Intertek

TEST REPORT

REPORT NUMBER: AU13014016-2
ORIGINAL ISSUE DATE: February 23, 2013

EVALUATION CENTER

Intertek Testing Services Ltd., Shanghai Jingiao Branch
Building T52-8, No. 1201 Gui Qiao Road,
Jinqiao Development Area, Pudong District
Shanghai 201206

RENDERED TO

BESTKO Precision Limited
UNIT 303, BLOCK A, PO LUNG CENTRE,
11 WANG CHIU ROAD, KOWLOON BAY, HONG KONG

PRODUCT EVALUATED
Concealed Hinge
Model: WJ201

EVALUATION PROPERTY
Fire Resistance

Report of Testing Concealed Hinge 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 BESTKO Precision Limited to determine the fire resistance characteristics of the Concealed Hinge – WJ201 in Wooden Door Assembly. This test was designed to demonstrate evaluation on the Concealed Hinge of eight types including WJ201BS, WJ201B, WJ203, WJ203BS, WJ203B, WJ205BS, WJ205B and WJ201. This evaluation began on January 27, 2013 and was completed on February 6, 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 January 27, 2013.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

Door	Type	Single Swing Wooden Door (Fully-insulated)
	Nominal Size	777 mm wide by 2066 mm high by 64 mm thick
Frame	Nominal Size	874 mm wide by 2118 mm high
Hardware	Latch	Euro Mortise Lockset , Model Number: S6072-01
	Concealed Hinges	Stainless Steel Concealed Hinge, Quantity: Two Model Number: WJ201

The sample ID number is S1301127.003- 004.

Specification of the series:

Model No.	Specification
WJ201	155x34x66mm
WJ201BS	155x32x65mm
WJ201B	155x32x65mm
WJ203	144x30x59mm
WJ203BS	144x28x58mm
WJ203B	144x28x58mm
WJ205BS	110x24x51mm
WJ205B	110x24x51mm

The largest size and the maximum thickness of the hinge is selected for the test to cover the other model provided that the configuration is same.

The drawings of the stainless steel concealed hinge, fire door assembly, and test wall construction can be found in Appendices A, B and C respectively. A comprehensive description of the stainless steel pivot hinge for certification is maintained on Intertek file.

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 which allowed the sample to be 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 D.

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 D.

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 108 minutes. No through openings or penetrations were evident at the conclusion of the fire exposure portion of the test and the door latch remained engaged to the strike. During the fire exposure period no significant flaming was observed on the unexposed face of the assembly.

This assembly therefore met the criteria of the test standards for integrity performance of 108 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 108 minutes. A full set of test data is included in Appendix E, and photographs have been presented in Appendix F.

6 Conclusion

The concealed hinge – WJ201 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 Concealed Hinge of eight types including WJ201BS, WJ201B, WJ203, WJ203BS, WJ203B, WJ205BS, WJ205B and WJ201.

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

Integrity	Sustained flaming	108 minutes
	Gap gauge	108 minutes
	Cotton pad	108 minutes
Insulation		108 minutes

The test was discontinued after a period of 108 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

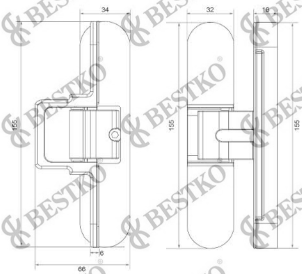
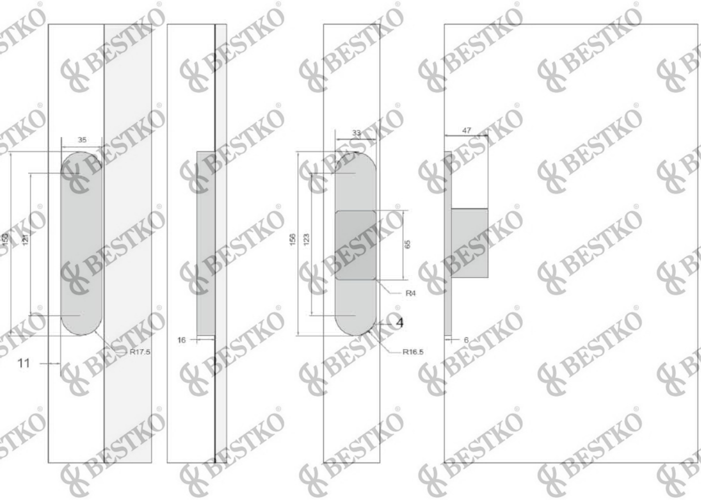
Star Shi
Engineer, Building Products

Reviewed by: Sun Sun

Sun Sun
Technical Supervisor, Building Products

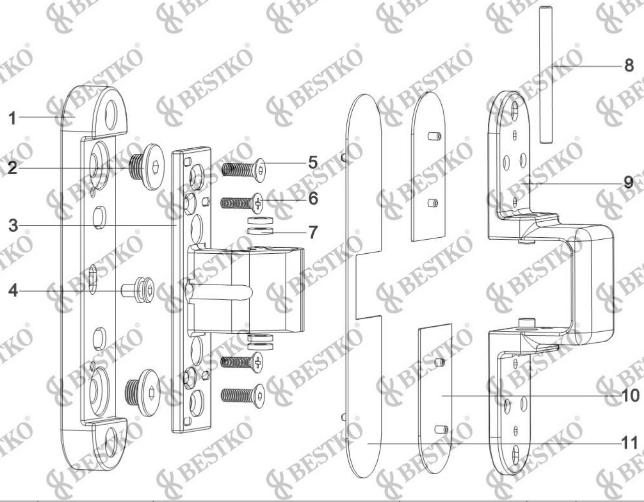
7 Appendix A: Concealed Hinge Drawings

Model: WJ201
Description: Concealed Hinge 160kg (adjustable)

Image	Dimension
	
Notch Preparation	
	

Model of WJ201

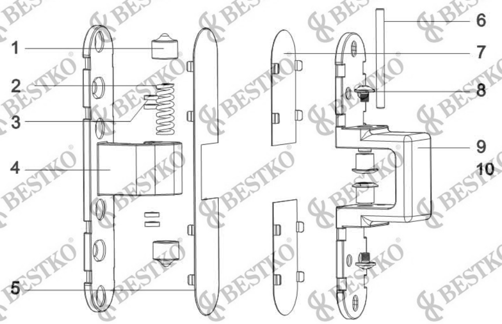
Concealed Hinge - WJ201 (160kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ201-1	mounting base	SUS304	1	
2	WJ201-4	screw for verticality adjustment	SUS303	2	
3	WJ201-2	hinge body (jamb side)	SUS304	1	
4	WJ201-5	screw for alignment adjustment	SUS304	1	
5	T015-37A	set screw	SUS303	2	
6	T016-85A	mounting screw	SUS303	2	
7	WJ201-6	metal washer	SUS420 (tempered)	4	
8	WJ201-7	axle	GCr15	1	chrome
9	WJ201-3	hinge body (door side)	SUS304	1	
10	WJ201-8	cover plate	ABS	2	chrome
11	WJ201-9	cover plate	ABS	1	chrome

Model of WJ201

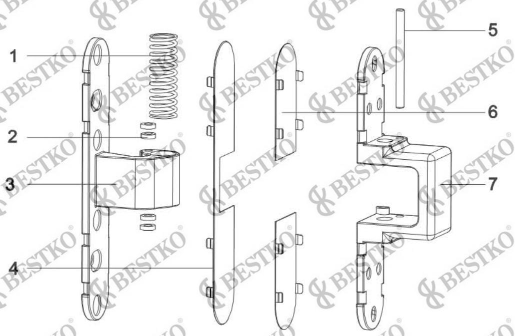
Concealed Hinge - WJ201BS (160kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ203A-7	hold-open piston	SUS420 (tempered)	2	chrome
2	WJ201A-4	compression spring	manganese	1	
3	WJ201-16	metal washer	SUS420 (tempered)	4	chrome
4	WJ201B-1	hinge body (jamb side)	SUS303	1	
5	WJ203-2	cover plate	SUS304	1	
6	WJ201A-3	axle	GCr15	1	chrome
7	WJ101-9	cover plate	SUS304	2	
8	T010-20	set screw	SUS303	2	
9	WJ201A-2	hinge body (door side)	SUS303	1	
10	WJ201A-6	hold-open piston	SUS420 (tempered)	2	chrome

Model of WJ201BS

Concealed Hinge - WJ201B (160kg loading)

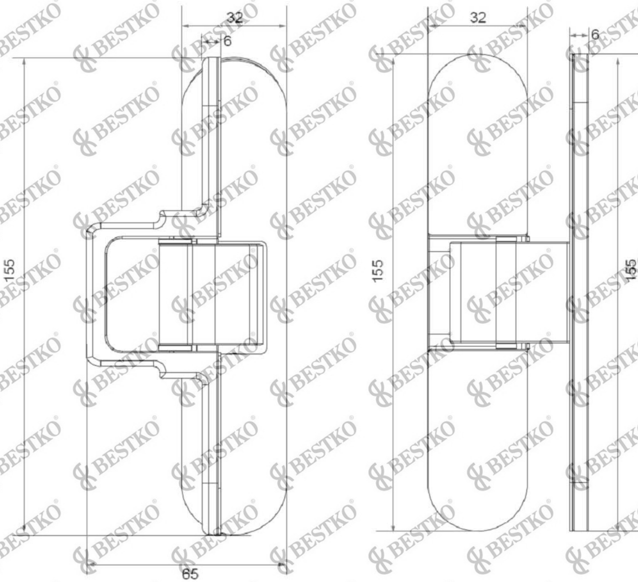


No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ201A-7	compression spring	manganese	1	
2	WJ201-16	metal washer	SUS420 (tempered)	4	chrome
3	WJ201B-1	hinge body (jamb side)	SUS303	1	
4	WJ203-2	cover plate	SUS304	1	
5	WJ201A-3	axle	GCr15	1	chrome
6	WJ101-9	cover plate	SUS304	2	
7	WJ201A-2	hinge body (door side)	SUS303	1	

Model of WJ201B

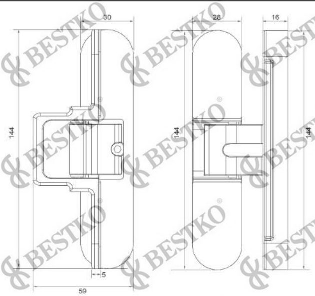
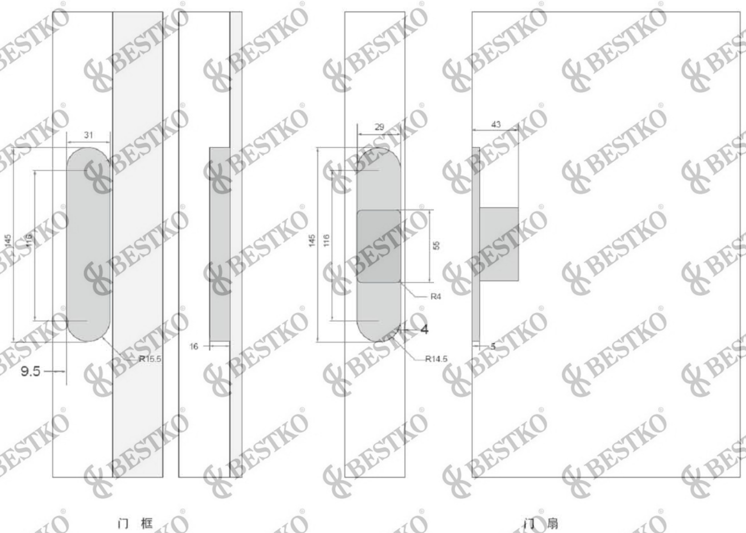
Dimension Drawing

Model	:	WJ201BS	WJ201B
Description	:	Concealed Hinge	Concealed Hinge
Loading	:	160kg	160kg
Feature	:	Hold-Open	Free Swing



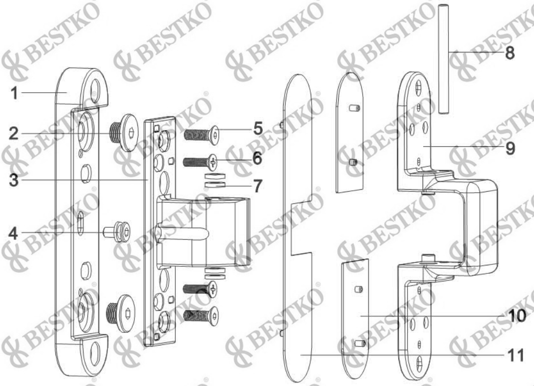
Model of WJ201BS and WJ201B

Model: WJ203
Description: Concealed Hinge 120kg (adjustable)

Image	Dimension
	
Notch Preparation	
	

Model of WJ203

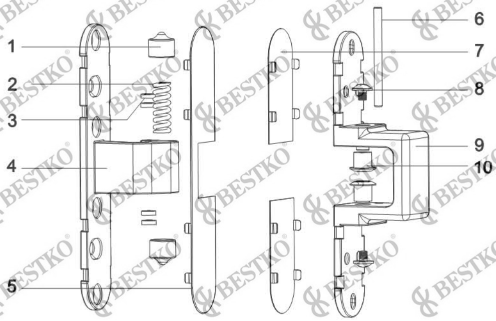
Concealed Hinge - WJ203 (120kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ203-1	mounting base	SUS304	1	
2	WJ203-4	screw for verticality adjustment	SUS303	2	
3	WJ203-2	hinge body (jamb side)	SUS304	1	
4	WJ203-5	screw for alignment adjustment	SUS304	1	
5	T015-37A	set screw	SUS303	2	
6	T016-85A	mounting screw	SUS303	2	
7	WJ203-6	metal washer	SUS420 (tempered)	4	
8	WJ203-7	axle	GCr15	1	chrome
9	WJ203-3	hinge body (door side)	SUS304	1	
10	WJ203-8	cover plate	ABS	2	chrome
11	WJ203-9	cover plate	ABS	1	chrome

Model of WJ203

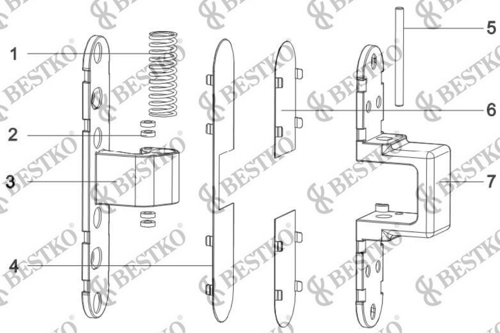
Concealed Hinge - WJ203BS (120kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ203A-7	hold-open piston	SUS420 (tempered)	2	chrome
2	WJ203A-11	compression spring	manganese	1	
3	WJ203A-5	metal washer	SUS420 (tempered)	4	chrome
4	WJ203B-1	hinge body (jamb side)	SUS303	1	
5	WJ203B-2	cover plate	SUS304	1	
6	WJ203A-8	axle	GCr15	1	chrome
7	WJ203A-9	cover plate	SUS304	2	
8	T010-20	set screw	SUS303	2	
9	WJ203A-3	hinge body (door side)	SUS303	1	
10	WJ201A-6	hold-open piston	SUS420 (tempered)	2	chrome

Model of WJ203BS

Concealed Hinge - WJ203B (120kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ203A-12	compression spring	manganese	1	
2	WJ203A-5	metal washer	SUS420 (tempered)	4	chrome
3	WJ203B-1	hinge body (jamb side)	SUS303	1	
4	WJ203B-2	cover plate	SUS304	1	
5	WJ203A-8	axle	GCr15	1	chrome
6	WJ203A-9	cover plate	SUS304	2	
7	WJ203A-3	hinge body (door side)	SUS303	1	

Model of WJ203B

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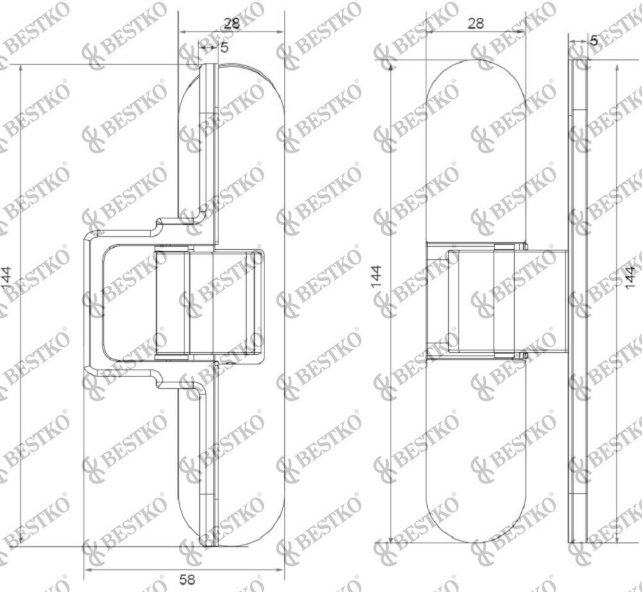
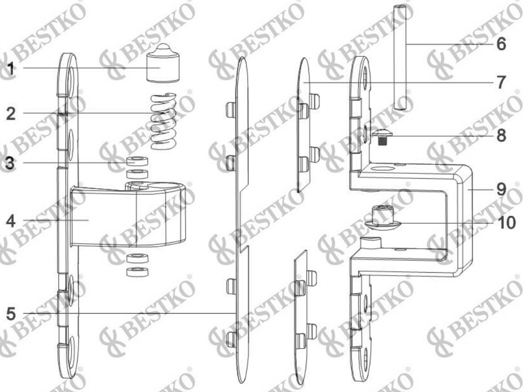
Dimension Drawing

Model	:	WJ203BS	WJ203B
Description	:	Concealed Hinge	Concealed Hinge
Loading	:	120kg	120kg
Feature	:	Hold-Open	Free Swing



Model of WJ203BS and WJ203B

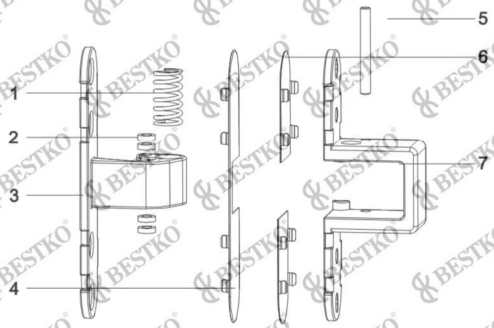
Concealed Hinge - WJ205BS (60kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ205B-5	hold-open piston	SUS420 (tempered)	1	chrome
2	WJ205B-4	compression spring	manganese	1	
3	WJ203A-5	metal washer	SUS420 (tempered)	4	chrome
4	WJ205B-1	hinge body (jamb side)	SUS303	1	
5	WJ205B-8	cover plate	SUS304	1	
6	WJ205B-3	axle	GCr15	1	chrome
7	WJ205B-7	cover plate	SUS304	2	
8	T010-20	set screw	SUS303	1	
9	WJ205B-2	hinge body (door side)	SUS303	1	
10	WJ205B-1	hold-open piston	SUS420 (tempered)	1	chrome

Model of WJ205BS

Concealed Hinge - WJ205B (60kg loading)



No.	Code	Name of Component	Material	Qty.	Finishing
1	WJ205B-9	compression spring	manganese	1	
2	WJ203A-5	metal washer	SUS420 (tempered)	4	chrome
3	WJ205B-1	hinge body (jamb side)	SUS303	1	
4	WJ205B-8	cover plate	SUS304	1	
5	WJ205B-3	axle	GCr15	1	chrome
6	WJ205B-7	cover plate	SUS304	2	
7	WJ205B-2	hinge body (door side)	SUS303	1	

Model of WJ205B

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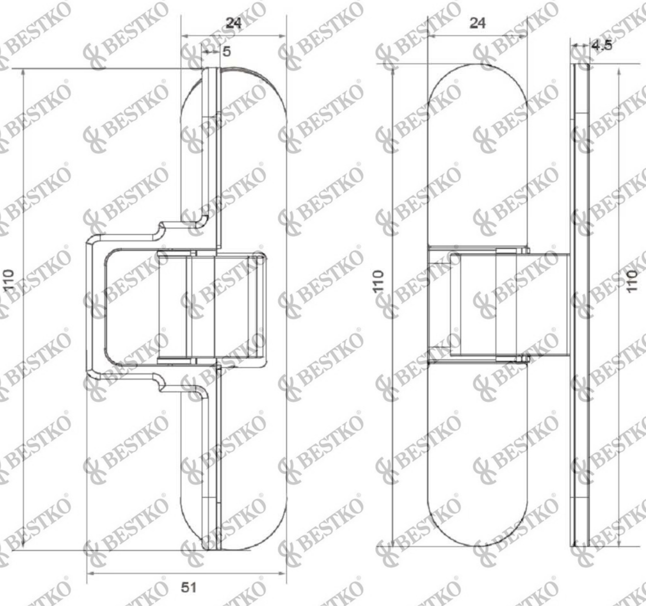
Dimension Drawing

Model	:	WJ205BS	WJ205B
Description	:	Concealed Hinge	Concealed Hinge
Loading	:	60kg	60kg
Feature	:	Hold-Open	Free Swing



Model of WJ205BS and WJ205B

Installation Guide

1. Prepare notches on door leaf and door jamb with template provided.

2. Fix hinge body onto door leaf, mounting base onto door jamb correspondingly.

3. Connect hinge body with mounting base by mounting screws, install but not tighten fully.

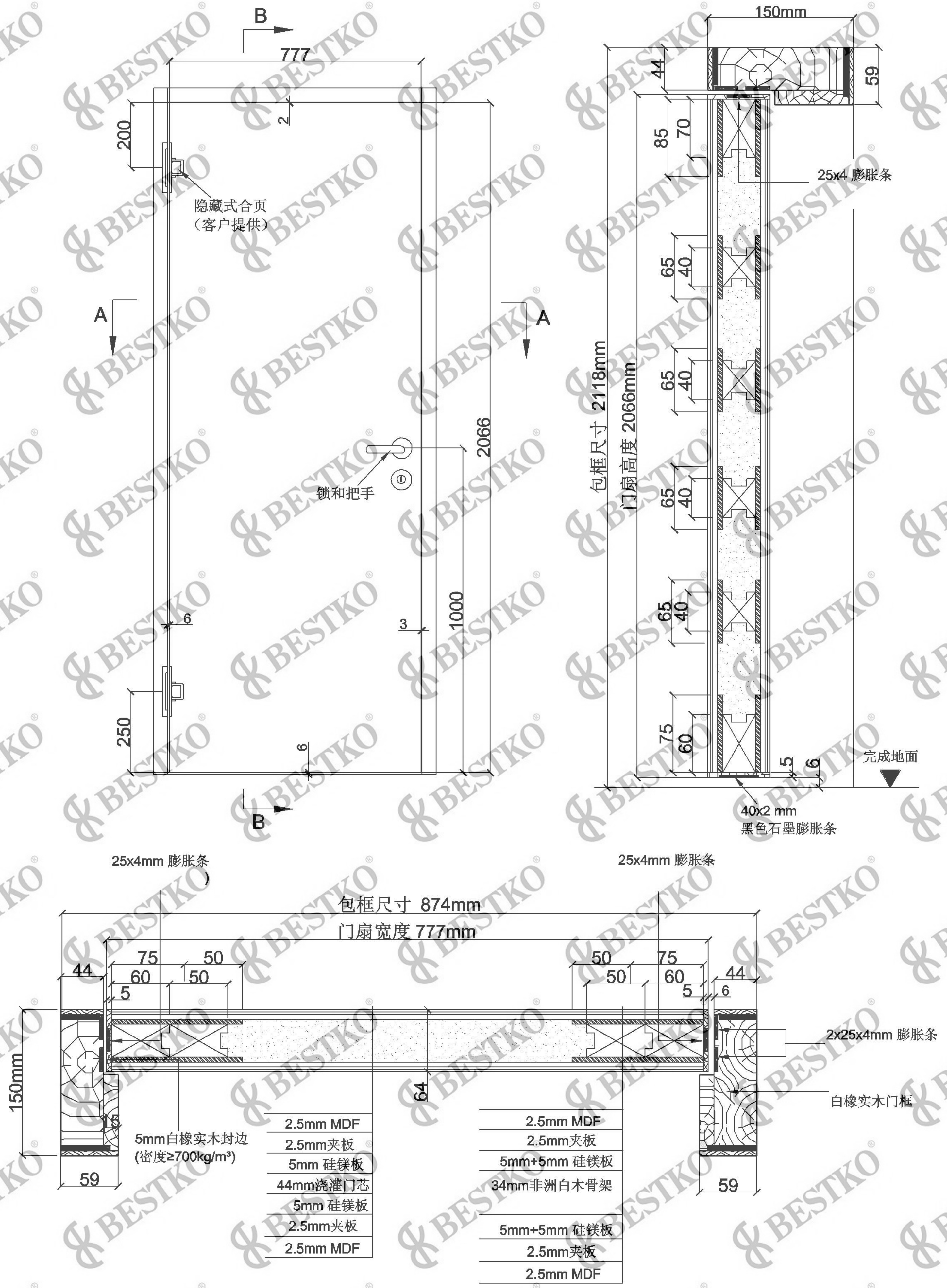
4. Correct the verticality by adjusting the screw members on mounting base.

5. Correct the alignment by adjusting by adjusting socket screw on hinge body.

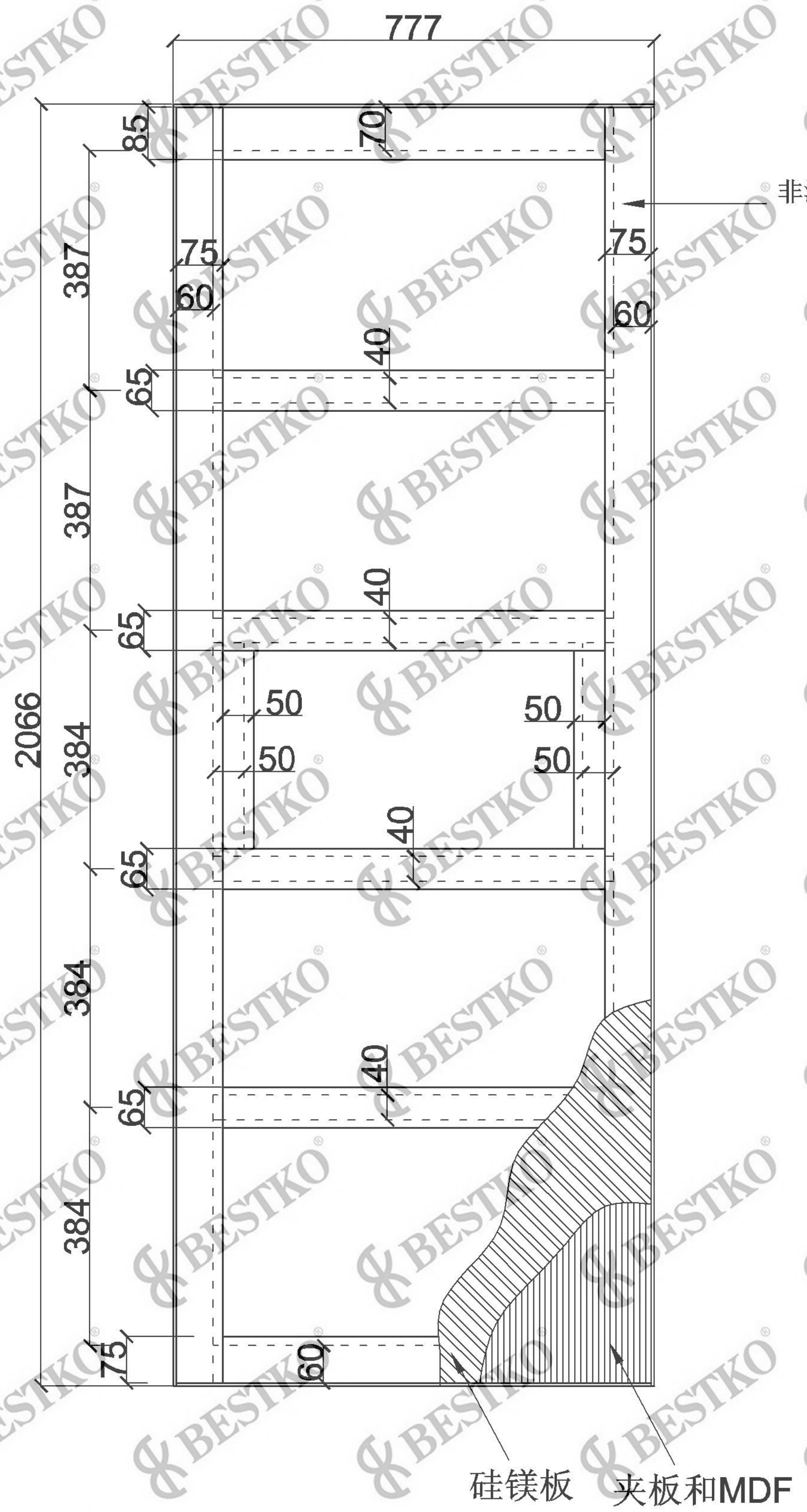
6. Tighten all the set screws and fixing screws, fix the cover plates properly and installation is done.

8 Appendix B: Fire Door Assembly Drawings

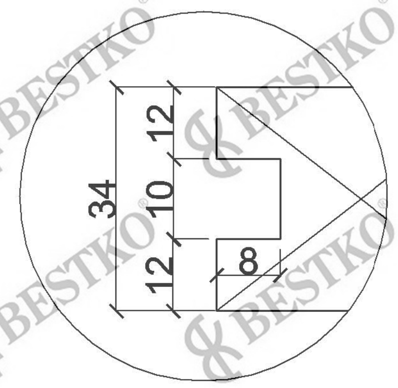
B-B 剖面



A-A 剖面



门芯骨架

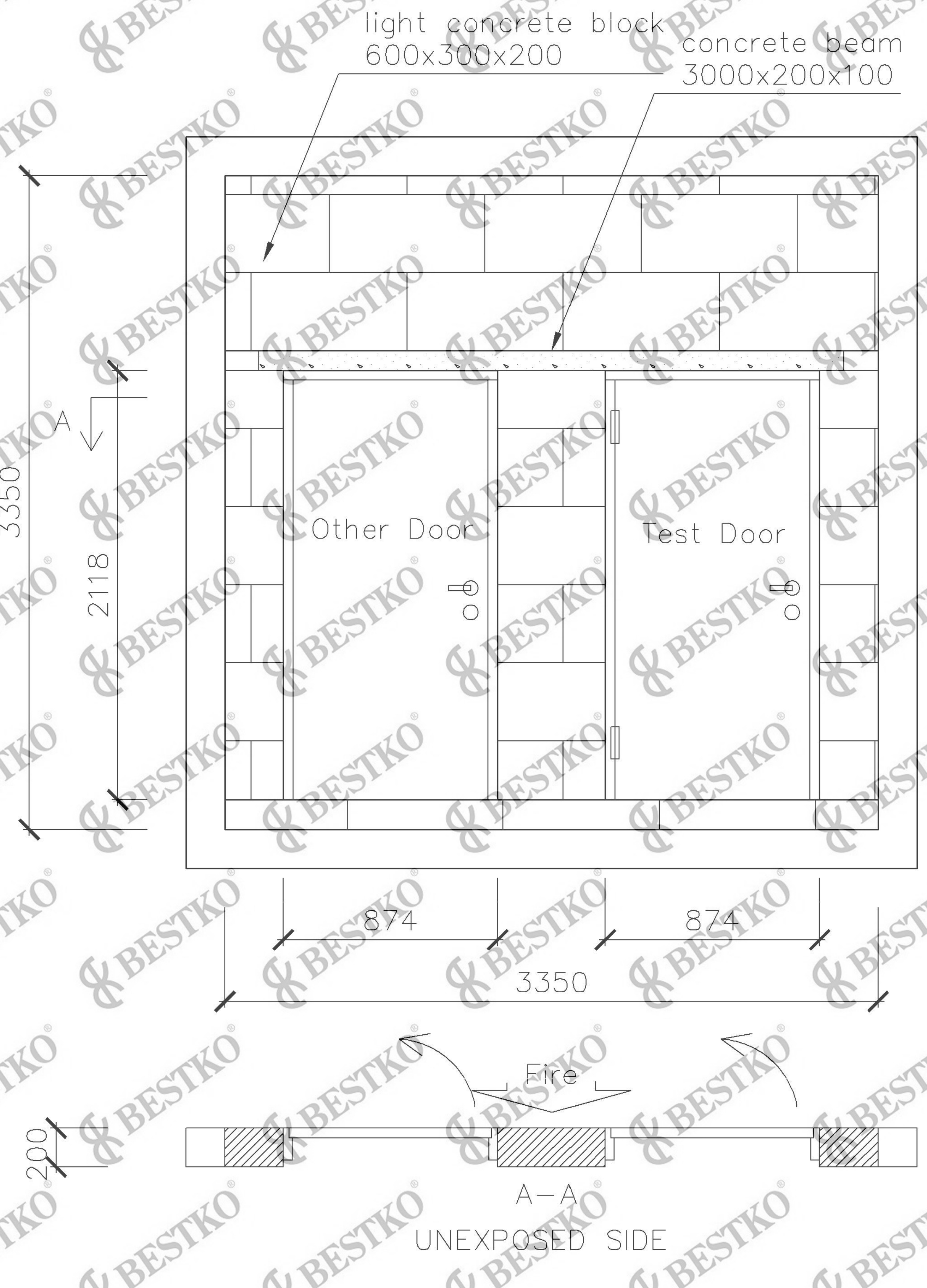


骨架开槽规格

注意事项：

1、五金中的锁挡板、锁扣板、锁体、铰链、隐藏式插销，须用2mm白色膨胀垫片。

9 Appendix C: Test Wall Construction Drawing



10 Appendix D: Test Measurement Data

Exposed Side

DOOR ASSEMBLY INITIAL CLEARANCES

POSITION FOR MEASUREMENT OF HORIZONTAL DEFLECTION

POSITION FOR MEASUREMENT OF UNEXPOSED TEMPERATURE

11 Appendix E: Test Data

Intertek

Test: Fire Resistance
Test Date: 2013.2.6
Job No: AU13014016-2
Client: BESTKO Precision Limited
Sample: Concealed Hinge - WJ201
Sample ID: S1301127.003- 004
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:

Reviewer: Sun Sun
Eng/Tech: Star Shi

Item	ID	Cal Due Date
Vertical furnace	SH1098	n/a
Furnace pressure gauge	SH1097-15	2013.4.27
Test Clock	SH1042	2013.8.20
Furnace thermocouple 1-3	SH1097-1~3	2013.4.27
Ambient temperature gauge	SH1097-11	2013.4.27
Unexposed thermocouple	SH1097-12~14	2013.4.27
Clearance Measurements	SH1057-1	2013.12.13
Displacement Measurements	SH1034	2013.8.18

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

Test: Fire Resistance
Test Date: 2013.2.6
Job No: AU13014016-2
Client: BESTKO Precision Limited
Sample: Concealed Hinge - WJ201
Sample ID: S1301127.003- 004
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

Reviewer: Sun Sun
Eng/Tech: Star Shi

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
4'0"	--	0	No Pass	Heavy smoke comes out from the hinge side, top and lock edge of the door leaf.
16'0"	--	0	No Pass	Little somke is observed.
30'0"	--	0	No Pass	The area of top of the door leaf turns dark.
60'0"	--	0	No Pass	Little smoke comes out from the top of the door leaf.
90'0"	No ignition	0	No Pass	The area of lock of the door leaf turns dark.
108'0"	--	0	No Pass	Sustained flame comes out from the top edge of the door, integrity failure is deemed to occur.
Requirement	No ignition	<150	No "Pass Through"	No excessive openings, Sustained flaming, etc.

Intertek

Test: Fire Resistance
Test Date: 2013.2.6
Job No: AU13014016-2
Client: BESTKO Precision Limited
Sample: Concealed Hinge - WJ201
Sample ID: S1301127.003- 004
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

Reviewer: Sun Sun
Eng/Tech: Star Shi

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)	T16 (°C)	T17 (°C)	T18 (°C)	T19 (°C)	T20 (°C)	T21 (°C)	T22 (°C)
Initial	9	9	9	9	9	9	9	9
5	9	11	9	9	9	9	9	9
10	9	11	9	9	11	9	16	11
15	9	11	9	9	12	9	37	26
20	9	11	10	10	32	9	46	42
25	9	14	13	13	39	13	51	49
30	9	19	21	21	41	20	52	51
35	9	29	36	32	46	30	53	53
40	9	38	46	41	48	41	53	55
45	9	45	53	47	50	47	54	58
50	9	49	57	52	50	50	54	60
55	9	52	60	55	50	52	56	62
60	9	53	61	58	51	52	58	64
65	9	53	62	60	51	53	59	65
70	9	56	66	63	55	57	61	68
75	9	58	67	66	57	59	62	70
80	9	59	68	67	58	60	64	71
85	9	61	69	70	60	62	65	71
90	9	62	70	71	62	64	67	72
95	9	63	70	73	63	66	69	73
100	9	65	71	74	63	67	72	73
105	9	67	71	75	64	68	78	74
108	9	68	71	75	64	69	81	74
Temperature Rise (°C)		59	62	66	55	60	72	65

Average temperature rise 60 °C
Maximum temperature rise 75 °C
Maximum temperature rise(Frame) 47 °C

Test: Fire Resistance
Test Date: 2013.2.6
Job No: AU13014016-2
Client: BESTKO Precision Limited
Sample: Concealed Hinge - WJ201
Sample ID: S1301127.003- 004
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

Reviewer: Sun Sun
Eng/Tech: Star Shi

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)	T23 (°C)	T24 (°C)	T25 (°C)	T26 (°C)	T27 (°C)	T28 (°C)	T29 (°C)	T30 (°C)
Initial	9	9	9	9	9	9	9	9
5	12	12	9	14	14	9	9	10
10	12	12	9	17	14	9	9	10
15	12	12	9	18	14	10	9	10
20	17	24	10	19	14	11	9	10
25	27	33	12	19	14	12	9	10
30	36	38	17	19	14	13	9	11
35	42	42	27	20	15	15	9	11
40	45	44	36	21	15	15	10	12
45	46	46	42	21	15	16	10	12
50	48	48	45	22	16	17	10	13
55	50	50	47	22	17	17	11	13
60	52	52	48	24	17	18	12	15
65	54	54	49	25	18	20	13	17
70	57	57	52	26	20	21	14	17
75	58	60	54	27	22	24	15	18
80	58	64	55	29	25	28	16	20
85	58	65	57	30	26	30	17	22
90	58	68	58	32	28	33	19	23
95	59	70	60	35	30	35	20	25
100	70	74	62	42	33	38	21	26
105	73	83	63	53	36	41	22	28
108	75	84	64	56	37	42	23	30
Temperature Rise (°C)	66	75	55	47	28	33	14	21

Intertek

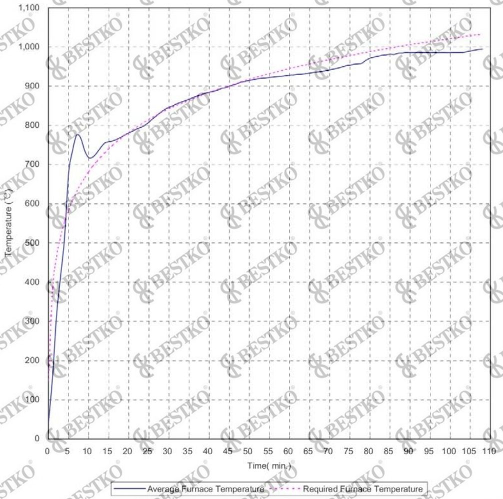
Test: Fire Resistance
Test Date: 2013.2.6
Job No: AU13014016-2
Client: BESTKO Precision Limited
Sample: Concealed Hinge - WJ201
Sample ID: S1301127.003- 004
Standards: EN1634-1:2008 Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware
Procedure: Part 1: Fire resistance tests for doors, shutters and openable windows
Performance Criteria: According to EN 1634-1, Section 9.3

Reviewer: Sun Sun
Eng/Tech: Star Shi

Time(Minutes)	Maximum perpendicular displacement where a positive measurement indicates movement towards the furnace (mm)						
	D8	D9	D10	D11	D12	D13	D14
Initial	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0
30	0	0	4	0	0	0	0
40	0	0	6	0	0	0	0
50	0	0	7	0	0	0	0
60	0	0	8	0	0	0	0
70	0	0	9	0	0	3	0
80	0	0	12	0	0	4	0
90	0	0	14	0	5	4	0
100	0	0	14	0	5	4	0

Intertek

Test:	Fire Resistance	Reviewer:	Sun Sun
Test Date:	2013.2.6		
Job No:	AU13014016-2		
Client:	BESTKO Precision Limited	Eng/Tech:	Star Shi
Sample:	Concealed Hinge - WJ201		
Sample ID:	S1301127.003- 004		
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		



12 Appendix F: Test Photographs

Fig. 1 - Exposed Side Prior to the Fire Test

Fig. 2 – Unexposed Side after 4 Minutes

Fig. 3 – Unexposed Side after 16 Minutes

Fig. 4 – Unexposed Side after 30 Minutes

Fig. 5 – Unexposed Side after 60 Minutes

Fig. 6 – Unexposed Side after 90 Minutes

Fig. 7 – Unexposed Side after 108 Minutes

Fig. 8 - Exposed Side after 108 Minutes

13 Revision Page

Revision No.	Date	Changes	Author	Reviewer
0	February 23, 2013	First issue	Star Shi	Sun Sun

END OF DOCUMENT