TEST REPORT

EN 1935

Building hardware-Single-axis hinges-Requirements and test methods

Report reference No. ..... :	GZ12090564-2R2 Supersede Report No. GZ12090564-2R1 dated March 13, 2013
Tested by (name and signature)..... :	Credy Chen
Approved by (name and signature) .. :	Blusea Dong
Date of issue ..... :	July 3, 2013
Contents ..... :	Total test report 14 pages including: Report text: 8 pages Appendix A for product photos: 2 pages Appendix B for product drawings: 2 pages Appendix C for product instruction: 2 pages
Testing Laboratory name	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Address ..... :	Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
Testing location ..... :	Same as above
Applicant's name	Bestko Precision Limited
Address..... :	Unit 303, Block A, Po Lung Centre, 11 Wang Chiu Road, Kowloon Bay, Hong Kong.
Test specification	
Standard ..... :	EN 1935:2002/AC:2003
Non-standard test method ..... :	None
Test Report Form NO.	TTRF EN 1935: 2002 B
TTRF Originator..... :	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Master TTRF..... :	Dated 2008-01
Test item Description	Concealed Hinge
Trademark ..... :	BESTKO
Model and/or type reference ..... :	WJ201 & WJ201B
Manufacturer..... :	Bestko Precision Hardware (Shenzhen) Company Limited
Rating(s) ..... :	4 | 7 | 6 | 1 | 1 | 0 | 1 | 13

Summary of testing

The submitted samples **COMPLIED WITH** all applicable mechanical performance requirements of EN 1935:2002/AC:2003 for the classification.

Test item particulars	
Classification of installation and use ..... :	Severe duty, use on door
Test case verdicts	
Test case does not apply to the test object ..... :	N/A
Test item does meet the requirement ..... :	P (Pass)
Test item does not meet the requirement ..... :	F (Fail)
Testing	
Date of receipt of test item ..... :	September 12, 2012 and May 16, 2013
Date(s) of performance of test ..... :	September 12, 2012 to November 16, 2012 May 16, 2013 to June 14, 2013

General remarks

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"(See remark #)" refers to a remark appended to the report.
"(See Appendix #)" refers to an appendix appended to the report.
Throughout this report a comma (point) is used as the decimal separator.

When determining the test result, measurement uncertainty has been considered.

General product information:

This report include two models conceal hinge, model WJ201 and WJ201B. The two hinges have same material and similar structure, the difference is the jamb mounting of hinge which reflected in jamb side part.

The model WJ201 was subjected to fully standard test, in order to assess potential performance differences between the two models, model WJ201B undergoing evaluation, customer-supplied technical drawings of each model are reviewed and compared to those of mainly tested model WJ201, and model WJ201B subjected to Static Load Test and Shear Strength Test.

Details see Appendix B.

Schedule of Components:

See Appendix B – Product Drawings for component list and raw material information.

Detail "Ratings" information listed as following:

First digit (Category of use): Grade 4 – severe duty, For use on door;

Second digit (Durability): Grade 7 – 200 000 cycles;

Third digit (Test door mass): Grade 6* – 160 Kg; * Customized requirement of applicant.

Fourth digit (Suitability for use on fire/smoke compartmentation doors): Grade 1 – Suitable for use on fire resistant and /or smoke control door assemblies;

Fifth digit (Safety): Grade 1 – Safety the essential requirement of safety in use;

Sixth digit (Corrosion resistance): Grade 0 – no defined corrosion resistance;

Seventh digit (Security-Burglar-Resistance): Grade 1 – suitable for use on burglar-resistant door assemblies, subject to satisfactory assessment of the contribution of the hinges to the burglar resistance of specified burglar-resistant door assemblies;

Eighth digit (Hinge Grade): Grade 13.

Amendment 1:

The original Report Reference No. GZ12090564-2, dated December 4, 2012 modified on July 3, 2013 to include the following changes and/or additions:

1. Changed fourth digit from '0' to '1'.
2. Revised the typo in BOM .

Amendment 2:

The Report Reference No. GZ12090564-2R1, dated March 18, 2013 modified on July 3, 2013 to include the following changes and/or additions:

1. Added grouping model WJ201B and test data of related test.

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Clause	Requirement – Test	Result - Remark	Verdict
4	**CLASSIFICATION**		—
4.2	Category of use ..... :	Grade 4	—
4.3	Durability ..... :	Grade 7	—
4.4	Test door mass ..... :	Grade 6	—
4.5	Suitability for use on fire/smoke compartmentation doors ..... :	Grade 1	—
4.6	Safety ..... :	Grade 1	—
4.7	Corrosion resistance ..... :	Grade 0	—
4.8	Security-Burglar-Resistance ..... :	Grade 1	—
4.9	Hinge grade ..... :	Grade 13	—
5	**REQUIREMENTS**		—
5.1	Initial friction torque measurements The maximum permissible frictional torque shall be: 4 Nm for hinge grade 12 to 14 ..... :	For Model WJ201: 0 degree: 2,5 Nm 30 degree: 2,2 Nm 60 degree: 2,1 Nm 90 degree:2,5 Nm For Model WJ201B: 0 degree: 2,0 Nm 30 degree: 2,6 Nm 60 degree: 2,9 Nm 90 degree:1,6Nm	P
5.2	Static load		—
5.2.1	Load deformation The total mass of the hinged test element plus any additional load is equal to the load deformation mass of 320Kg ..... :	Both two models subjected Loading: 320 Kg	—
5.2.1 (a)	The vertical displacement under load shall not exceed 2 mm ..... :	WJ201: 0,08 mm WJ201B: 1,34 mm	P
5.2.1 (b)	The lateral displacement under load shall not exceed 4 mm ..... :	WJ201: 0,60mm WJ201B: 1,13 mm	P

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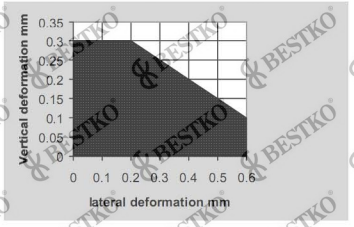
Clause	Requirement – Test	Result - Remark	Verdict
5.2.1 (c)	Residual displacement after unloading shall be within the shaped area of Figure G.1		
		For Model WJ201: Lateral displacement: 0,03 mm Vertical displacement: 0,10 mm	P
	Figure G.1 — Limits of allowable deformation in static load tests	For Model WJ201B:	
	Lateral displacement (mm) ..... :	Lateral displacement: 0,16 mm	
	Vertical displacement (mm) ..... :	Vertical displacement: 0,14 mm	
5.2.1 (d)	No visible cracking or breakage..... :	No defects were found	P
5.2.2	Overload The total mass of the hinged test element plus any additional load is equal to the load overload mass of 480 Kg ..... :	Both two models subjected overload mass: 480Kg	—
5.2.2 (e)	Shall be no breakage of any hinge leaf, knuckle, barrel, pin and no any cracking visible to normal or corrected vision..... :	No defects were found.	P
5.2.2 (f)	Shall remain connection to the frame even though the hinge may have been rendered inoperable ... :	Connected to the frame well and operable	P
5.3	Shear strength		—
5.3 (g)	Shall be no breakage or cracking, or lateral deformation greater than 3 mm..... :	For Model WJ201: When load 10 kN force, the lateral deformation: 2,87 mm For Model WJ201B: When load 10 kN force, the lateral deformation: 2,80 mm	P

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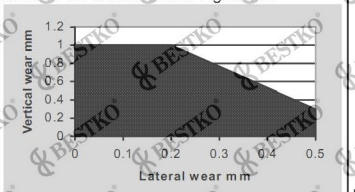
Clause	Requirement – Test	Result - Remark	Verdict
5.3 (h)	Additional lateral and vertical displacements after test shall no exceed 1 mm ..... : Shall operate for 20 cycles without breakage of any hinge leaf, knuckle, barrel or pin ..... :	For Model WJ201: Lateral: 0,68mm Vertical: 0,05mm Not found any breakage after test. For Model WJ201B: Lateral: 0,86mm Vertical: 0,20mm Not found any breakage after test.	P
5.3 (i)	Unlimited permanent deformation ..... :	Only for grade 14 burglar resistant door hinge	N/A
5.4	Durability		—
5.4 (j)	The displacements from the datum surface shall be within the shaded area of Figure G.2.  Figure G.2 — Limits of allowable wear in durability test Lateral wear of the hinge (mm) ..... : Vertical wear of the hinge (mm) ..... :	For model WJ201: After 200,000 cycles, 0,10 mm; 0,83 mm.	P
5.4 (k)	Maximum permissible frictional torque measured after the first 20 cycles and also after completion of test shall be 4 Nm grade 12 to 14 ..... :	For model WJ201: Initial: 0 degree: 2,2 Nm 30 degree: 2,0 Nm 60 degree: 1,4 Nm 90 degree: 1,2 Nm Final: 0 degree: 2,1 Nm 30 degree: 2,0 Nm 60 degree: 1,3 Nm 90 degree: 1,3Nm	P
5.5	Corrosion resistance		—

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Clause	Requirement – Test	Result - Remark	Verdict
5.5.1	Hinges not intended to be protected after fitting 0 hours neutral salt spray exposure for grade 0 .. :	Claimed Grade 0	N/A
5.5.2	Hinges intended to be protected after fitting ..... :	No to be protected after fitting	N/A
5.6	Hinges for use on fire-resistant and/or smoke-control doors ..... :	Approved for use on fire resistant and/or smoke control door assemblies. Refer to Report No. AU13014016-2 dated February 23, 2013	P
5.7	Hinges for use on burglar-resistant doors..... :	Claimed Grade 1 Refer to Annex C	P
Annex C	Hinges for use on burglar-resistant doors		—
C.1	Hinges for use on burglar-resistant doors shall conform to the appropriate requirements of clauses 4 to 8 of EN 1935. In addition, the requirements of C.2 to C.4 apply.	Refer to clauses 4 and 5. Refer to C.2 to C.4	P
C.2	Hinges shall confirm to the requirement of severe-duty grades 12, 13 or 14 as specified in 4.2.	Met requirement of Grade 13	P
C.3	Fastenings shall not be accessible from the exterior face of the door when the hinge has been installed in accordance with the manufacturer's instruction.	Concealed hinge, fastenings can not be accessible from the exterior face of the door when the hinge has been installed.	P

EN 1935			
Clause	Requirement – Test	Result - Remark	Verdict
C.4	Hinges used on outward-opening external doors shall be either of such a design that the hinge pin can only be removed when the door is open or, alternatively, they shall incorporate hinge bolts within the hinge flap that enable the hinge to withstand the shear strength test loads specified in Table 2 (see 7.4) for grades 12, 13 or 14. The hinge pin shall be removed for the test, the acceptance criterion being that the hinge elements shall not become separated whilst under load.	The hinge pin conceals in the door, it can not be removed when the door is closed.	P

**********End of page**********

Appendix A

Product Photos

WJ201 Overall view (1)

WJ201 Overall view (2)

Appendix A

Product Photos

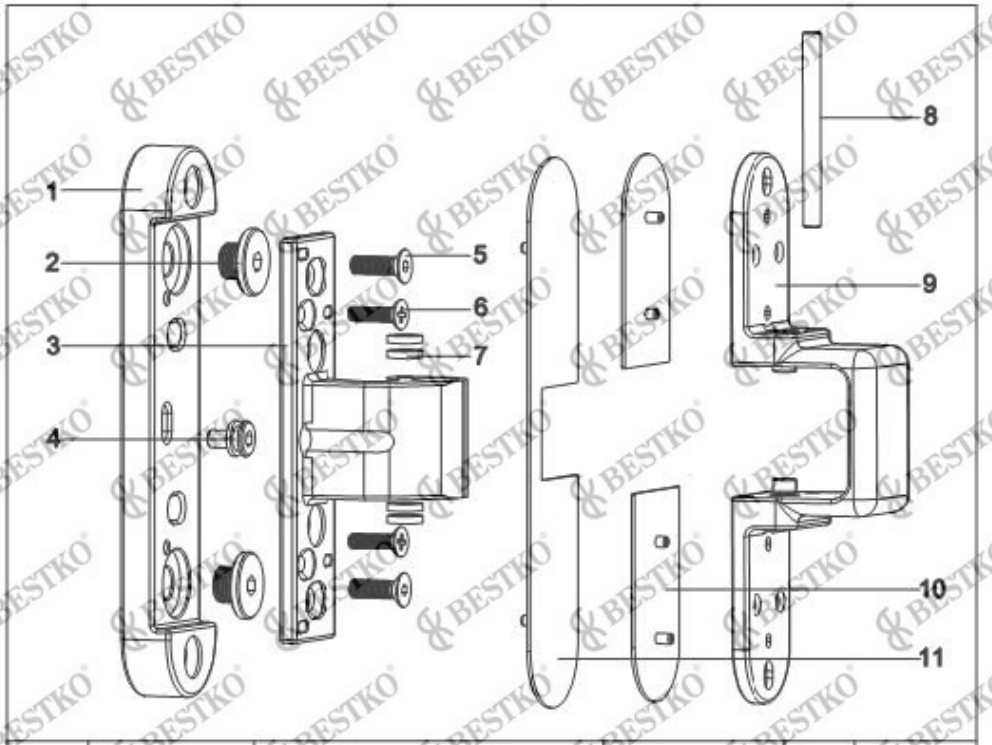
WJ201B Overall view (1)

WJ201B Overall view (2)

Appendix B

Product Drawings and Bill of Material

Concealed Hinge - WJ201



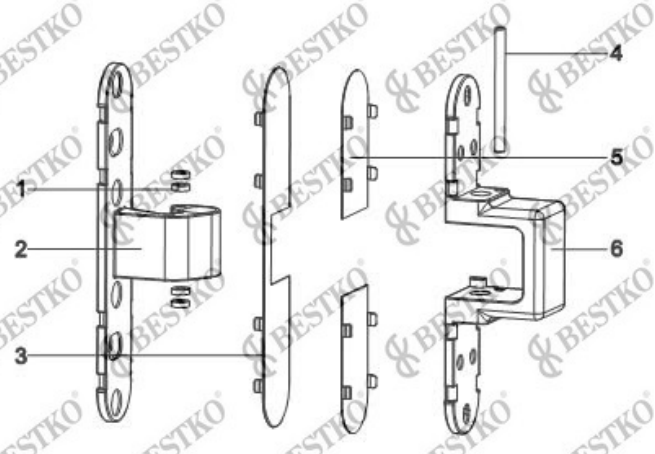
No.	Code	Name of Component	Material	Qty.	Finishing
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

WJ201

Appendix B

Product Drawings and Bill of Material

Concealed Hinge - WJ201B



No.	Code	Name of Component	Material	Qty.	Finishing
1					
2					
3					
4					
5					
6					

WJ201B

Appendix C

Product Installation Guide

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.

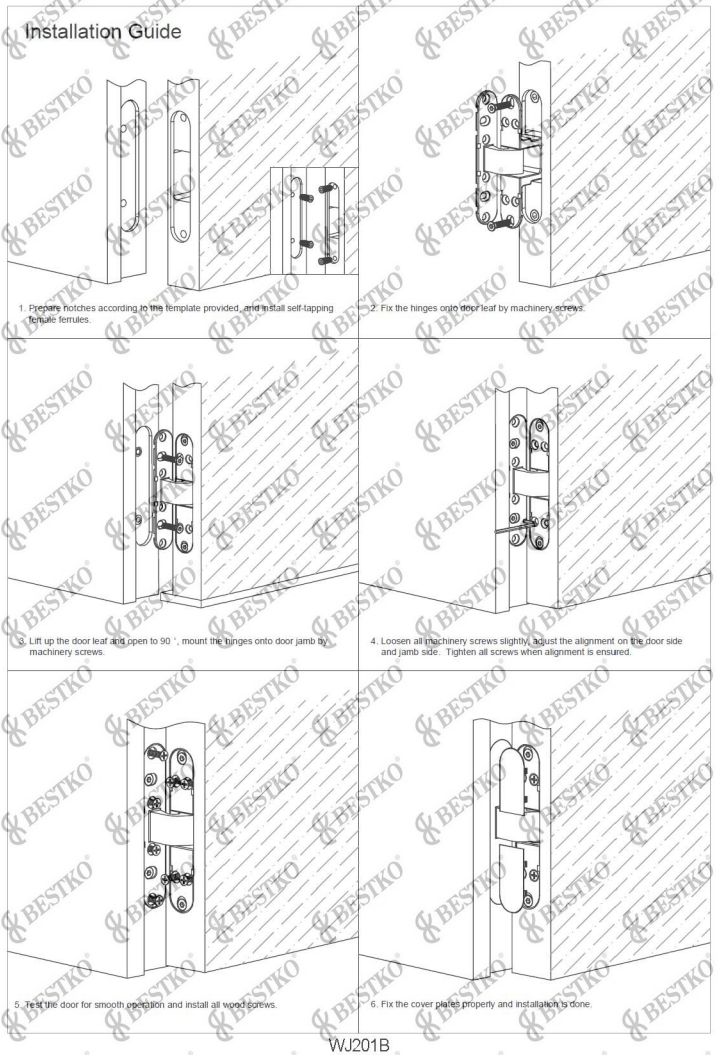
4. Correct the verticality by adjusting the screw members on mounting base.

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.

Appendix C

Product Installation Guide



WJ201B

**********End of report**********

TTRF EN 1935: 2002 B
Originator: Intertek Testing Services Shenzhen Ltd. Guangzhou Branch