TEST REPORT

REPORT NUMBER: 130820007SHJ-BP-1
ORIGINAL ISSUE DATE: November 8, 2013

EVALUATION CENTER

Intertek Testing Services Ltd., Shanghai Jinqiao Branch
Plant 7, No. 6958 Daye Road, Fengxian District, Shanghai

RENDERED TO

Dongguan Leado Door System Co., Ltd.
Xinhe Village, Wanjiang District, Dongguan City,
Guangdong Province, China, Post code: 523061

PRODUCT EVALUATED
Floor spring
Model: DFG893

EVALUATION PROPERTY
Fire Resistance

Report of Testing Floor spring in Wooden Door Assembly for compliance with the applicable requirements of the following criteria: *EN 1634-1:2008, Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware – Part 1: Fire resistance tests for doors, shutters and openable windows.*

1 Table of Contents

2 Introduction

Intertek Testing Services has conducted an evaluation for Dongguan Leado Door System Co., Ltd. to determine the fire resistance characteristics of the Floor spring –DFG893 in Wooden Door Assembly. This test was designed to demonstrate evaluation on the Floor spring of two types including DFG893 and DFG883.This evaluation began on September 1, 2013 and was completed on November 8, 2013. The test was conducted on October 12, 2013.

The test was conducted in accordance with EN 1634-1:2008 “Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware – Part 1: Fire resistance tests for doors, shutters and openable windows”.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were submitted to Intertek directly from the client. Samples were not independently selected for testing. Samples were received at the Evaluation Center on September 1, 2013.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

Door	Type	Single Swing Wooden Door
	Nominal Size	732 mm wide by 2045 mm high by 54 mm thick
Frame	Nominal Size	800 mm wide by 2100 mm high
Hardware	Floor Spring	Standard Installation Model: DFG893 Bedding material: intumescent strip Bedding material model : THERM-A-STRIP, 2mm thick

The sample ID number is IASQSH130402001.001.

The trade name is DORINT.

The Floor spring - DFG893 is selected for the test to cover the other model provided that the configuration and the material are same.

The drawings of the door closer, floor spring installation instruction, fire door assembly, and test wall construction can be found in Appendices A, B, C and D respectively.

4 Testing and Evaluation Methods

The test was conducted in accordance with EN 1634-1:2008 “Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware – Part 1: Fire resistance tests for doors, shutters and openable windows”, and EN 1363-1:1999 “Fire Resistance Tests – Part 1: General Requirements”.

The test assembly was installed in a steel restraint frame. The test sample moved in front of the furnace for the fire exposure. The test door was oriented to open into the furnace, and was built into a concrete masonry unit partition, with fully mortared joints. The nominal dimensions of the test wall were 3 m high by 3 m wide. The test measurement data was shown in Appendix E.

After positioning the assembly frame over the furnace opening, the burners were ignited and the timer was started when any of the furnace thermocouples exceeded 50°C. 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 Appendix E.

5 Testing and Evaluation Results

5.1. INTEGRITY

The assembly withstood the fire resistance test without passage of flame or gases hot enough to ignite cotton waste for 40 minutes. No through openings or penetrations were evident at this 40 minutes fire exposure portion of the test and the door latch remained engaged to the strike. During this 40 minutes fire exposure period no significant flaming was observed on the unexposed face of the assembly.

After exposed to the fire for a period of 40 minutes, sustained flame comes out from the bottom of the door, integrity failure is deemed to occur. This assembly therefore met the criteria of the test standards for integrity performance of 40 minutes.

5.2. INSULATION

Transmission of heat through the assembly during the fire resistance test did not raise the average temperature on the unexposed surface by more than 140°C, and did not raise the maximum temperature on the unexposed surface by more than 180°C. 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.

This assembly passed the insulation portion of the test of 40 minutes. A full set of test data is included in Appendix F, and photographs have been presented in Appendix G.

6 Conclusion

The Floor spring –DFG893 and single wooden door assembly identified in this report has been tested in accordance with EN 1634-1:2008 “Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware – Part 1: Fire resistance tests for doors, shutters and openable windows”. This test was designed to demonstrate evaluation on the Floor spring of two types including DFG893 and DFG883.

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

Integrity	Sustained flaming	40 minutes
	Gap gauge	40 minutes
	Cotton pad	40 minutes
Insulation		40 minutes

The test was discontinued after a period of 40 minutes at the request of the sponsor.

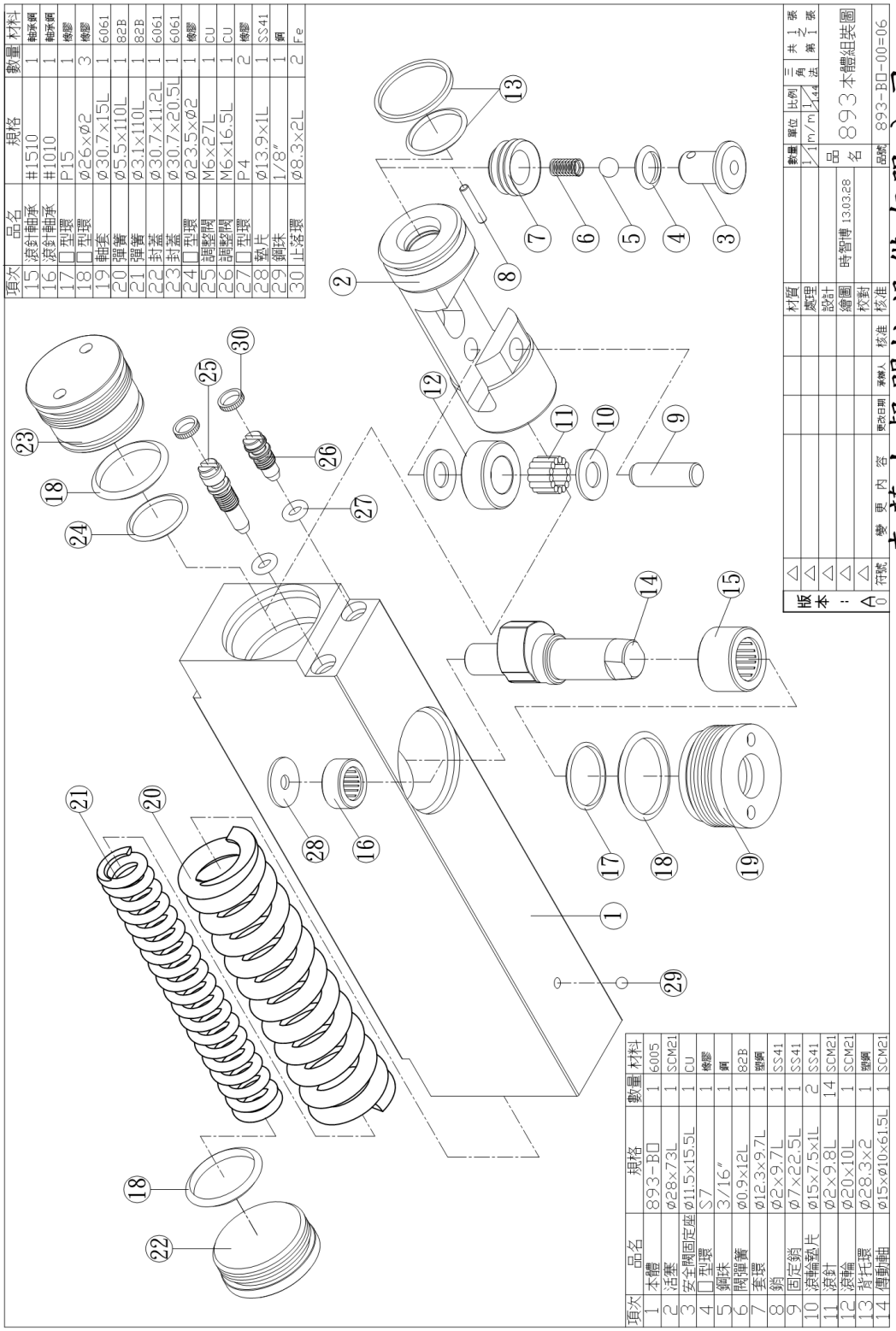
The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK

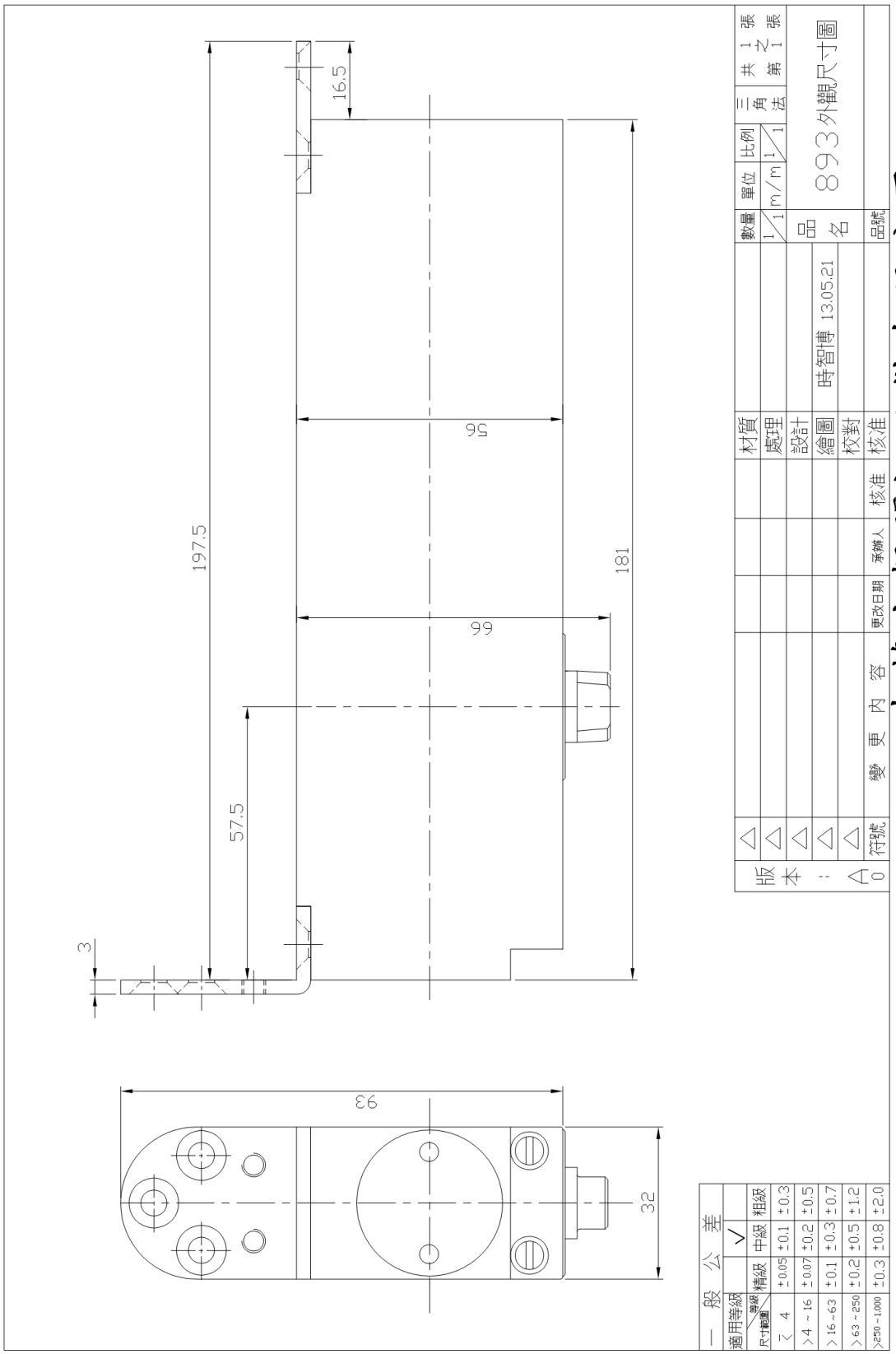
Reported by: _____
Star Shi
Engineer, Building Products

Reviewed by: _____
Harrison Li
Senior Project Engineer, Building Products

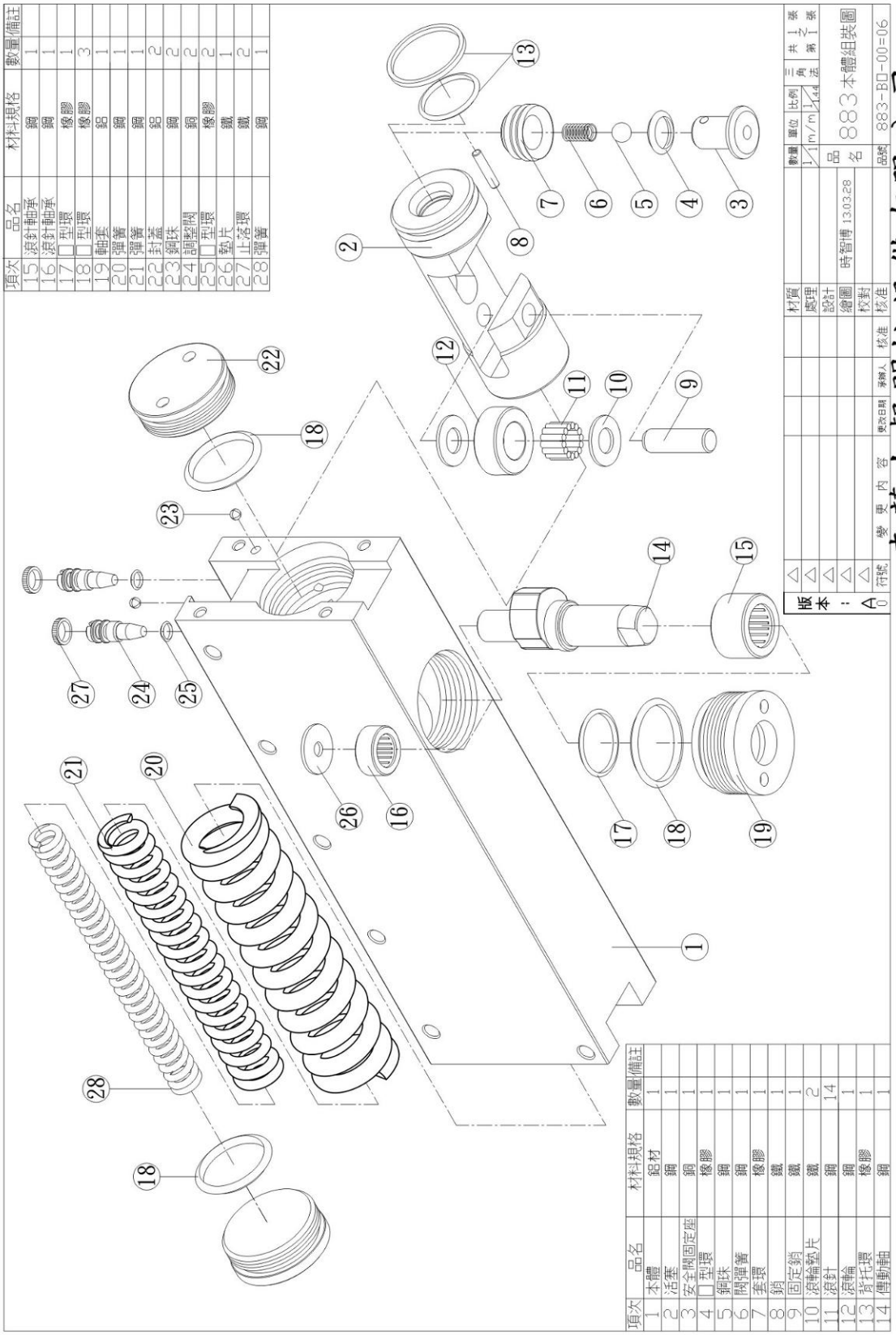
7 Appendix A: Floor Spring Drawings



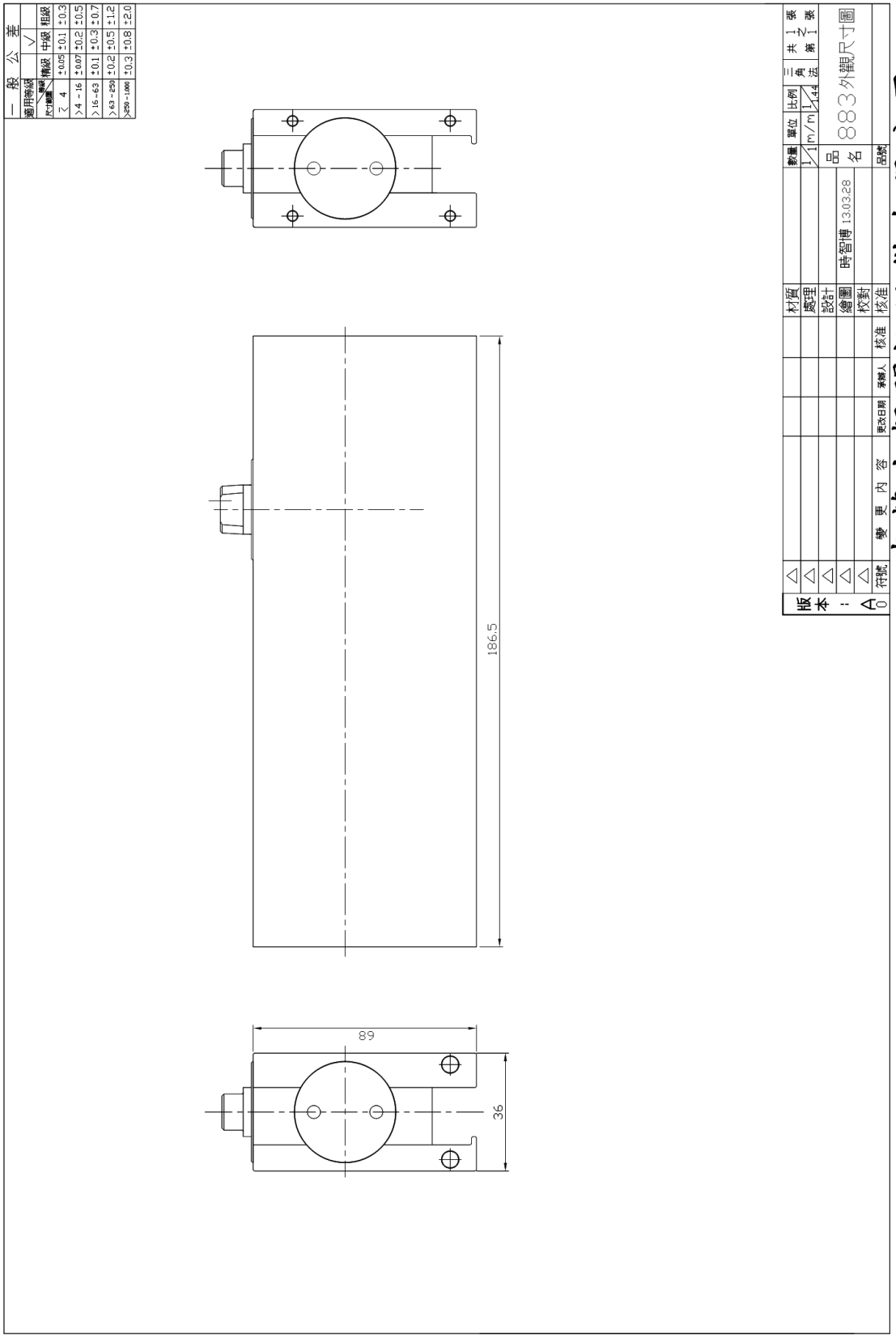
Model of DFG893



Model of DFG893



Model of DFG883



Model of DFG883

8 Appendix B: Floor Spring Installation Instruction

893 EN3 CONCEAL FLOOR HINGE INSTALLATION INSTRUCTION

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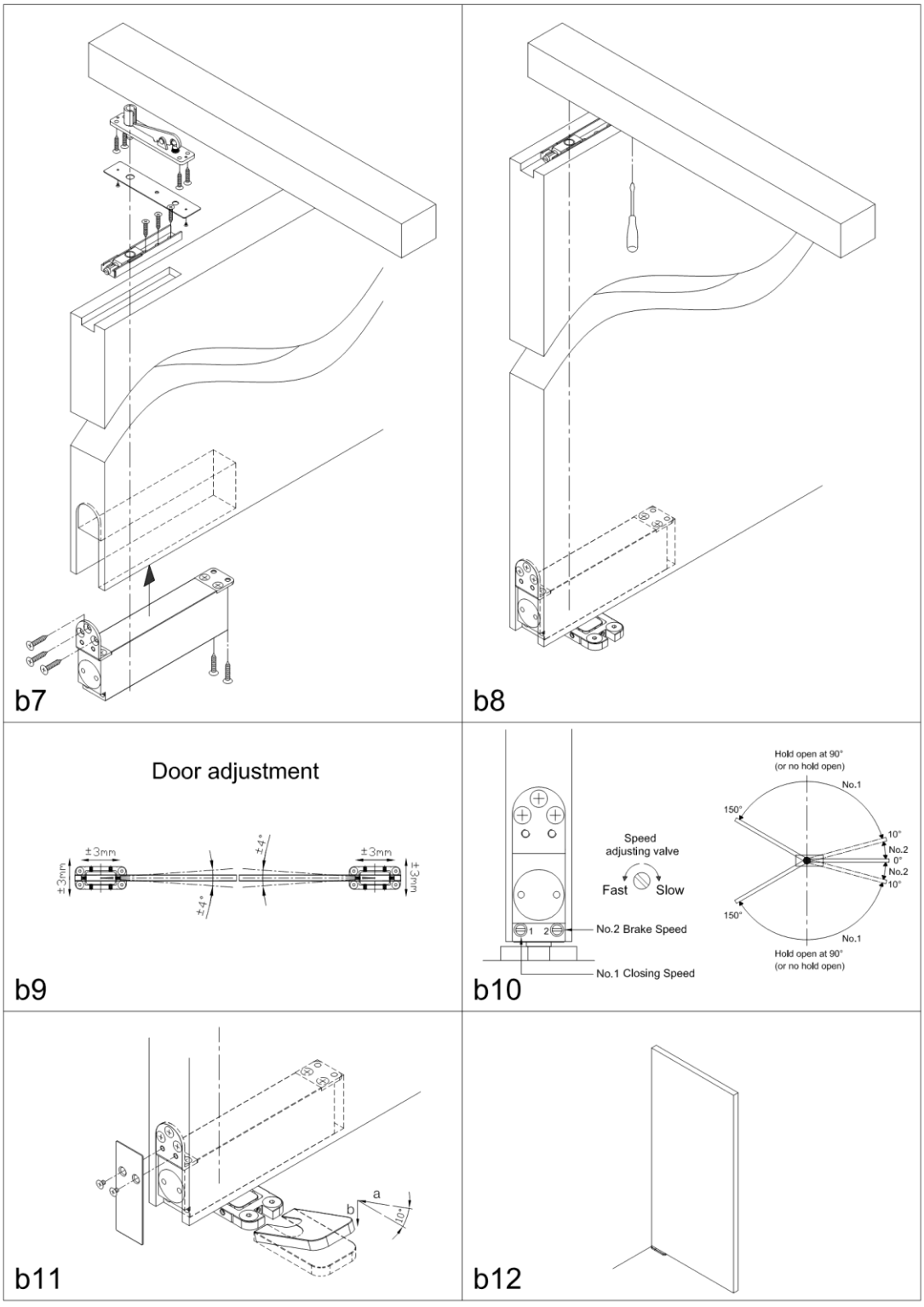

Model of DFG893

893 EN3 CONCEAL FLOOR HINGE INSTALLATION INSTRUCTION

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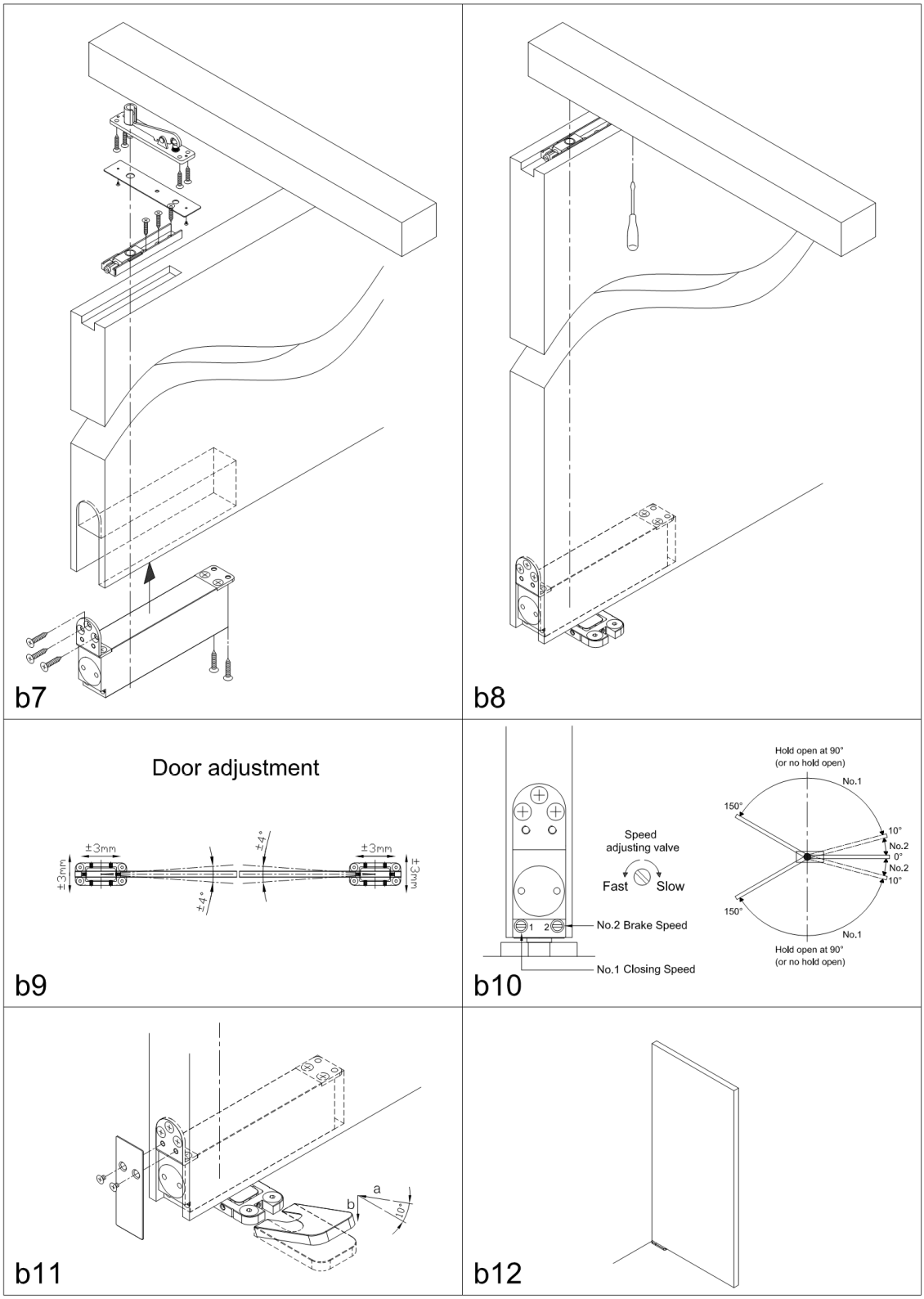

Model of DFG893

883 EN3 CONCEAL FLOOR HINGE INSTALLATION INSTRUCTION

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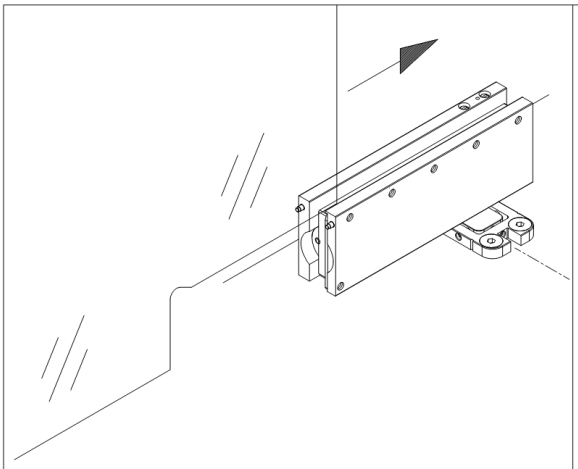

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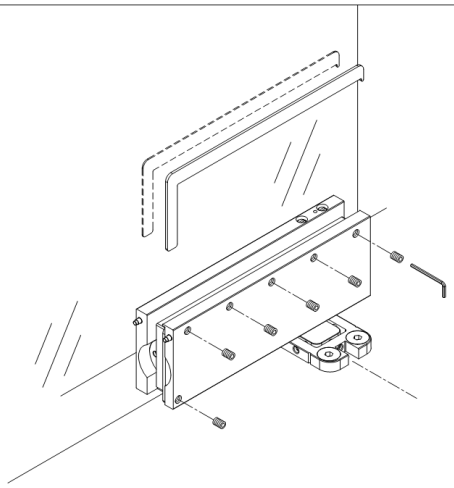
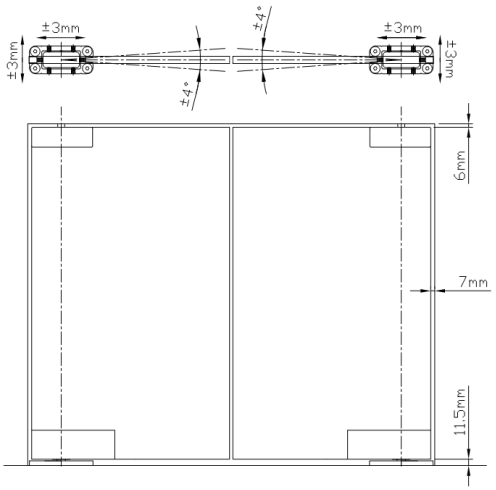


Adjust the Door position



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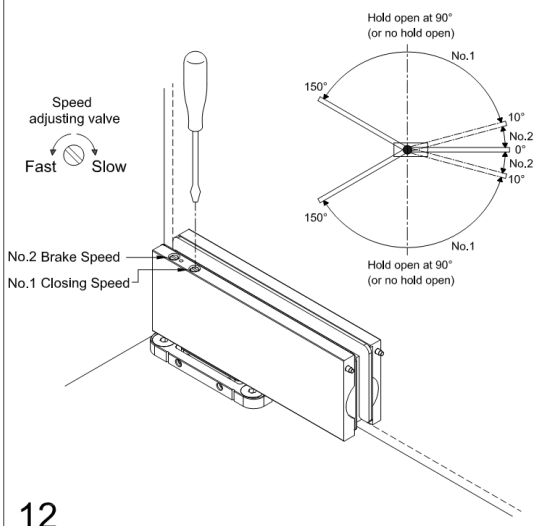

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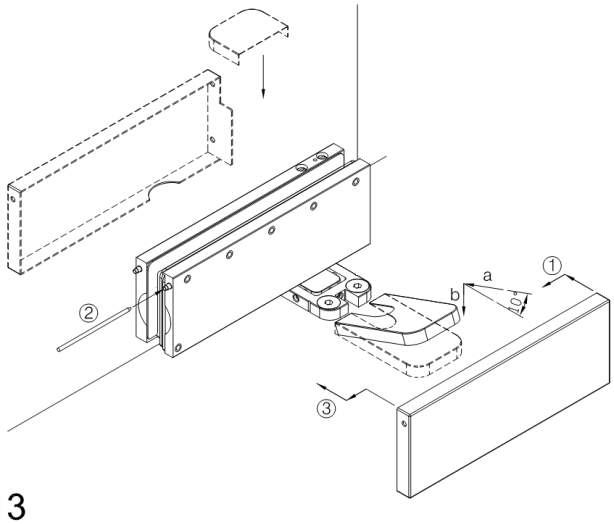

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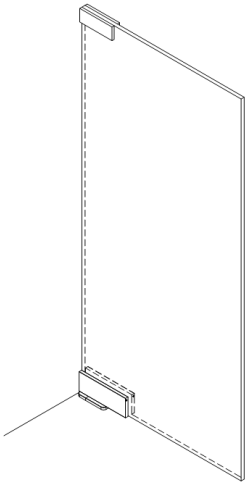

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Model of DFG883

883 EN3 CONCEAL FLOOR HINGE INSTALLATION INSTRUCTION

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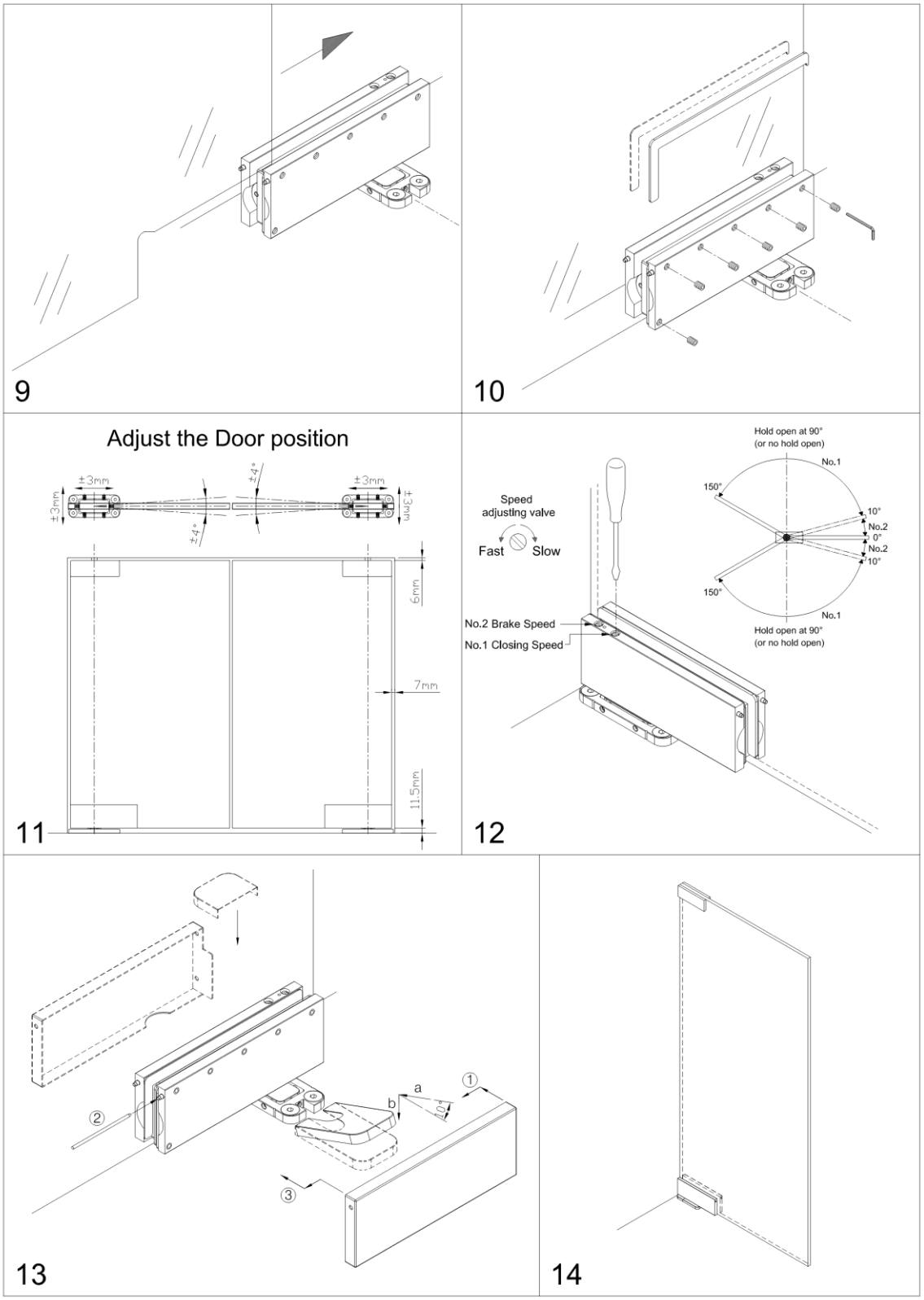
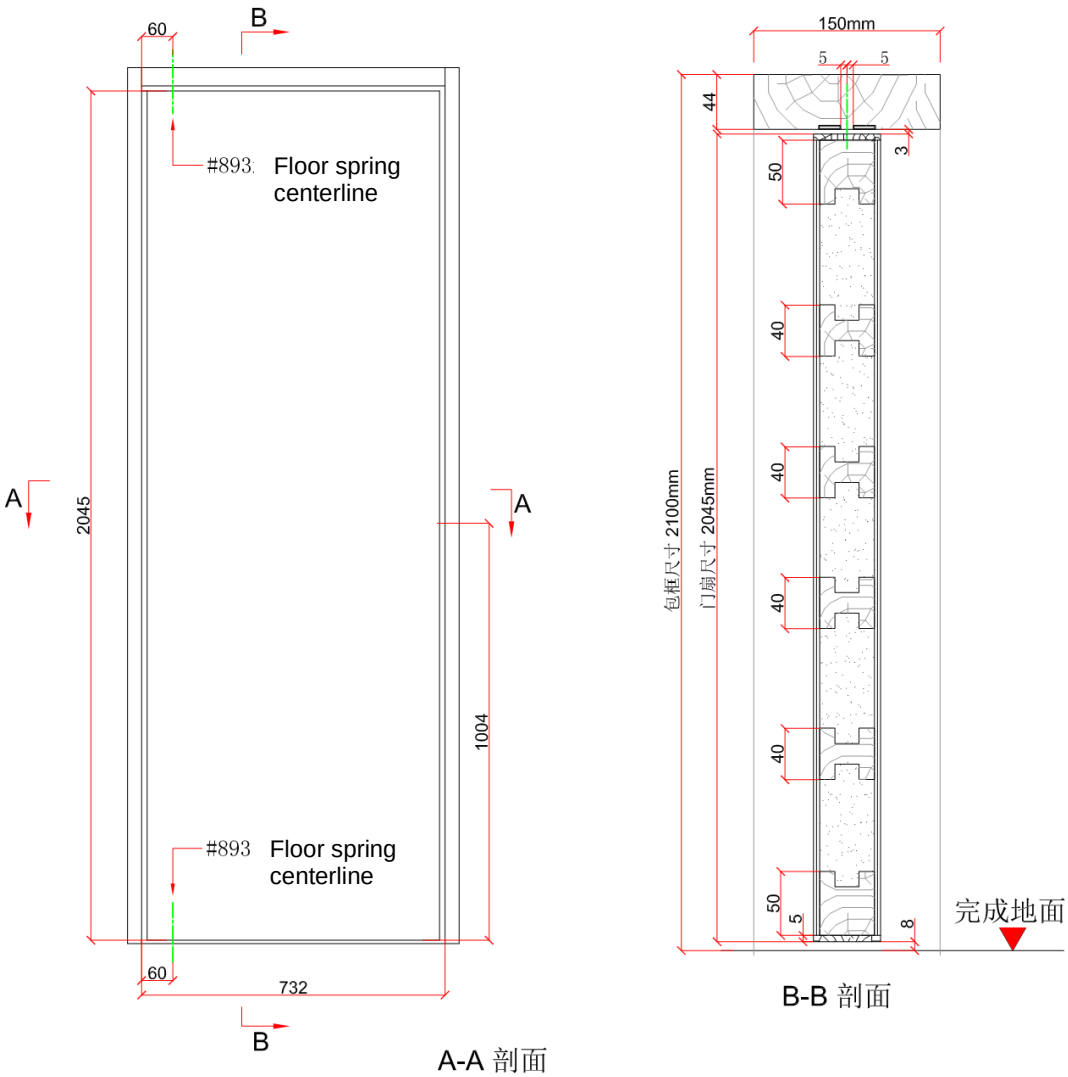
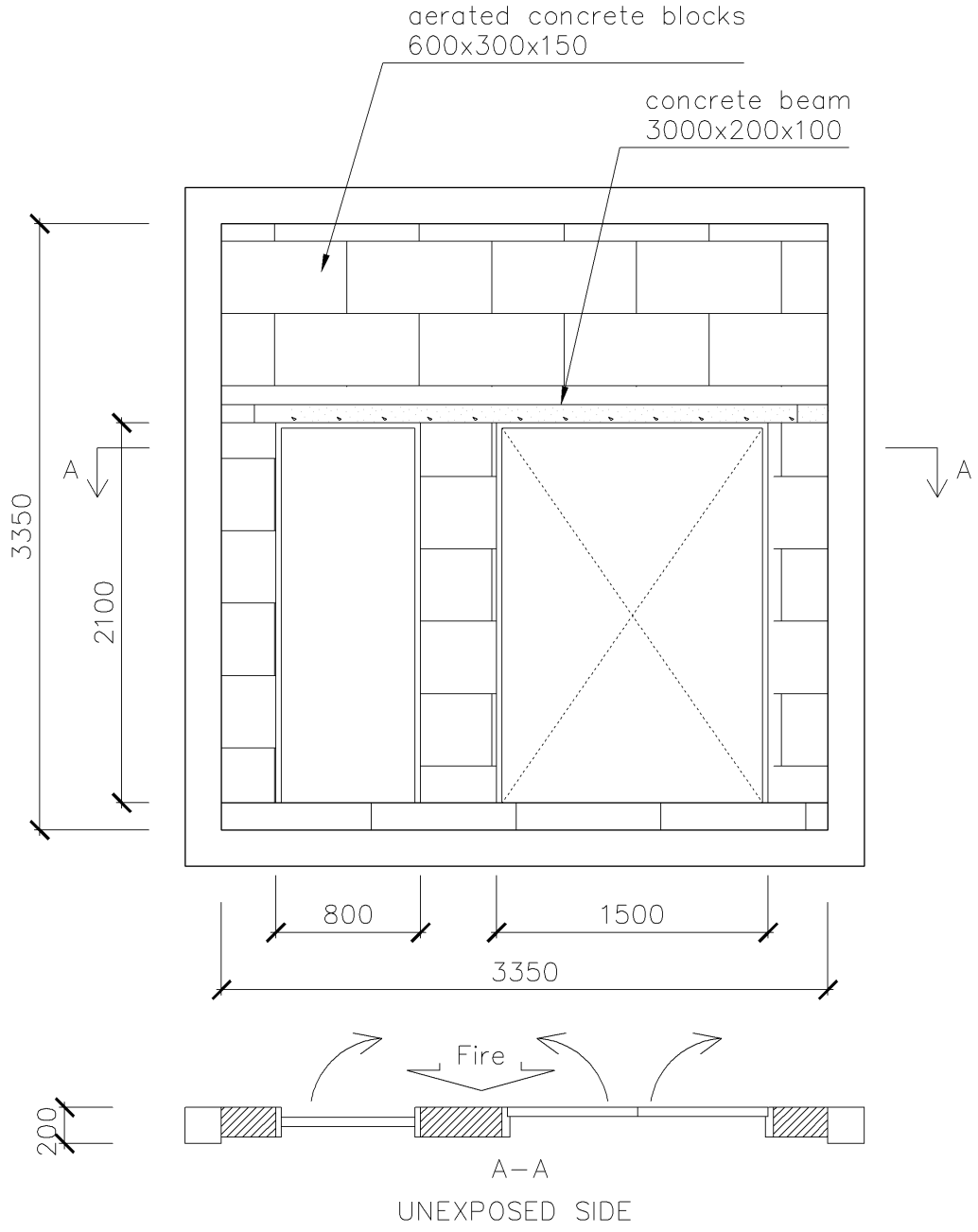


Model of DFG883

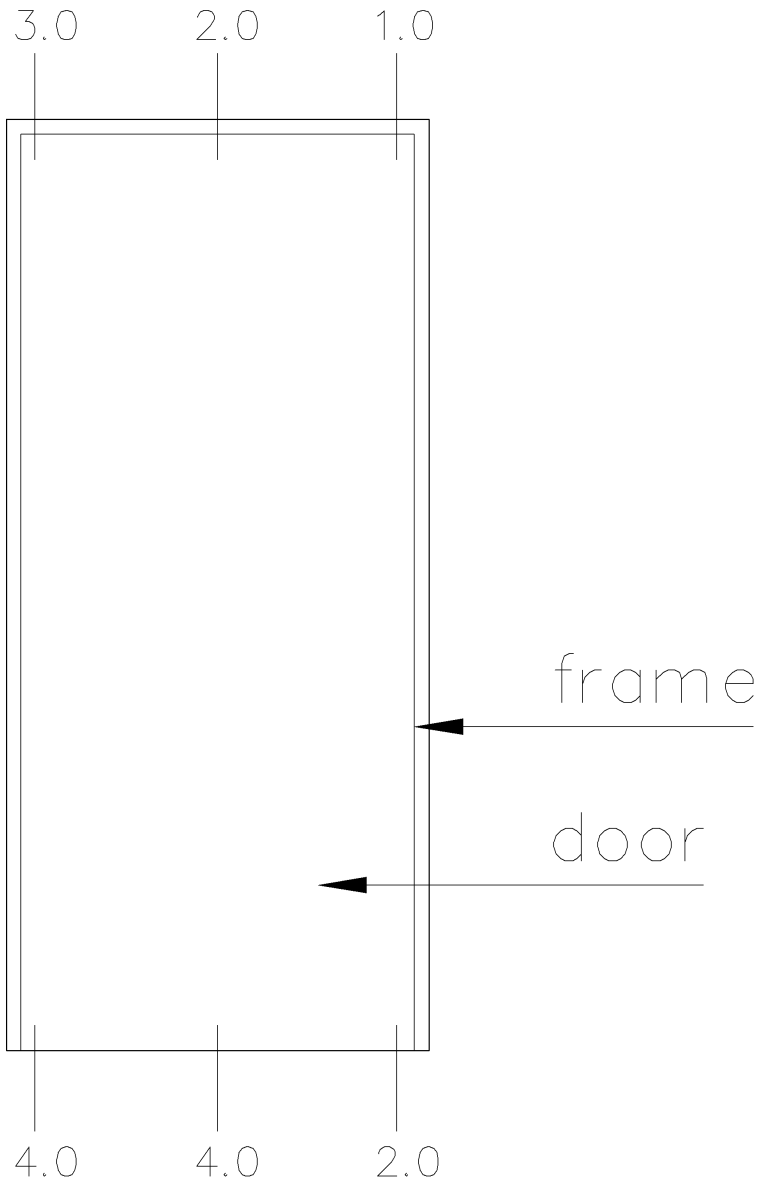
9 Appendix C: Fire Door Assembly Drawings



10 Appendix D: Test Wall Construction Drawing

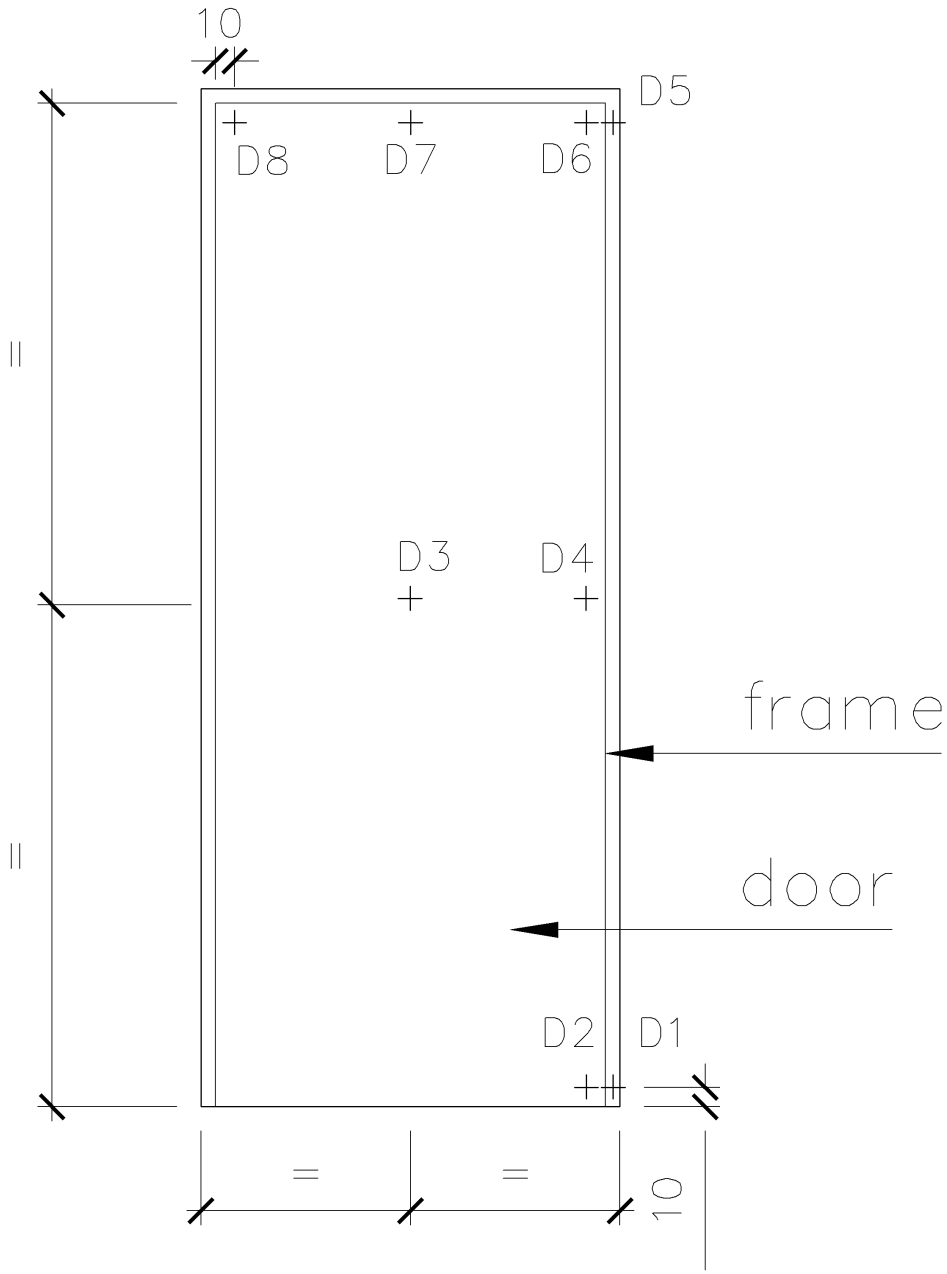


11 Appendix E: Test Measurement Data



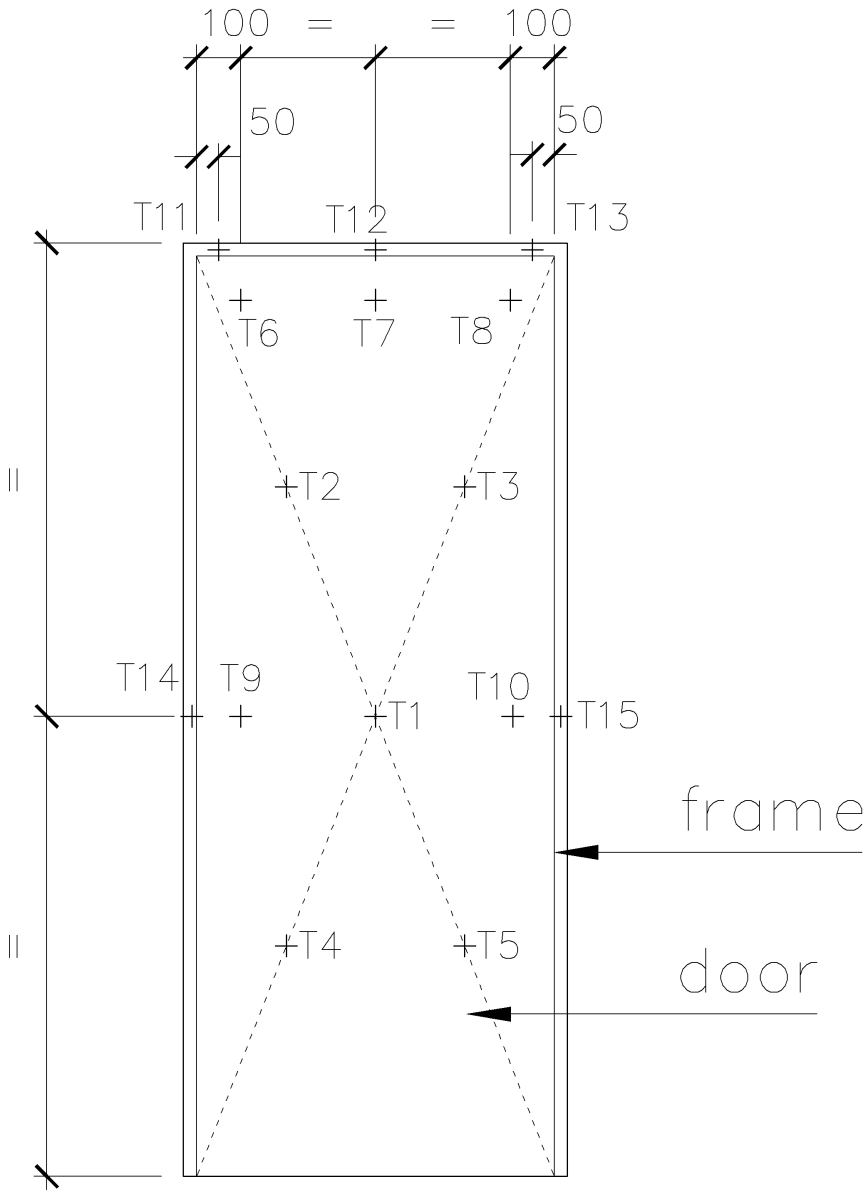
Exposed side

DOOR ASSEMBLY INITIAL CLEARANCES



UNEXPOSED SIDE

POSITION FOR MEASUREMENT OF HORIZONTAL DEFLECTION



POSITION FOR MEASUREMENT OF UNEXPOSED TEMPERATURE

12 Appendix F: Test Data

Intertek

Test:	Fire Resistance	Reviewer: Harrison Li
Test Date:	2013.10.12	
Job No:	130820007SHJ-BP-1	
Client:	Dongguan Leado Door System Co., Ltd.	Eng/Tech: Star Shi
Sample:	Floor spring - DFG893	
Sample ID:	IASQSH130402001.001	
Standards:	EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware	
Procedure:	Part 1: Fire resistance tests for doors, shutters and openable windows	
Conditioning:	According to EN 1363-1, Section 8	

Equipment:

Item	*ID*	*Cal Due Date*
Vertical furnace	SH1098	n/a
Furnace pressure gauge	SH1097-15	2014.4.27
Test Clock	SH1042	2014.8.20
Furnace thermocouple 1-3	SH1097-1~3	2014.4.27
Ambient temperature gauge	SH1097-11	2014.4.27
Unexposed thermocouple	SH1097-12~14	2014.4.27
Clearance Measurements	SH1057-1	2013.12.13
Displacement Measurements	SH1034	2014.8.18

Heating Conditions:	According to EN 1363-1, Section 5.1
Pressure Conditions:	According to EN 1363-1, Section 5.2
Ambient Conditions:	20 ± 10°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	According to EN 1634-1, Section 9.1.2
Thermocouple Pads:	Length and width 30 ± 0.5 mm, thickness 2.0 ± 0.5 mm, density 900 ± 100 kg/m^3
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

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

Intertek

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Client:	Dongguan Leado Door System Co., Ltd.	Eng/Tech: Star Shi
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Sample ID:	IASQSH130402001.001	
Standards:	EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware	
Procedure:	Part 1: Fire resistance tests for doors, shutters and openable windows	
Performance Criteria:	According to EN 1634-1, Section 11.1 Gap gauges per 10.4.5.3 of EN 1363-1 Flaming per 10.4.5.4 of EN 1363-1	

Time (min'sec")	Cotton Pad Check	6mm Gap Gauge Distance (mm)	25mm Gap Gauge "Pass Through"	Performance Observations
Initial	--	0	No Pass	The test starts when any of the furnace thermocouples exceeds 50°C
7'0"	--	0	No Pass	Little smoke comes out from the top side of the door leaf.
20'0"	--	0	No Pass	No smoking is observed.
30'0"	--	0	No Pass	The area around the top edge on the door leaf turns dark.
35'0"	--	0	No Pass	The area around the bottom edge on the door leaf turns dark.
40'0"	--	0	No Pass	Sustained flame comes out from the bottom of the door, integrity failure is deemed to occur.
Requirement	No ignition	<150	No "Pass Through"	No excessive openings, Sustained flaming, etc.

Intertek

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Standards: EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware
Procedure: Part 1: Fire resistance tests for doors, shutters and openable windows
Performance Criteria: According to EN 1634-1, Section 11.2

2) Insulation: Average temperature rise 140 ° C according to EN1363-1. Maximum temperature rise 180°C according to EN 1363-1, Section 11.3, and of the frame of the door or shutter assembly shall be 360 ° C according to EN 1634-1, Section 11.2.3. Unexposed temperatures according to EN 1634-1, Section 9.1.2.3, and and EN 1363-1, Section 9.1.2.3.

Time(Minutes)	Ambient (°C)	T1 (°C)	T2 (°C)	T3 (°C)	T4 (°C)	T5 (°C)	T6 (°C)	T7 (°C)
Initial	26	26	27	26	26	26	26	27
5	26	26	27	26	26	27	29	28
10	26	27	28	27	28	28	29	28
15	26	31	34	30	33	30	40	32
20	26	43	45	38	45	38	52	44
25	26	55	55	51	56	49	59	54
30	26	59	58	56	60	54	62	59
35	26	62	60	60	62	57	64	63
40	26	65	61	62	64	60	66	65
Temperature Rise (°C)		39	34	36	38	34	40	38

Average temperature rise	36	°C
Maximum temperature rise	40	°C
Maximum temperature rise(Frame)	18	°C

Intertek

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Job No: 130820007SHJ-BP-1
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Sample: Floor spring - DFG893
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Performance Criteria: According to EN 1634-1, Section 11.2

2) Insulation: Average temperature rise 140 ° C according to EN1363-1. Maximum temperature rise 180°C according to EN 1363-1, Section 11.3, and of the frame of the door or shutter assembly shall be 360 ° C according to EN 1634-1, Section 11.2.3. Unexposed temperatures according to EN 1634-1, Section 9.1.2.3, and and EN 1363-1, Section 9.1.2.3.

Time(Minutes)	T8 (°C)	T9 (°C)	T10 (°C)	T11 (°C)	T12 (°C)	T13 (°C)	T14 (°C)	T15 (°C)
Initial	27	26	27	27	28	27	25	27
5	29	26	28	34	30	34	28	28
10	29	27	28	38	28	38	27	28
15	30	27	28	40	29	40	28	28
20	37	31	32	43	29	43	28	28
25	48	40	41	45	29	45	29	29
30	54	46	47	45	30	45	30	29
35	59	53	52	45	32	45	32	30
40	62	57	56	45	33	45	34	32
Temperature Rise (°C)	35	31	29	18	5	18	9	5

Intertek

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Job No:	130820007SHJ-BP-1	
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Sample:	Floor spring - DFG893	
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Standards:	EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware	
Procedure:	Part 1: Fire resistance tests for doors, shutters and openable windows	
Performance Criteria:	According to EN 1634-1, Section 9.3	

Time(Minutes)	Maximum perpendicular displacement where a positive measurement indicates movement towards the furnace (mm)							
	D1	D2	D3	D4	D5	D6	D7	D8
Initial	0	0	0	0	0	0	0	0
10	0	0	2	0	0	-2	-2	-1
20	0	0	0	0	0	2	1	4
30	0	4	3	1	0	5	2	5

Test:	Fire Resistance	Reviewer: Harrison Li
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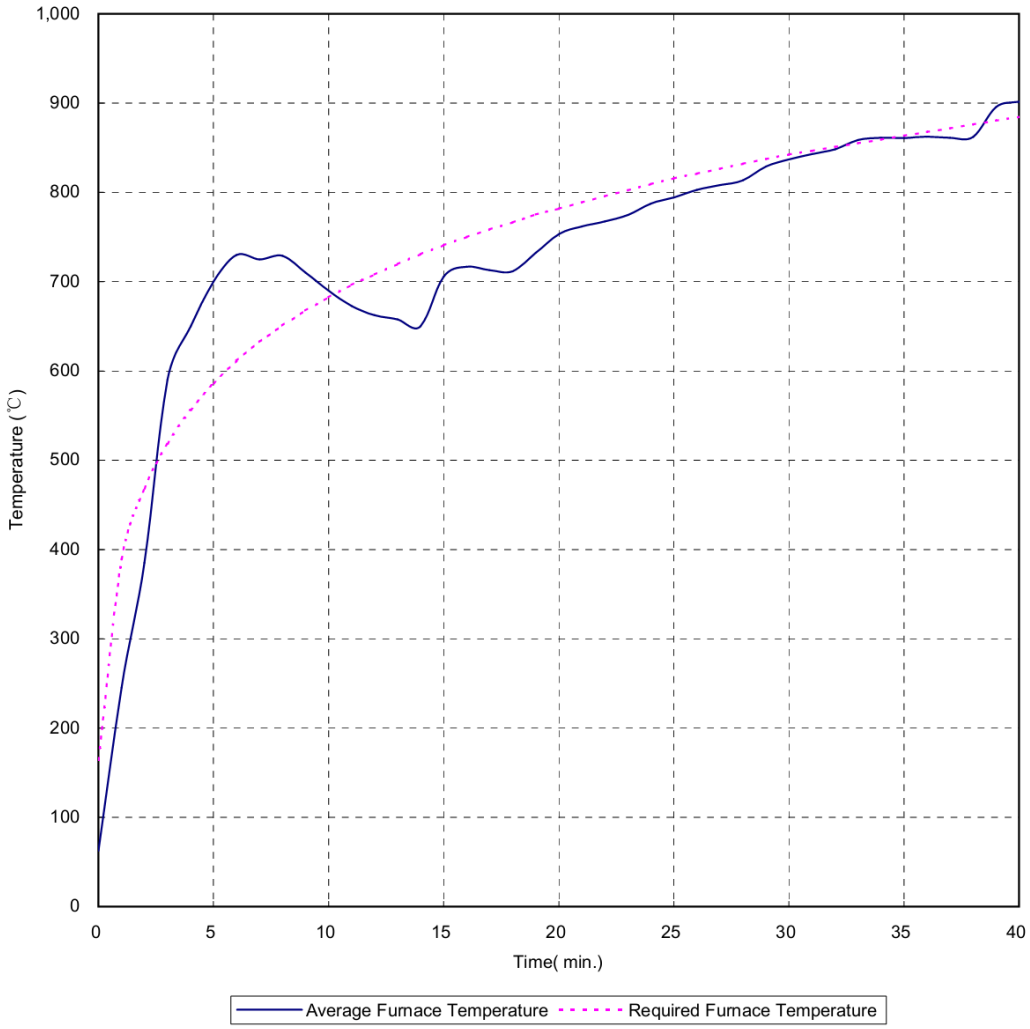
Standards:	EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware	
Procedure:	Part 1: Fire resistance tests for doors, shutters and openable windows	
Measurement of Furnace Conditions:	Pressure and temperature according to EN 1363-1, Section 10.4.2 and 10.4.3	



13 Appendix G: Test Photographs

Fig. 1 - Exposed Side Prior to the Fire Test

Fig. 2 - Unexposed Side Prior to the Fire Test

Fig. 3 – Unexposed Side after 7 Minutes

Fig. 4 – Unexposed Side after 30 Minutes

Fig. 5 – Unexposed Side after 40 Minutes

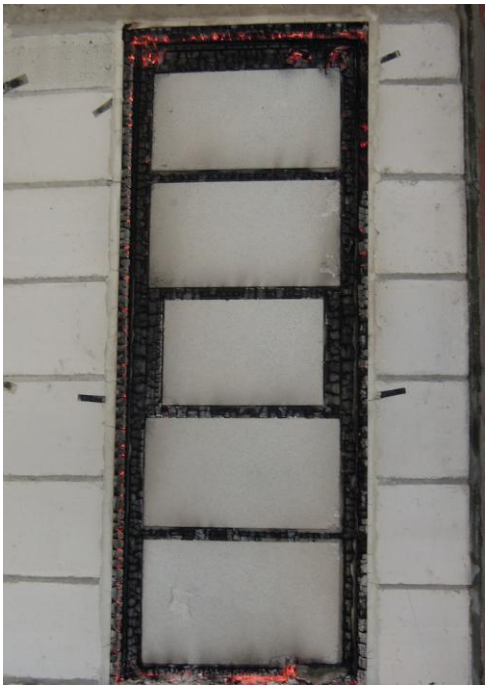


Fig. 6 - Exposed Side after 40 Minutes

14 Revision Page

Revision No.	Date	Changes	Author	Reviewer
0	November 8, 2013	First issue	Star Shi	Harrison Li

END OF DOCUMENT