are nominal, unless tolerances are given. All dimensions are in mm in this report, unless otherwise specified.

TESTED ASSEMBLY DESCRIPTION		
Door	Type	Single Leaf Single Action Swing Timber Composite Fire Door
	Nominal Size	914 mm wide by 2134 mm high by 70 mm thick
	Facing	6 mm Plywood (Flame retardant treatment), density of 600 kg/m^3
	Sub-facing	9 mm Calcium silicate board, density of 850 kg/m^3
	Core	40 mm Perlite board, density of 340 kg/m^3
	Rail & Stile	45 mm x 40 mm Solid wood (Flame retardant treatment), density of 600 kg/m^3
	Lipping	0.7 mm thick PVC sheet
Frame	Nominal Size	1000 mm wide by 2184 mm high by 120 mm deep
	Material	Plywood (Flame retardant treatment), density of 600 kg/m^3, bonded with 15 mm Calcium silicate board, density of 850 kg/m^3, clad with 0.7 mm thick PVC sheet on both faces.
Hardware	Hinge (Test specimen)	2BB butt hinge, Stainless Steel 304 Model: 5X4.5X3 Size: 5''X4.5''X3.0 mm, Quantity: 4 pcs
	Lock	Mortise lock, Model QA72-60A Lock case size: 165 mm x 90 mm x 15 mm Backset: 60 mm; Latch throw: 12 mm
	Door Closer	Model: 092; Installation: Surface mounted standard installation on the opening face of the door

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	Bedding material for hinge and lock	1 mm thick fire pad, made of graphite
Intumescent Seal		Location: 1. 1 strip 2*20mm surface mounted along frame stop; 2. 1 strip 6*30mm mortise mounted around door frame; 3. 1 strip 6*25mm mortise mounted at right, left and top of the door edge.

The sample ID number assigned by the test lab is S250521001SHF.001~004.

According to the document and product provided by the sponsor, Hinge, Model 4X3X3, 4X3.5X3, 4X4X3, 4.5X3X3, 4.5X3.5X3, 4.5X4X3, 4.5X4.5X3, 5X3X3, 5X3.5X3, 5X4X3, 5X4.5X3, have similar design and the same materials, but different dimension. Model 5X4.5X3 with the maximum size was selected to test to cover other models. Please see the table below for details.

Model No.	Dimension	Material	Type	Finish
4X3X3	4”X3”X3mm	SUS304	2BB butt hinge	Satin
4X3.5X3	4”X3.5”X3mm	SUS304		Satin
4X4X3	4”X4”X3mm	SUS304		Satin
4.5X3X3	4.5”X3”X3mm	SUS201		Satin
4.5X3.5X3	4.5”X3.5”X3mm	SUS304		Satin
4.5X4X3	4.5”X4”X3mm	SUS304		Satin
4.5X4.5X3	4.5”X4.5”X3mm	SUS304		Satin
5X3X3	5”X3”X3mm	SUS304		Satin
5X3.5X3	5”X3.5”X3mm	SUS304		Satin
5X4X3	5”X4”X3mm	SUS304		Satin
5X4.5X3	5”X4.5”X3mm	SUS304		Satin

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

A comprehensive drawing and Installation Instruction of the Hinge, Model 4X3X3, 4X3.5X3, 4X4X3, 4.5X3X3, 4.5X3.5X3, 4.5X4X3, 4.5X4.5X3, 5X3X3, 5X3.5X3, 5X4X3, 5X4.5X3 are maintained on Intertek file.

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 placed in front of the furnace for the fire exposure. Prior to the commencement of the EN 1634-1 fire test, the door to be tested 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 was mounted so as to open 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 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 approximately 500 mm above notional floor level. Periodic observations were made of the surface 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 surface temperature is 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 172 minutes. No through openings or penetrations were evident at this 180 minutes fire exposure portion of the test. During this 172 minutes fire exposure period no significant flaming was observed on the unexposed face of the assembly.

After exposed to fire for a period of 172 minutes, Sustained flame was observed at the top edge of the door and lasted more than 10s. Integrity failure was deemed to occur.

This assembly therefore met the criteria of the test standard for integrity performance of 172 minutes.

Insulation

Transmission of heat through the assembly during the fire resistance test of 172 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 the assembly did not raise the maximum temperature of the unexposed surface of the frame by more than 360°C for 172 minutes.

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After exposed to the fire for a period of 172 minutes, the temperature of T9 on unexposed surface increased by more than 180°C, insulation failure was deemed to occur.

This assembly therefore met the criteria of the test standards for insulation performance of 172 minutes.

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

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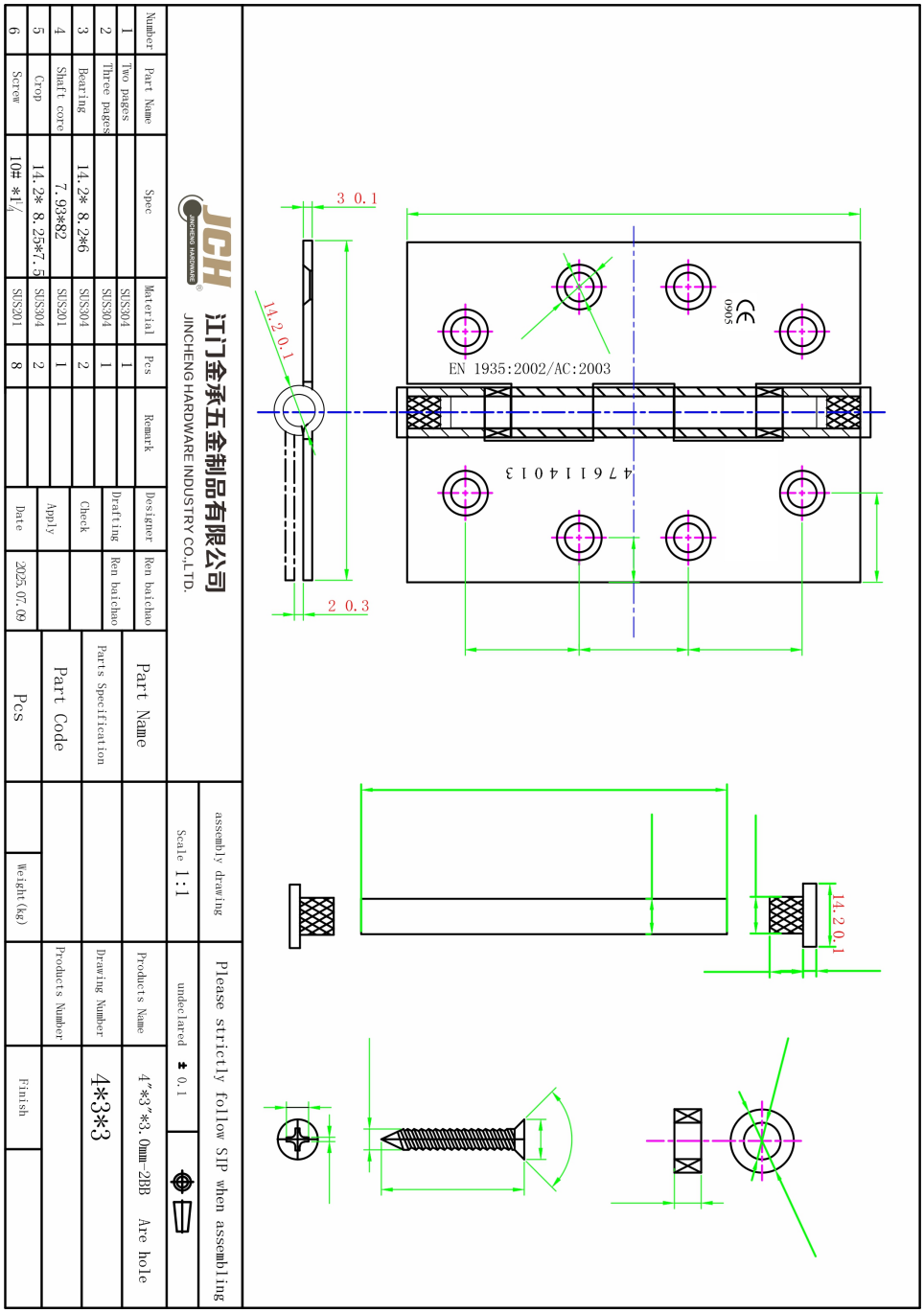
SECTION 6

PRODUCT DRAWING



Drawing of Hinge, model 4X3X3

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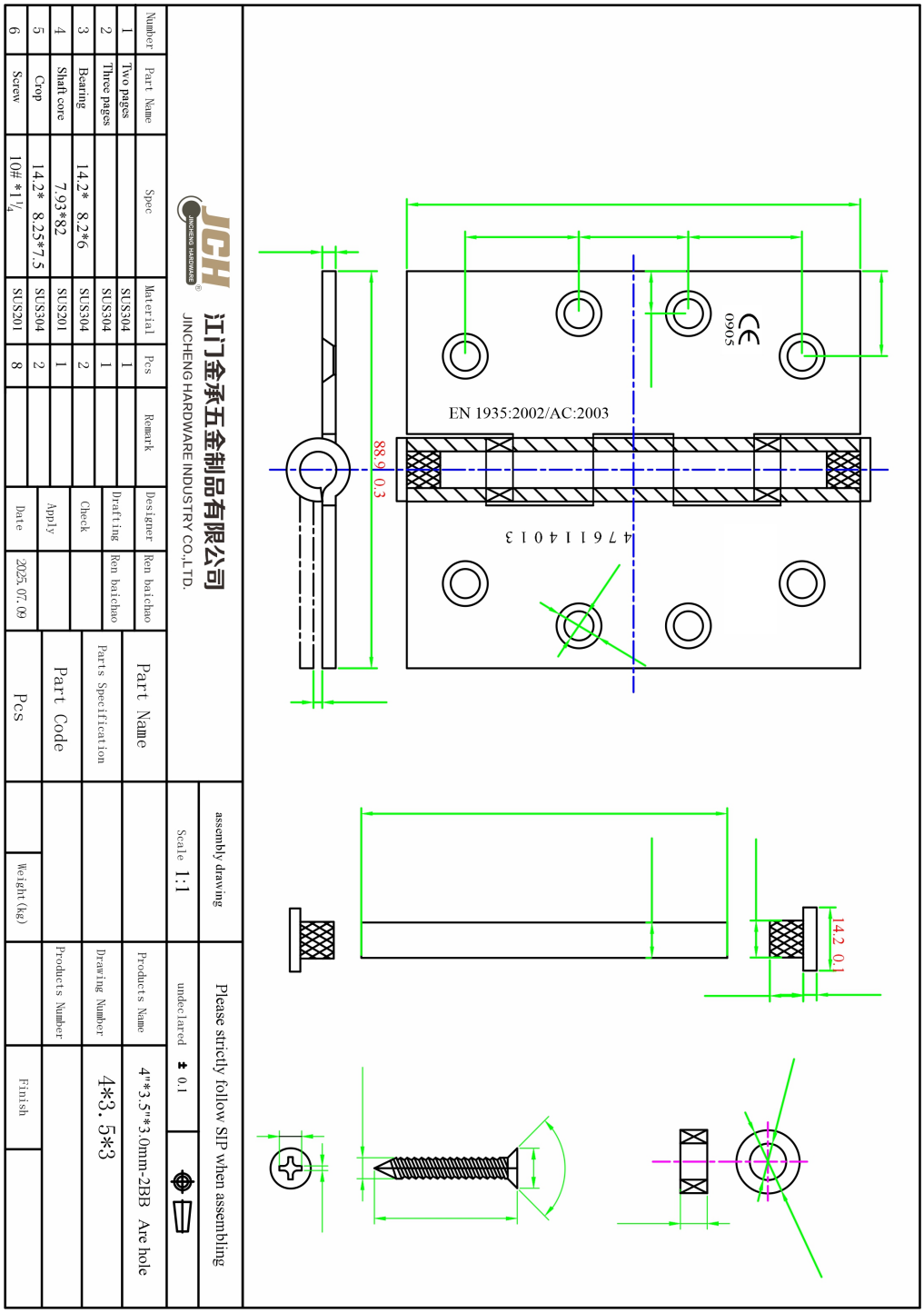

Drawing of Hinge, model 4X3.5X3

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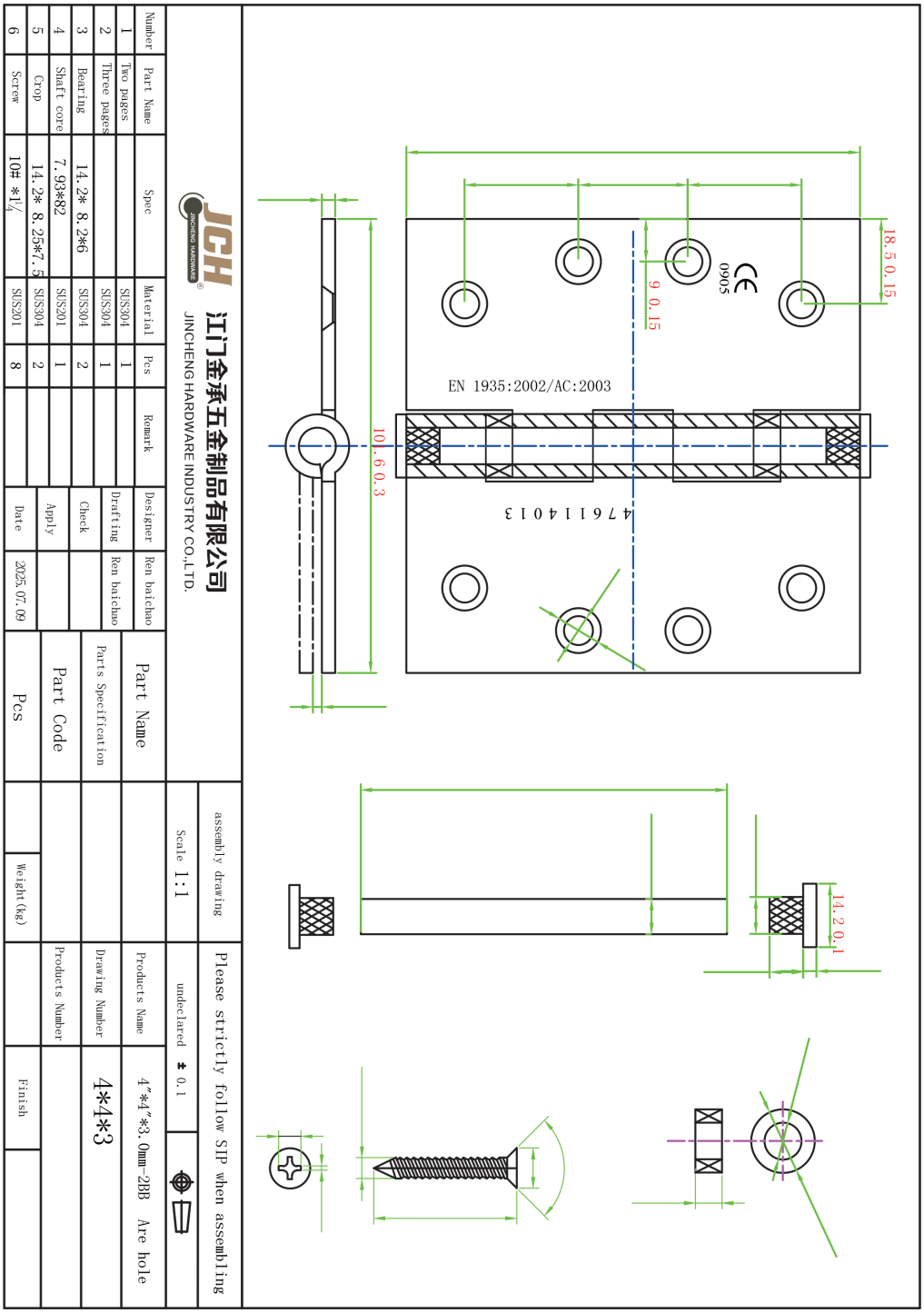

Drawing of Hinge, model 4X4X3

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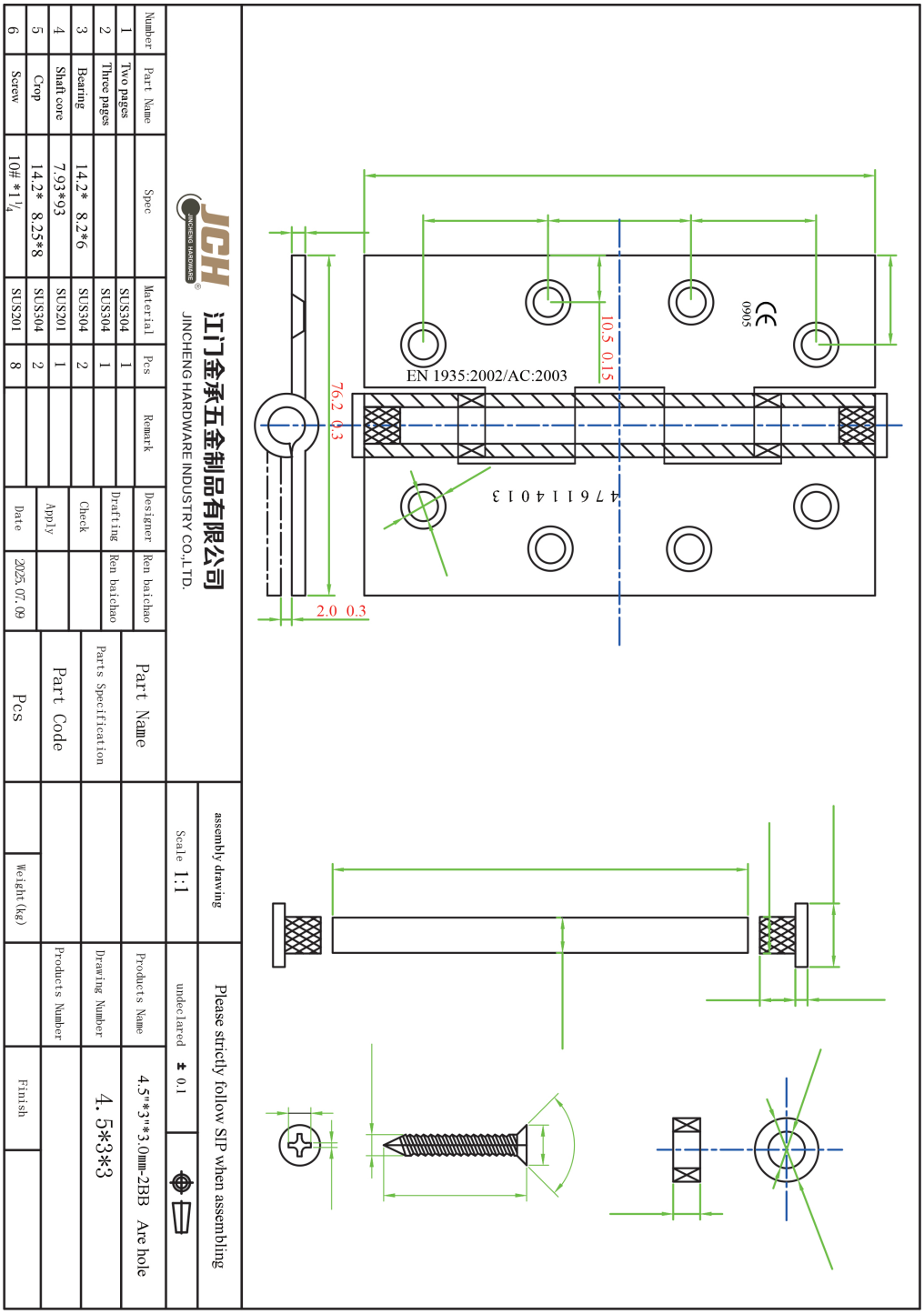

Drawing of Hinge, model 4.5X3X3

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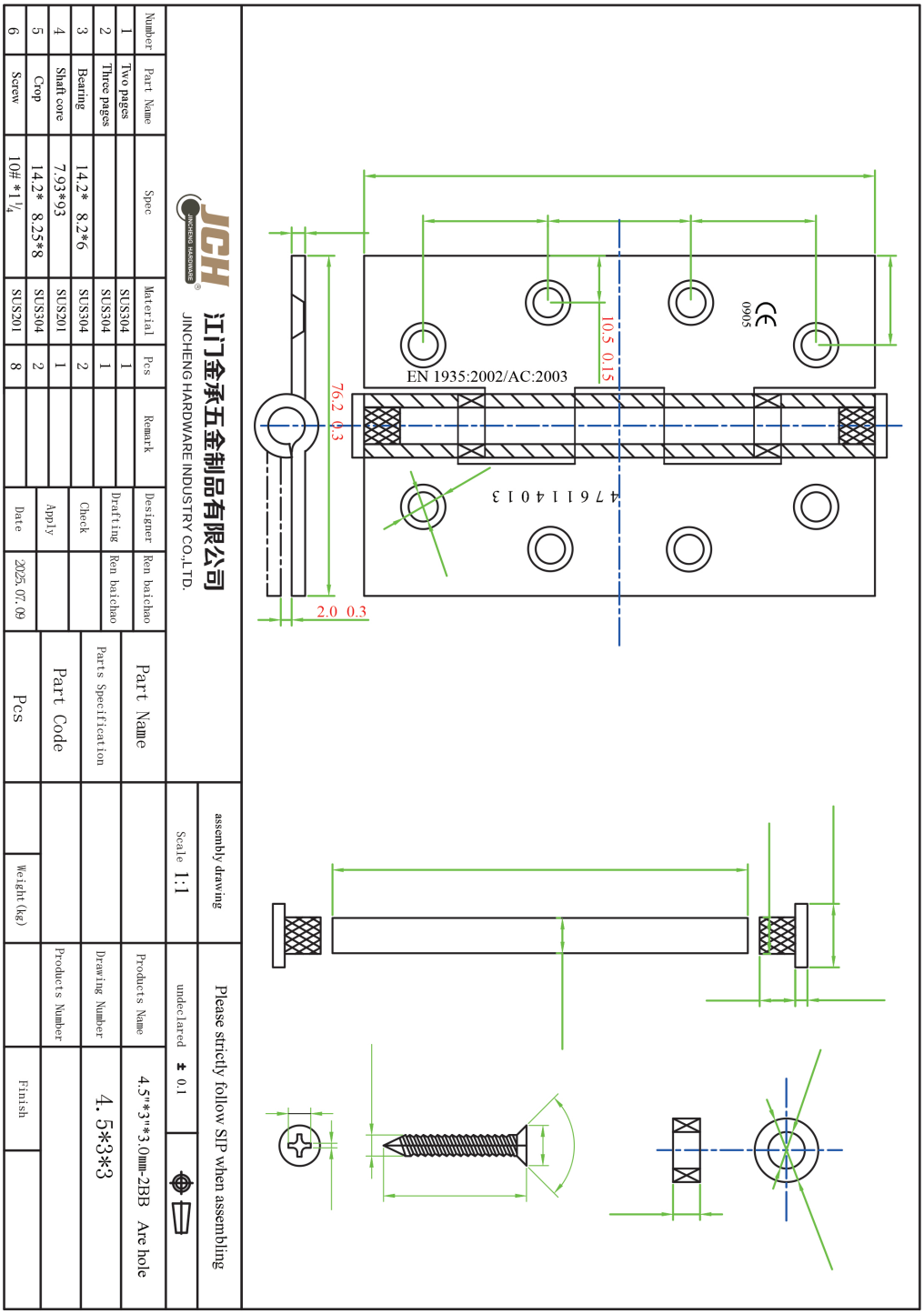

Drawing of Hinge, model 4.5X3.5X3

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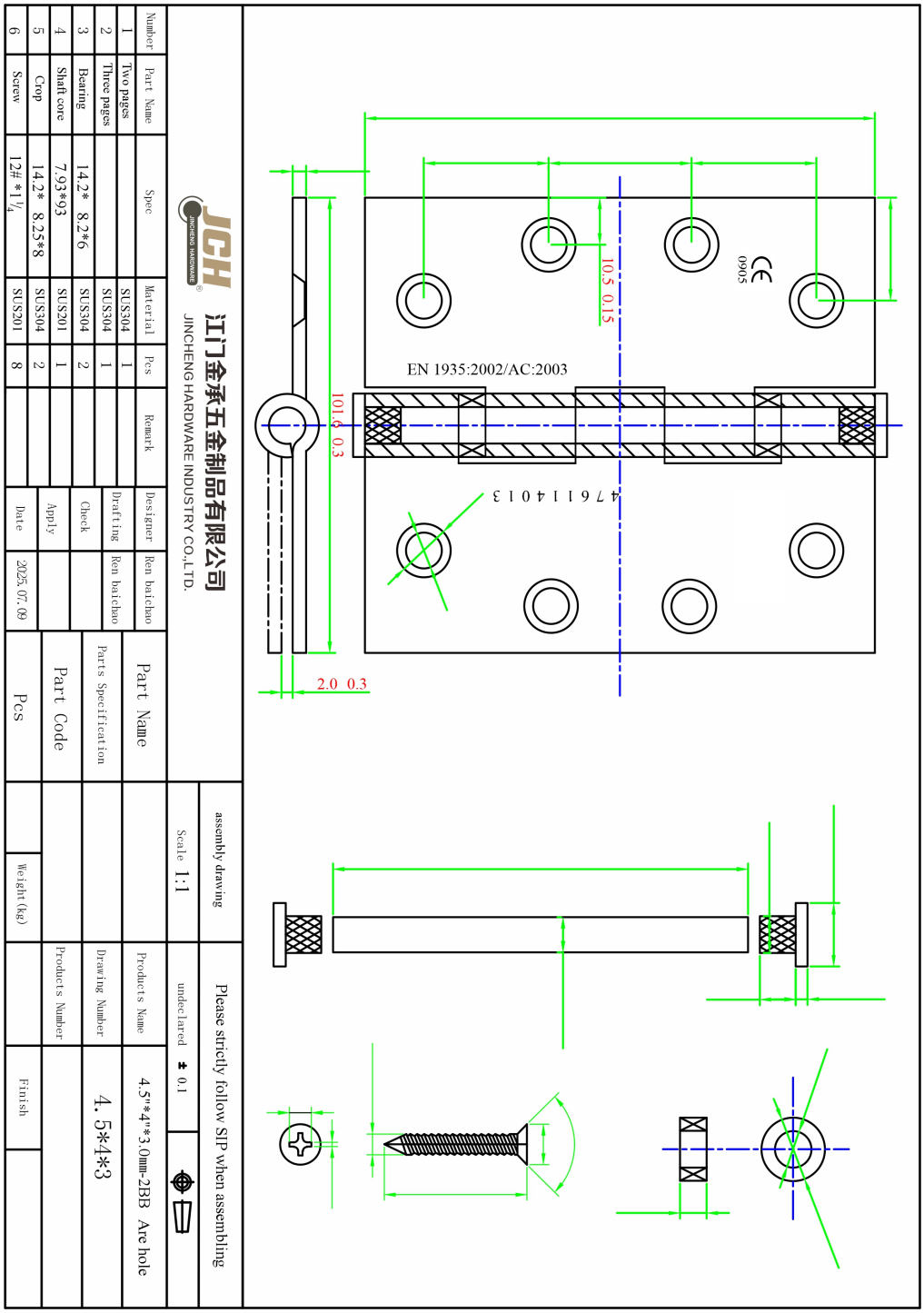

Drawing of Hinge, model 4.5X4X3

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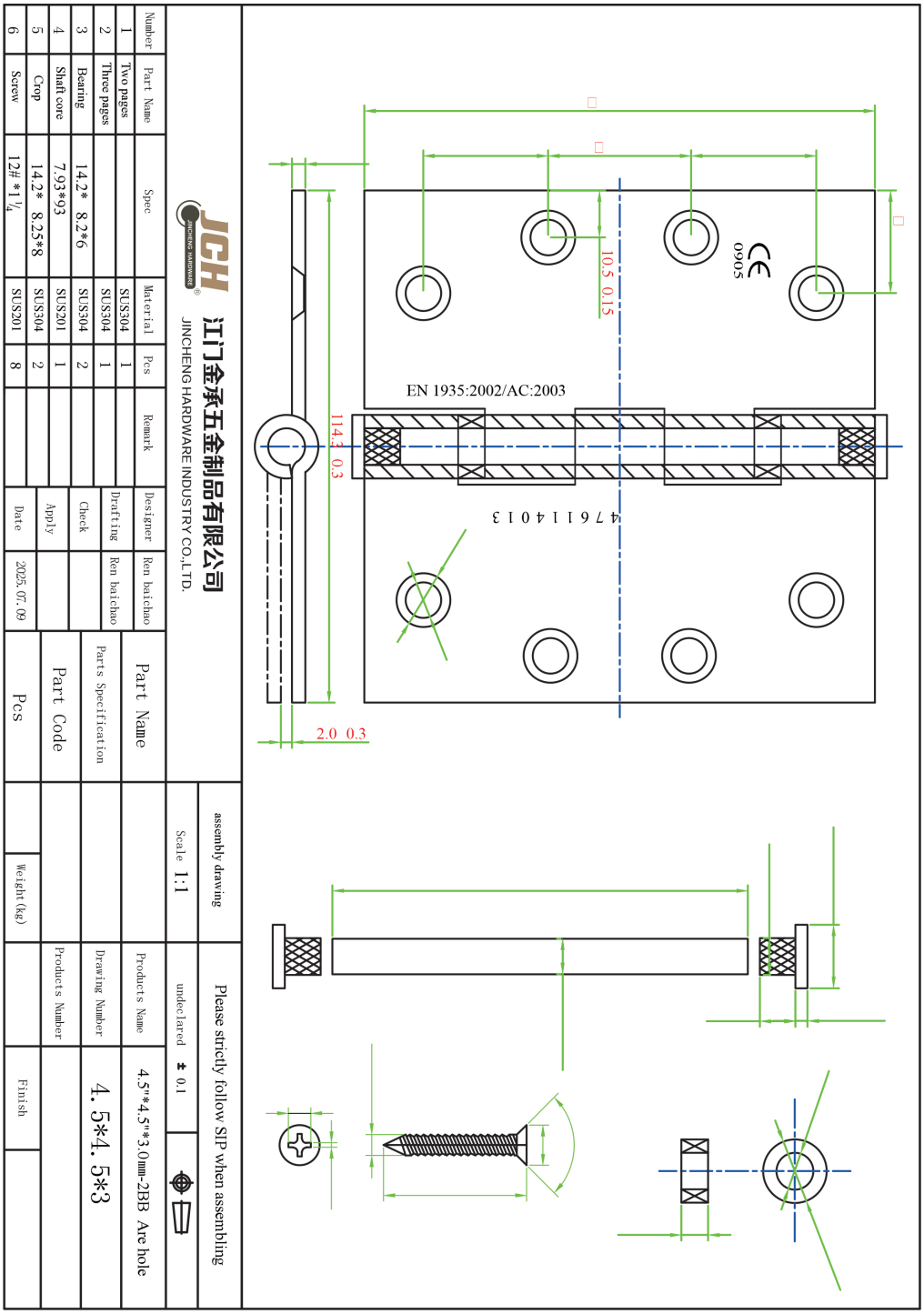

Drawing of Hinge, model 4.5X4.5X3

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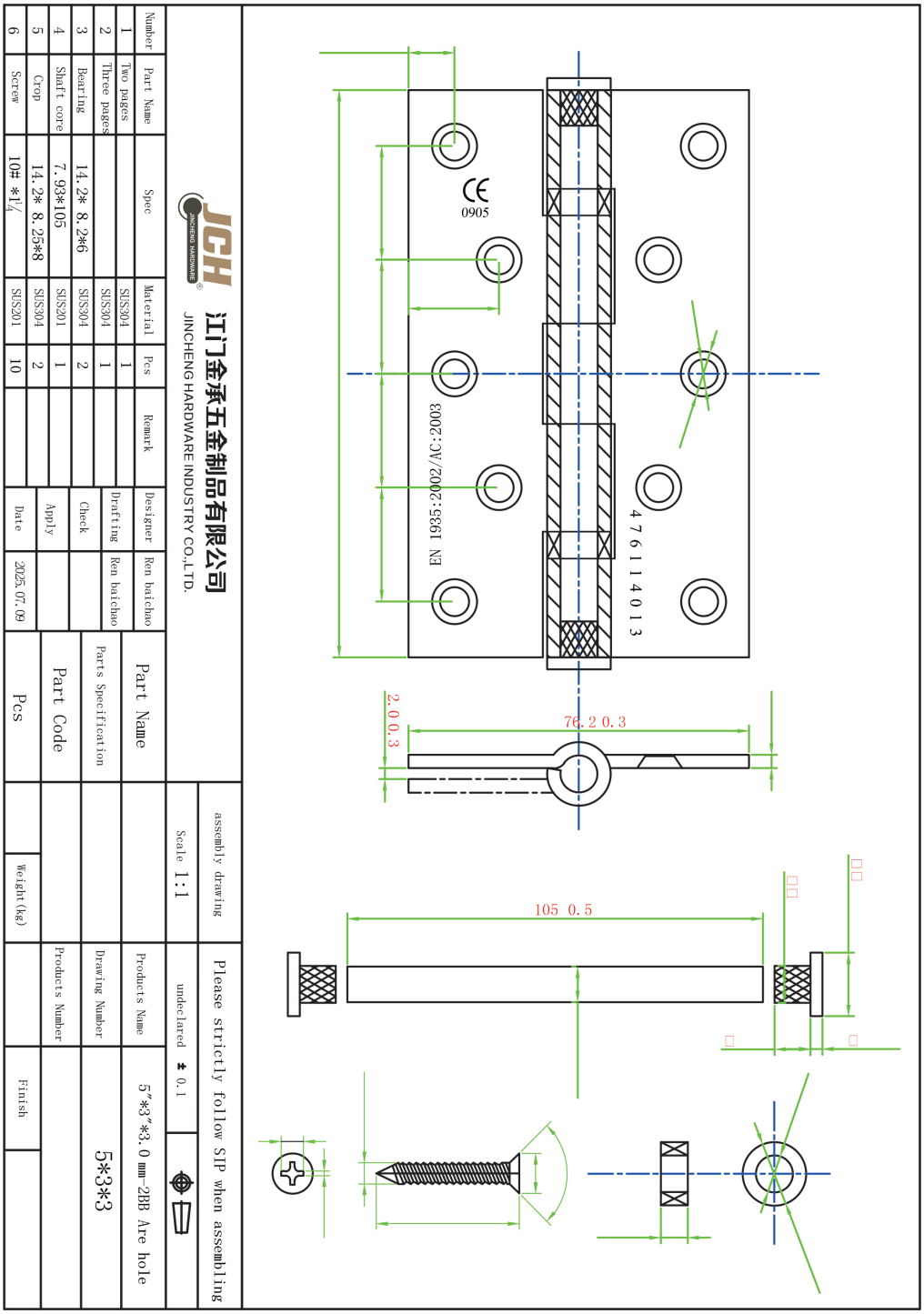

Drawing of Hinge, model 5X3X3

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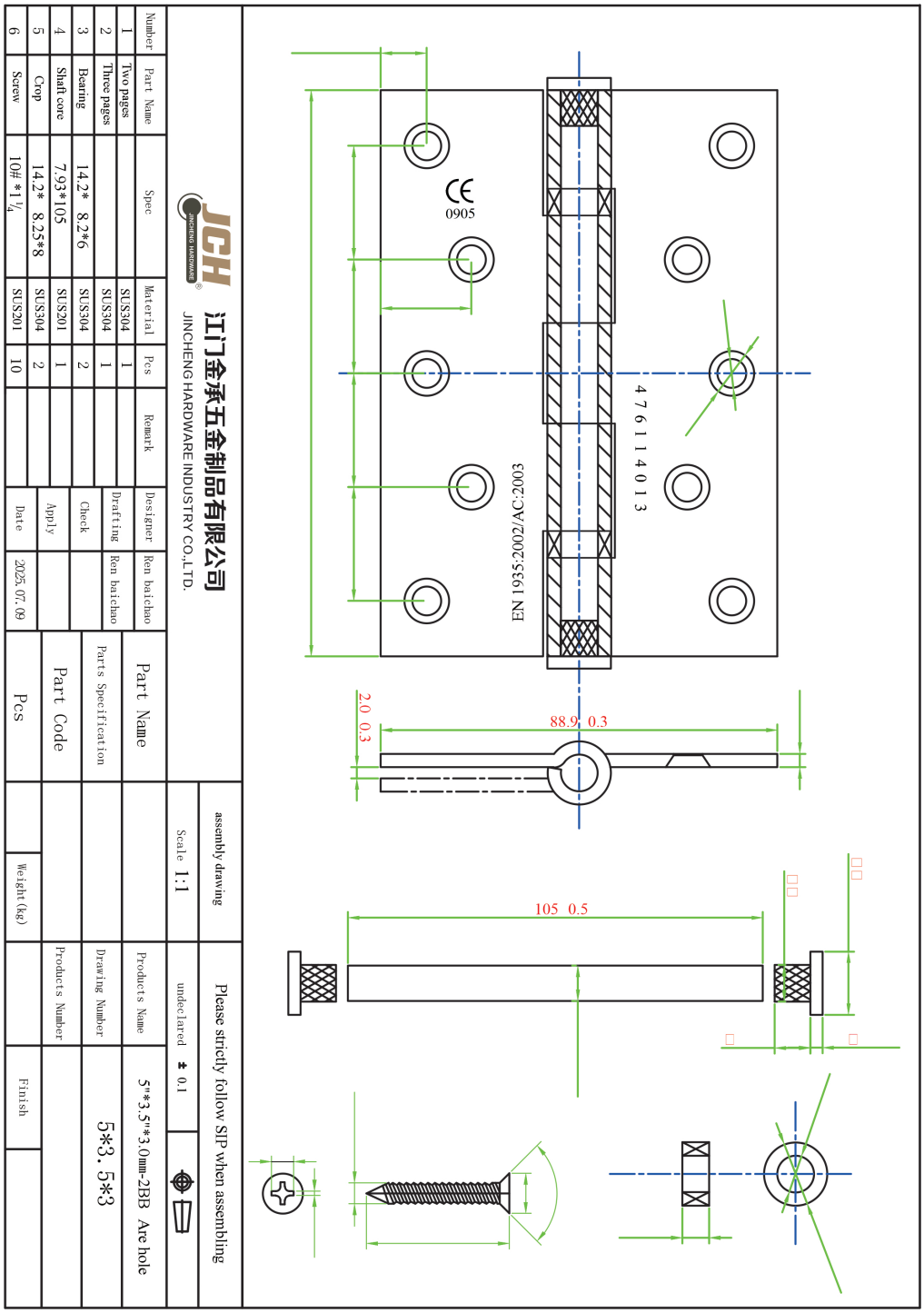

Drawing of Hinge, model 5X3.5X3

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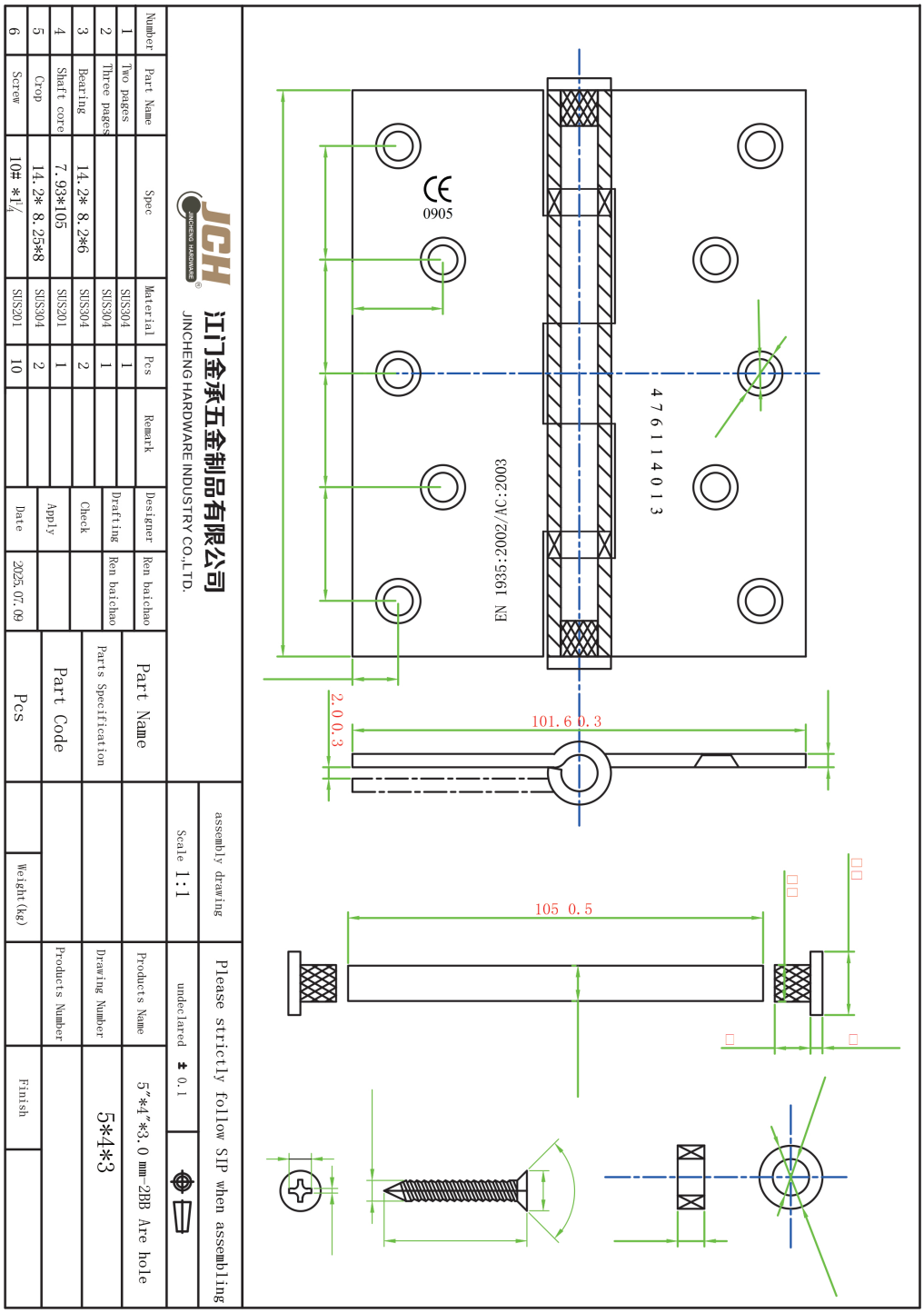

Drawing of Hinge, model 5X4X3

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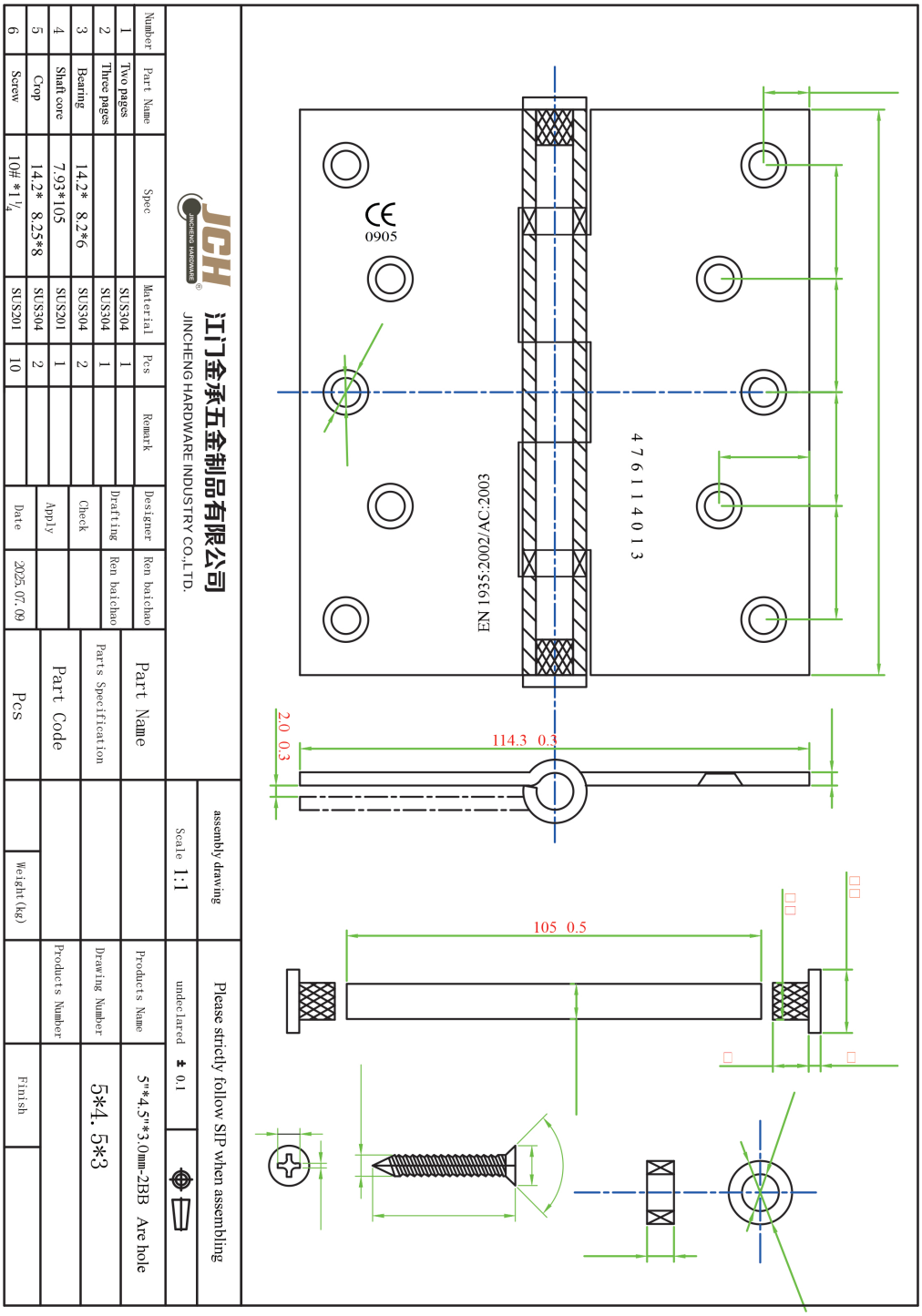

Drawing of Hinge, model 5X4.5X3

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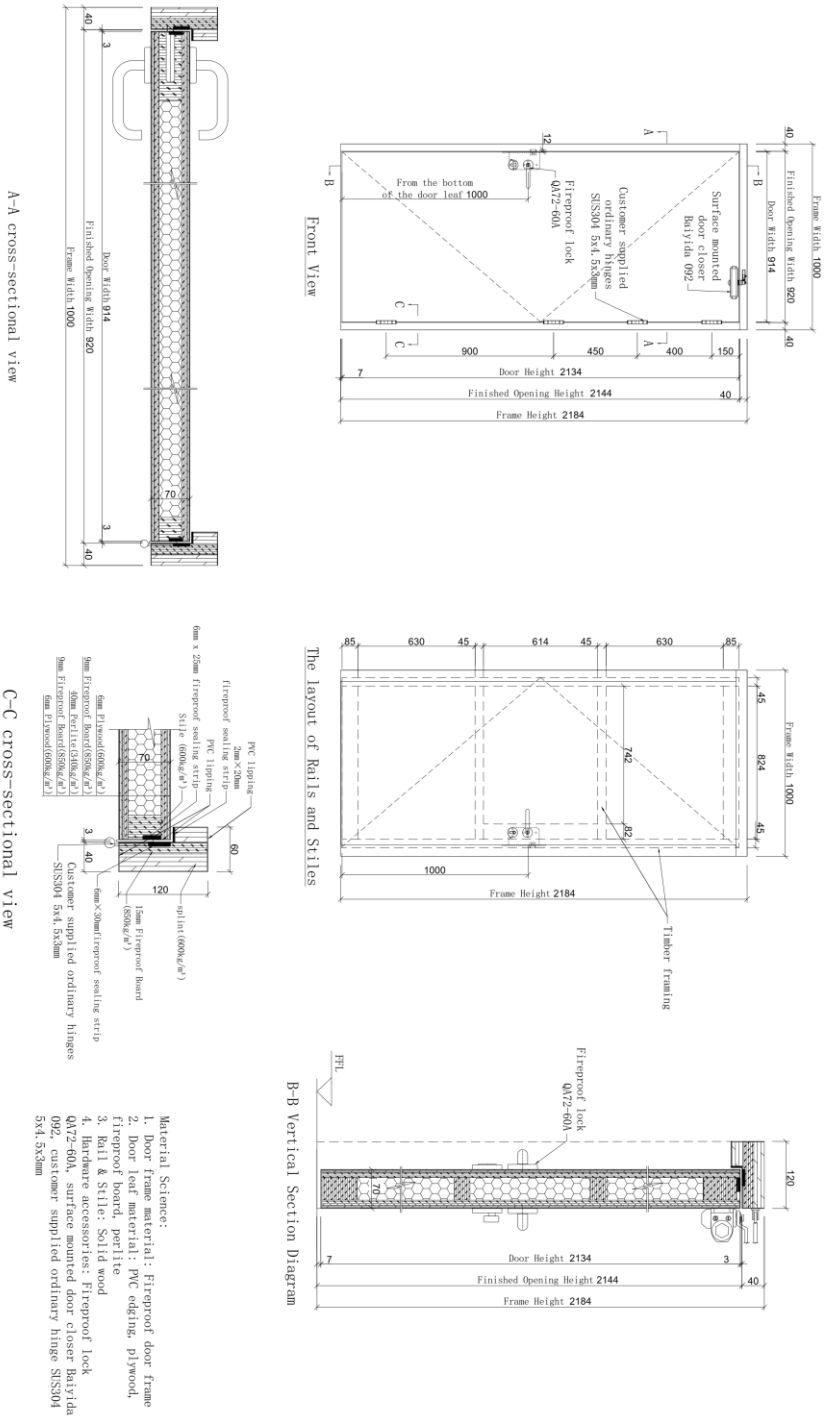
SECTION 7

FIRE DOOR ASSEMBLY DRAWING



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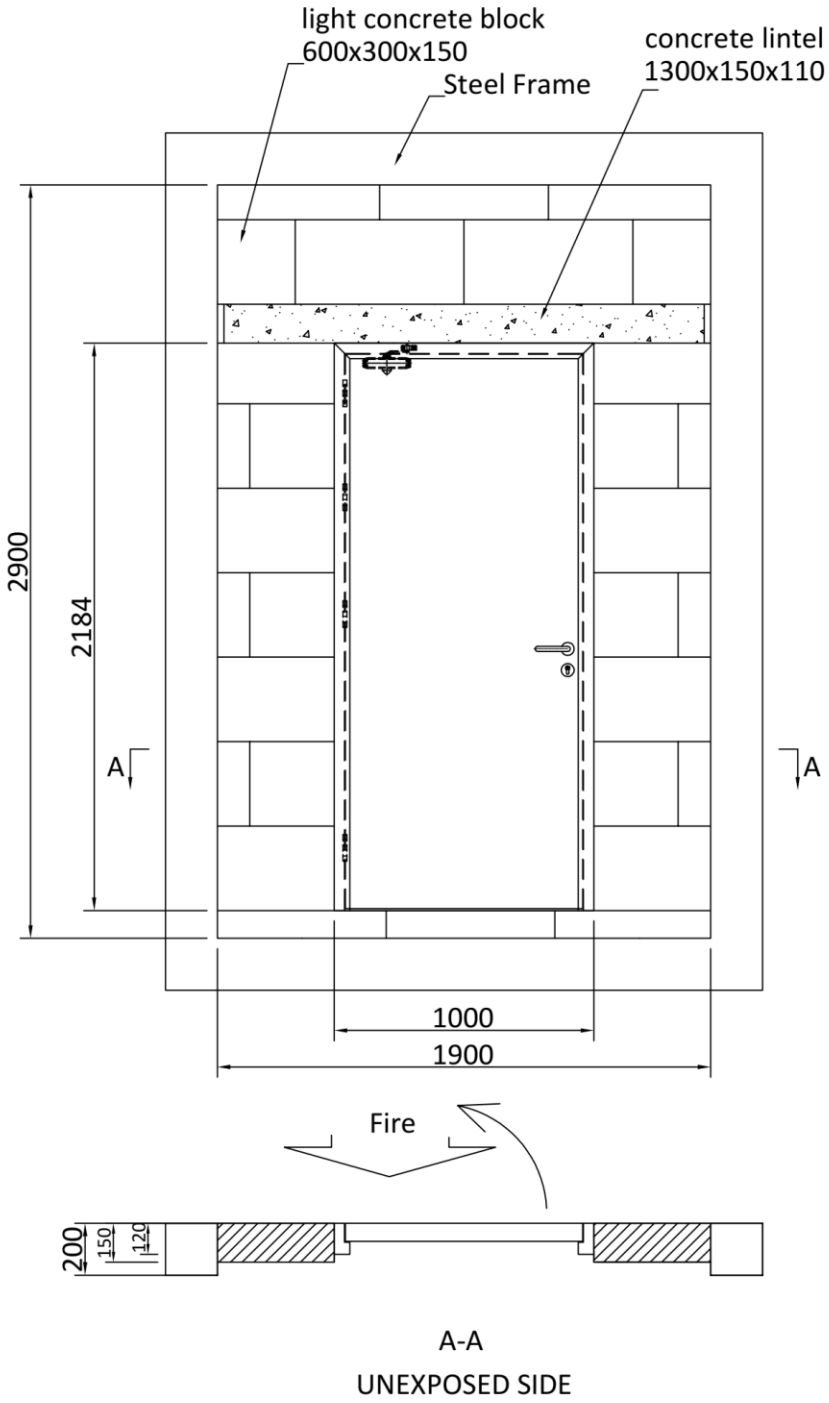
SECTION 8

TEST WALL CONSTRUCTION



A-A

UNEXPOSED SIDE

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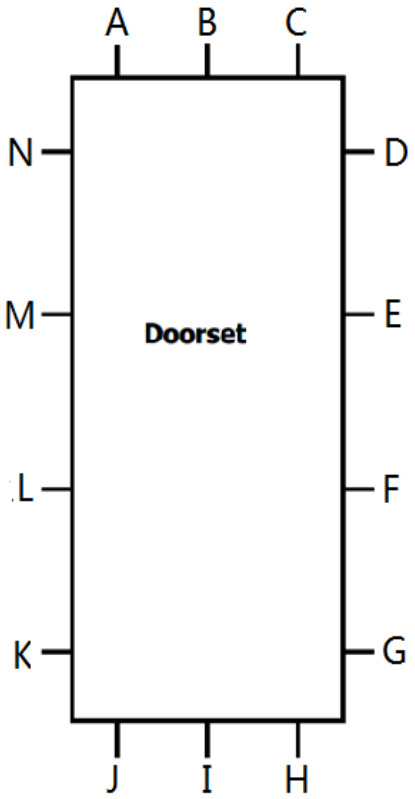
SECTION 9

TEST MEASUREMENT DATA



EXPOSED SIDE

Clearance dimension in mm at each position													
A	B	C	D	E	F	G	H	I	J	K	L	M	N
3.3	3.4	3.1	2.3	2.4	2.1	2.5	7.0	7.3	7.1	2.4	2.3	2.1	2.0

DO NOT SCALE

DOOR ASSEMBLY INITIAL CLEARANCES

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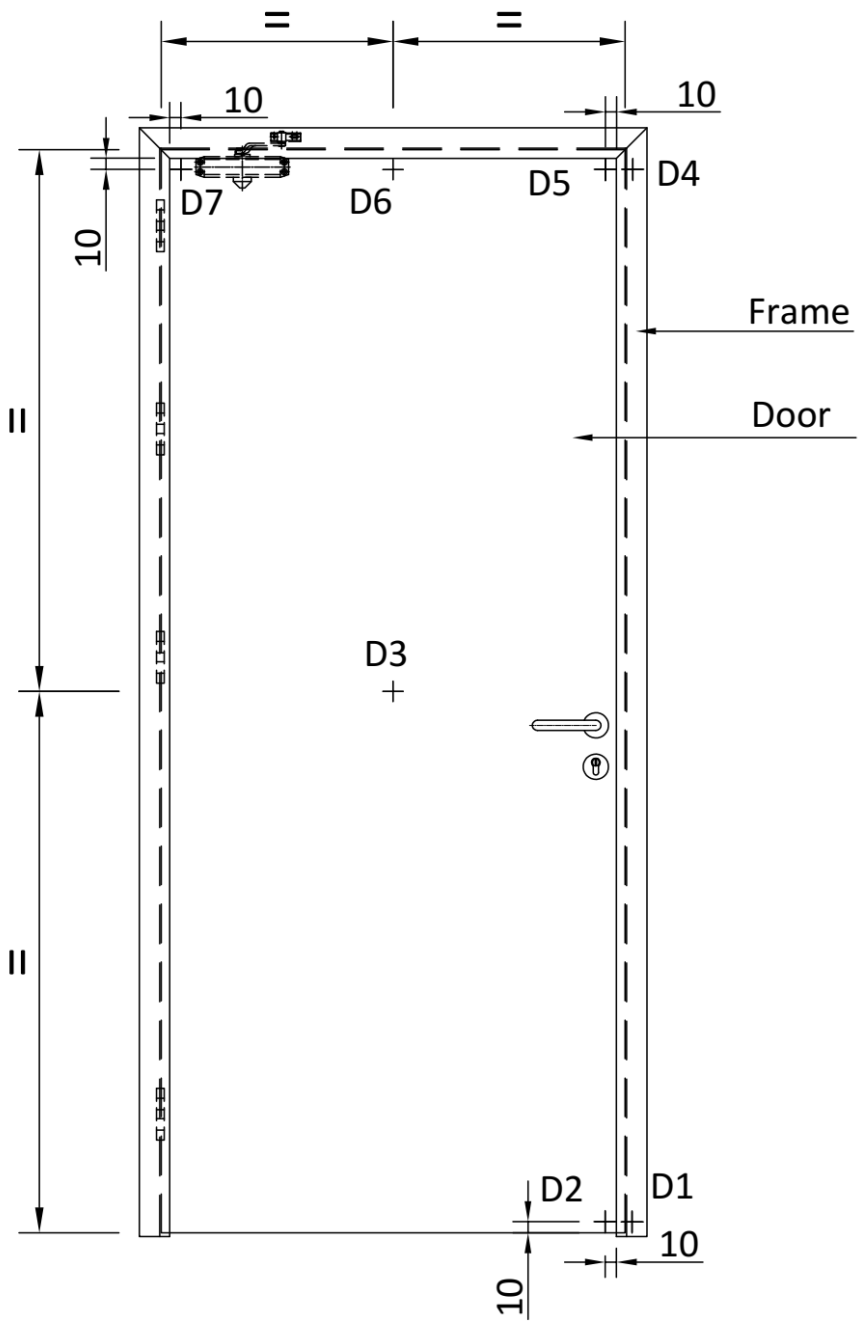

UNEXPOSED SIDE

POSITION FOR MEASUREMENT OF HORIZONTAL DEFLECTION

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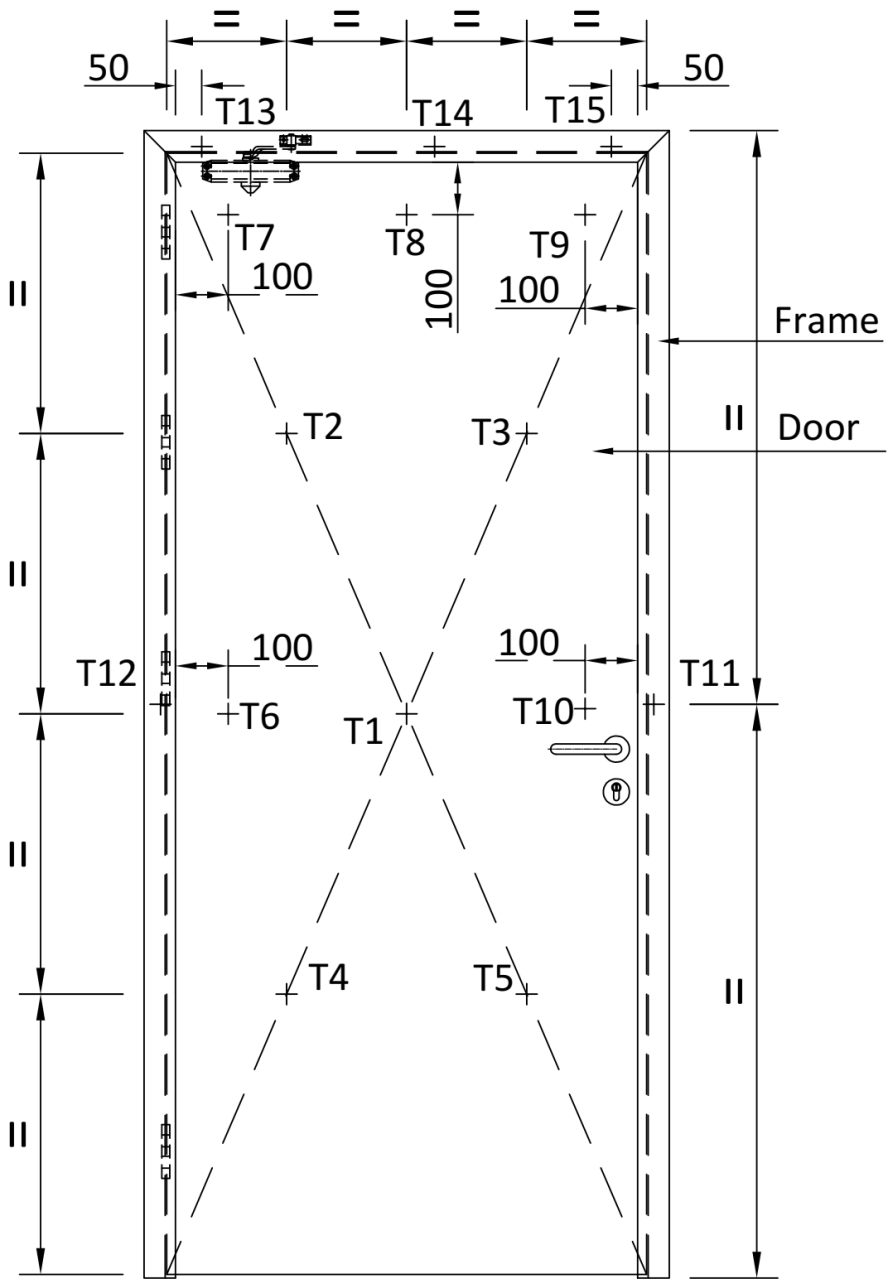

UNEXPOSED SIDE

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 door and shutter assemblies and openable windows

Conditioning: According to EN 1363-1, Section 8

Equipment:

ITEM	ID
Vertical furnace	SH1098
Furnace pressure gauge	SH1097-15-4 & SH1348
Test Clock	SH1042
Furnace thermocouple	SH1097-4 & SH1097-4-1~5
Ambient temperature gauge	SH1097-11
Unexposed thermocouple	SH1097-12 & SH1097-12-1~14
Clearance Measurements	SH1506
Displacement Measurements	SH1377-1~7
Force Gauge	SH1211

Heating Conditions: According to EN 1363-1, Section 5.1
Pressure Conditions: According to EN 1363-1, Section 5.2
Ambient Conditions: 10 to 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
Thermocouple Pads: Length and width 30 mm, thickness 2.0±0.5 mm, dry density 900±90 kg/m^2
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 started.
01	50	Smoke issued from the upper right corner of the door.
03	05	Smoke issued from the perimeter of the door.
04	30	Heavy smoke issued from the perimeter of the door.
30	00	No significant change.
40	30	There was an unidentified liquid emitted from the top edge of the door.
43	40	Darkening was observed at the cylinder.
82	10	The sealing strip separated from the stop of the header.
91	30	Darkening was observed at the cover of the cylinder and handle.
100	00	No significant change.
120	50	Darkening was observed at the upper left corner of the door.
129	12	The sealing strip separated from the stop of the header and fell down to the ground.
141	20	The sealing strip separated from the stop of the hinge jamb and fell down to the ground.
151	30	Darkening was observed at the top half of the leading edge and hinge edge, top edge of the door.
157	20	Darkening was observed at the lock position of the door.
169	50	Explosions were heard from the upper right corner of the door.
172	56	Sustained flame was observed at the top edge of the door and lasted more than 10s, and the Integrity failure was deemed to occur.
178	25	Sustained flame was observed at the upper left corner of the frame. Sustained flame was still observed at the top edge of the door.
180	00	Fire test was discontinued at the request of the client.

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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	25
5	576	624
10	678	704
15	739	751
20	781	780
25	815	816
30	842	844
35	865	880
40	885	910
45	902	899
50	918	911
55	932	926
60	945	947
65	957	961
70	968	973
75	979	983
80	988	977
85	997	996
90	1006	1015
95	1014	1026
100	1022	1023
105	1029	1026
110	1036	1036
115	1043	1043
120	1049	1049
125	1055	1055
130	1061	1060
135	1067	1067
140	1072	1072
145	1077	1078

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Time Mins	Specified Furnace Temperature (°C)	Furnace Mean Temperature (°C)
150	1082	1081
155	1087	1086
160	1092	1092
165	1097	1097
170	1101	1104
175	1106	1108
180	1110	1114

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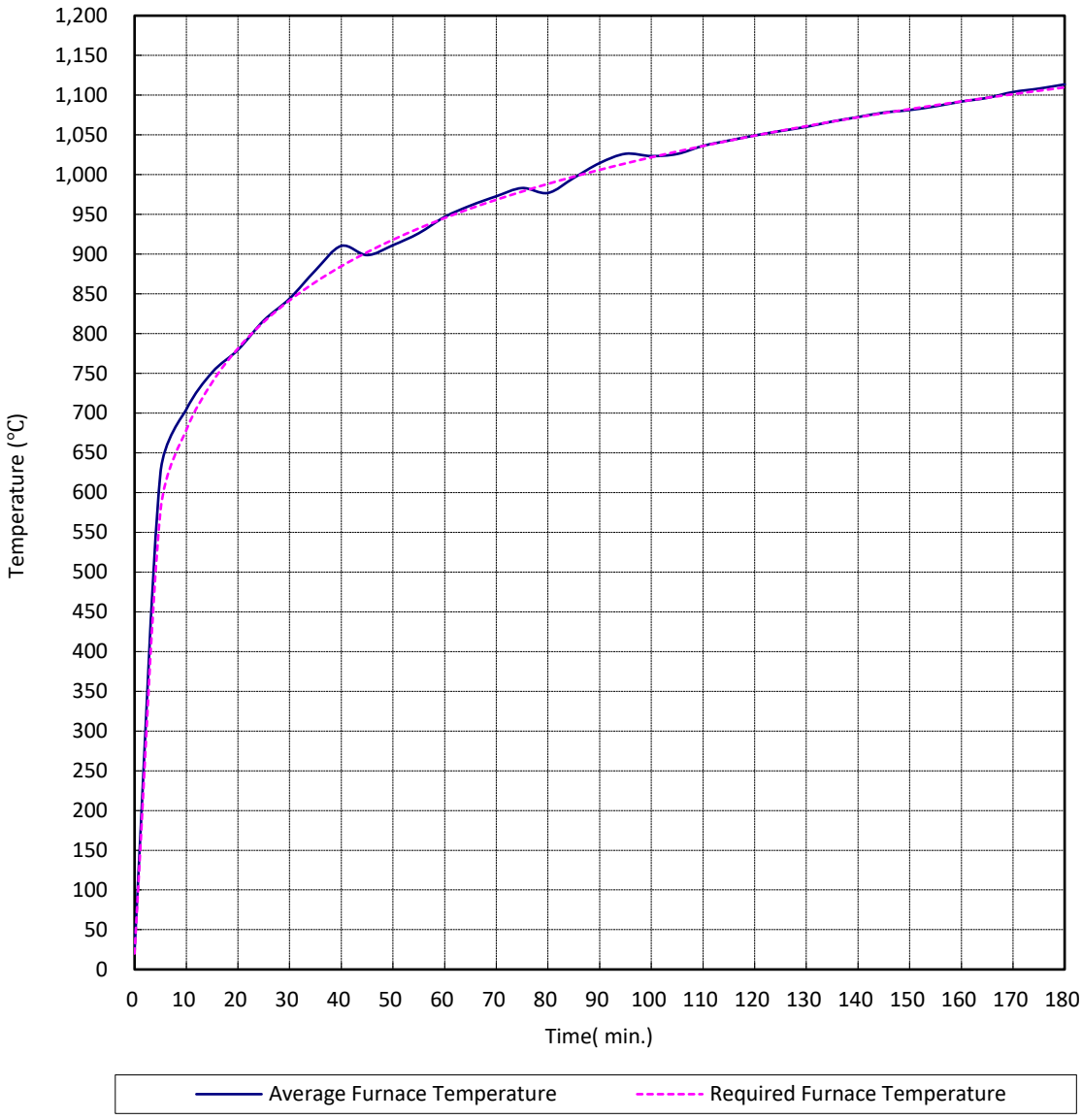
Graph for mean furnace temperature and temperature-time curve specified in the standard



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Unexposed surface temperatures

Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	Mean Temperature (°C)
0	27	26	25	25	25	26
5	27	26	25	25	25	26
10	27	26	25	25	25	26
15	27	26	26	25	25	26
20	28	27	27	26	26	27
25	30	29	30	28	28	29
30	32	32	35	31	31	32
35	37	39	45	35	35	38
40	45	47	57	42	42	47
45	54	54	65	50	50	55
50	63	59	69	57	57	61
55	68	62	71	63	62	65
60	71	64	72	66	66	68
65	73	65	73	68	69	70
70	74	66	74	69	70	71
75	74	66	74	69	71	71
80	75	67	74	69	71	71
85	75	67	74	70	72	72
90	75	67	75	70	72	72
95	76	68	75	70	72	72
100	76	68	75	70	73	72
105	77	68	75	70	73	73
110	77	69	75	70	73	73
115	77	69	75	70	73	73
120	77	69	76	71	73	73
125	77	69	76	71	74	73
130	77	70	76	71	74	74
135	78	70	76	71	74	74
140	77	70	76	71	74	74
145	78	71	77	71	75	74
150	80	74	78	72	78	76
155	84	79	86	74	83	81
160	91	86	96	80	90	89

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Time Mins	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	Mean Temperature (°C)
165	97	92	103	87	96	95
170	101	96	107	94	86	97
172	103	96	96	96	85	95
173	103	96	92	96	85	94
175	104	96	89	97	84	94
180	106	97	87	85	85	92

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Unexposed surface temperatures

Time Mins	T6 (°C)	T7 (°C)	T8 (°C)	T9 (°C)	T10 (°C)	T11 (°C)	T12 (°C)	T13 (°C)	T14 (°C)	T15 (°C)
0	25	25	26	26	25	25	25	24	24	24
5	25	26	27	27	25	25	25	25	25	31
10	25	26	26	27	25	25	25	25	25	27
15	26	26	26	27	26	25	25	25	25	27
20	26	27	27	28	26	25	25	25	25	29
25	28	28	30	31	27	27	27	26	26	31
30	30	32	35	36	29	29	29	27	28	32
35	36	41	42	44	32	32	31	29	30	35
40	43	45	48	52	38	35	35	33	34	37
45	52	48	54	58	43	38	38	37	36	40
50	58	51	59	63	48	41	43	41	40	44
55	62	54	64	66	52	43	48	45	43	49
60	64	58	68	69	57	46	54	49	47	52
65	65	62	71	70	61	48	59	53	50	56
70	66	67	72	71	66	50	65	56	53	58
75	67	70	73	71	70	53	70	58	56	60
80	68	71	73	72	75	56	73	60	58	61
85	68	72	74	72	79	59	77	62	59	63
90	68	73	74	73	82	63	80	64	62	65
95	68	74	75	74	84	67	82	66	64	67
100	69	74	75	74	85	71	83	67	66	69
105	69	75	75	74	87	76	85	70	69	71
110	69	75	75	74	88	82	87	74	73	74
115	69	75	76	75	90	87	88	78	78	78
120	69	76	76	76	92	89	90	84	84	80
125	70	77	77	77	94	91	91	88	87	84
130	70	82	78	82	95	92	91	91	88	87
135	71	88	79	90	98	93	92	92	89	89
140	73	94	81	96	101	94	92	93	89	91
145	79	100	85	101	106	94	93	94	89	92
150	84	105	89	105	113	94	93	95	90	93
155	90	118	94	116	123	94	93	96	90	94
160	93	133	99	133	134	95	94	97	91	95

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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)
165	95	146	104	150	134	95	94	99	92	95
170	96	160	107	173	145	95	95	100	93	97
172	96	165	101	191	149	95	96	101	95	98
173	96	168	99	208	152	95	97	101	96	99
175	96	174	103	273	157	96	97	101	116	100
180	96	187	118	451	173	97	99	103	112	118

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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	-3	2	4	2	2	2
20	1	-1	4	11	3	3	5
30	1	2	2	14	7	7	9
40	1	3	1	15	9	9	11
50	1	4	1	17	13	10	14
60	1	6	1	18	18	14	18
70	1	7	2	19	21	17	21
80	2	7	5	21	21	17	23
90	2	7	5	21	21	18	25
100	2	5	7	23	21	19	26
110	2	5	9	23	22	21	26
120	2	4	11	23	22	25	29
130	2	3	14	25	27	30	24
140	3	3	18	24	27	36	/
150	3	3	20	24	/	36	/
160	4	4	22	23	/	37	/
170	4	4	26	23	/	32	/
180	3	4	29	23	/	31	/

Note: Symbol "/" indicates the deflection measurement was discontinued due to heavy smoke.

Door Closer Closing Force

Closing Force		
Highest gauge reading (N)	Distance (m)	Moment (N.m)
24.6	0.77	19.3
25.2		
25.2		

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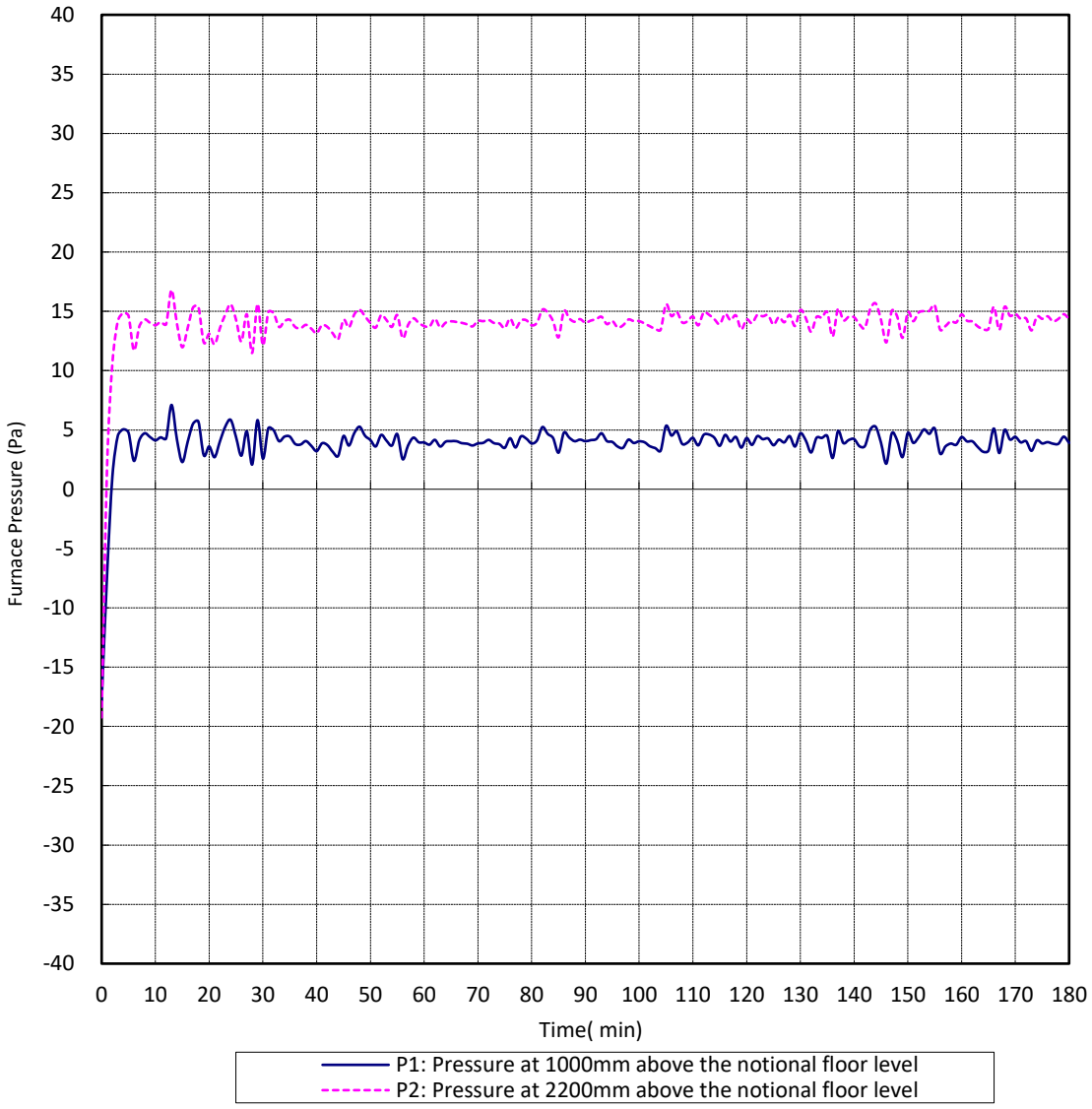
Graph for Furnace pressure



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SECTION 11
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 Unexposed Side after 120 Minutes

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Fig. 7 Unexposed Side after 172 Minutes

Fig. 8 Unexposed Side after 180 Minutes

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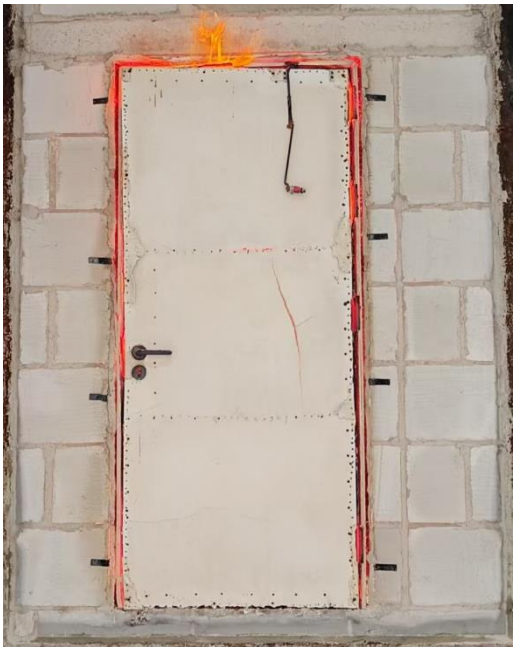

Fig. 9 Exposed Side after 180 Minutes

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SECTION 12
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	2025-06-24	N/A	Original Report Issue