Report No: 186214

Test of: Hager BB 6191 Butt Hinge

Tested to:
BS EN 1935:2002
Building Hardware – Single axis hinges

For: Hager Hinge Co
139 Victor Street
St. Louis
MO 63104
U.S.A
TEST CONCLUSIONS

Samples of: Butt Hinges
Manufacturer: Hager Hinges
Product: Butt Hinges
Model: BB 6191 Butt Hinge
Size: 4" X 4" X 3mm

have been tested in accordance with:
BSEN 1935: 2002 (Building hardware — Single-axis hinges.)
by Exova Warringtonapt [a UKAS accredited Testing Laboratory (No. 0621).and EC Notified Body number 1104]

At Key Industrial Park, Fernside Rd., Willenhall, West Midlands. WV13 3YA.

Results as detailed below:

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Description</th>
<th>Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1 / 6.4 / 7.1.2</td>
<td>Initial measurements</td>
<td>Yes</td>
</tr>
<tr>
<td>5.2.1 / 7.3.2</td>
<td>Load deformation test</td>
<td>Yes</td>
</tr>
<tr>
<td>5.2.2 / 7.3.3</td>
<td>Overload test</td>
<td>Yes</td>
</tr>
<tr>
<td>5.3 / 7.4</td>
<td>Shear strength</td>
<td>Yes</td>
</tr>
<tr>
<td>5.4 / 7.5</td>
<td>Endurance test</td>
<td>Yes</td>
</tr>
<tr>
<td>5.5 / 7.1.5</td>
<td>Corrosion resistance</td>
<td>Yes</td>
</tr>
<tr>
<td>5.6 / Annex B</td>
<td>Extra requirements for Fire-resistant doors</td>
<td>Yes</td>
</tr>
<tr>
<td>5.7 / Annex C</td>
<td>Extra requirements for burglary-resistant doors</td>
<td>N/a</td>
</tr>
<tr>
<td>5.8</td>
<td>Families of hinges</td>
<td>N/a</td>
</tr>
<tr>
<td>8</td>
<td>Marking</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Classification

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Category of duty</th>
<th>Number of test cycles</th>
<th>Test door mass</th>
<th>Fire resistance</th>
<th>Safety</th>
<th>Corrosion resistance</th>
<th>Security</th>
<th>Hinge grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB 6191</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No inferences can be made regarding performance against other requirements of this standard

NOTE.

Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.
Tests marked "NA" are not applicable to the type of device under test.
Tests marked "NT" not be applied to the device under test.
# AUTHORISATION

**Tests performed by:** Alan Fairfield

**Report issued by:** Alan Fairfield – Test Engineer

**Signed:**

**Date:** 22 - 10 - 2009

For and on behalf of Exova Warrington Apt

**Report authorised by:** Ian Keeling – Operations Manager

**Signed:**

**Date:** 22 - 10 - 09

For and on behalf of Exova Warrington Apt

**Report issued:** 22 October 2009

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**NOTE.**
Tests marked "Not UKAS Accredited" are not covered by the Laboratory UKAS accreditation schedule.

Tests marked NT were not tested

Tests marked NA are not applicable to the product on test.

The laboratory has tested the products supplied by the client as sampled in accordance with their own requirements

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Exova Warrington Apt is an EC Notified Body Number 1104

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TEST DETAILS

CLIENT DETAILS
Company name
Hager Hinges
Address
139 Victor Street
St. Louis
MO 63104
U.S.A
Contact
Mark McRae

ORDER DETAILS
Order number
11-28206
Dated
07/14/2009

SAMPLE DETAILS
Product
Butt Hinge
Model
BB 6191
Markings
Confirmed
Manufacturer
Hager Hinges
Date of Manufacture
Not Shown
Other information
Number and type of fixings – 8 of M5 Machine Screws

TEST DETAILS
Test reference nos.
186214
Date sample received
20/07/2009
Date test started
21/07/2009
Date test completed
12/08/2009
Specification tests conducted to
BS EN 1935:2002 Building Hardware- Single Axis Hinges
Class and or Category
Grade 13
Special Test requirements
None
Other reports to be used in conjunction with this report
Fire Test report number 136418

STANDARD REQUIREMENTS
Test door mass - for
Load deformation test  240 KG
Overload test  360 KG
Endurance test  120 KG
Endurance test cycles  200,000 cycles
Corrosion resistance grade 4 = 240 hours neutral salt spray exposure.
INITIAL OBSERVATIONS

ALL SAMPLES RECEIVED IN A GOOD CONDITION

HAGER BB 6191 STAINLESS STEEL BUTT HINGE
### TEST RESULTS

#### SAMPLE 1 – STATIC LOAD TESTS

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Detail</th>
<th>Requirement</th>
<th>Test Result</th>
<th>P = Pass</th>
<th>F = Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>Mounting</td>
<td>Screws tightened to required torque</td>
<td>10 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 / 6.4</td>
<td>Initial measurements</td>
<td>Door mass set to Cycled for 20 cycles Torque to initiate movement at 0° 30° 60° 90°</td>
<td>120 kg. Yes</td>
<td>1.44 Nm 1.98 Nm 1.44 Nm 1.08 Nm</td>
<td>P</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum permitted torque</td>
<td>4 Nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2.1</td>
<td>7.3.2</td>
<td>Load deformation</td>
<td>Door mass set to Cycled for 20 cycles Lateral displacement under load &lt;2 mm Vertical displacement under load &lt;4mm Door mass reduced to Cycled for 5 cycles Lateral displacement after deformation Vertical displacement after deformation Within shaded area of graph Hinge condition after test</td>
<td>240 kg. Yes 0.76 mm 0.27 mm 120 kg. Yes 0.07 mm 0.07 mm Yes Satisfactory</td>
<td>P</td>
</tr>
<tr>
<td>5.2.2</td>
<td>7.3.3</td>
<td>Overload</td>
<td>Door mass set to Cycled for 5 cycles Time under load (1 – 2 mins) Door mass reduced to Hinge condition after test</td>
<td>360 kg. Yes 2 mins 120 kg. Yes Satisfactory</td>
<td>P</td>
</tr>
</tbody>
</table>

### SAMPLE 2 - SHEAR TESTS

<table>
<thead>
<tr>
<th>Sample a</th>
<th>Fixed leaf details</th>
<th>3 Knuckle</th>
<th>5.3</th>
<th>Shear load test</th>
<th>Fixing screw torque</th>
<th>10 Nm</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.4</td>
<td></td>
<td>Force applied</td>
<td>10 Kn</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Force held for (1 minute)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Examination Grades 1-14</td>
<td>Condition of hinges Change in lateral position of leaves &lt; 3mm</td>
<td>Satisfactory 0.78 mm</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.4</td>
<td>Examination Grade 14 only</td>
<td>Hinge opens to 90° with torque &lt;220Nm</td>
<td>N/a</td>
<td>N/a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample b</th>
<th>Fixed leaf details</th>
<th>2 Knuckle</th>
<th>5.3</th>
<th>Shear load test</th>
<th>Fixing screw torque</th>
<th>10 Nm</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>7.4</td>
<td></td>
<td>Force applied</td>
<td>10 Kn</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Force held for (1 minute)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>Examination Grades 1-14</td>
<td>Condition of hinges Change in lateral position of leaves &lt; 3mm</td>
<td>Satisfactory 1.24 mm</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.4</td>
<td>Examination Grade 14 only</td>
<td>Hinge opens to 90° with torque &lt;220Nm</td>
<td>N/a</td>
<td>N/a</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Tests marked NA are not applicable to the device tested
### SAMPLE 3 – ENDURANCE TESTS

<table>
<thead>
<tr>
<th>Clause No.</th>
<th>Detail</th>
<th>Requirement</th>
<th>Test Result</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>Mounting</td>
<td>Screws tightened to required torque</td>
<td>10 Nm</td>
<td><strong>P</strong></td>
</tr>
<tr>
<td>5.4 /6.4</td>
<td>Initial measurement s</td>
<td>Door mass set to Cycled for 20 cycles Torque to initiate movement at 0° 30° 60° 90° Maximum permitted torque</td>
<td>120 kg. 1.53 Nm 1.26 Nm 1.26 Nm 1.26 Nm 4 Nm</td>
<td><strong>P</strong></td>
</tr>
<tr>
<td>5.4 7.5</td>
<td>Endurance test</td>
<td>Door mass set to Cycled for 200,000 cycles Screws retightened to Torque to initiate movement at 0° 30° 60° 90° Maximum permitted torque</td>
<td>120 kg. 1.44 Nm 0.90 Nm 1.80 Nm 1.17 Nm 4 Nm</td>
<td><strong>P</strong></td>
</tr>
<tr>
<td>5.4 7.3.3</td>
<td>Overload</td>
<td>Door mass set to Cycled for 5 cycles Time under load (1 – 2 mins) Door mass reduced to Hinge condition after test</td>
<td>360 kg. 2 mins 120 kg. Satisfactory</td>
<td><strong>P</strong></td>
</tr>
</tbody>
</table>

** Tests marked NA not applicable to the device tested

**Hinge condition after test** Satisfactory

Details: Hinge completed 200,000 durability cycles, and remained in a good condition
### SAMPLE 4 – CORROSION TESTS

<table>
<thead>
<tr>
<th>7.1.5</th>
<th>Neutral salt spray exposure</th>
<th>Exposure time.</th>
<th>240 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Condition after test.</td>
<td>Satisfactory</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operates satisfactorily.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No tarnishing of uncoated surfaces.</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No more than 1 spot per 650mm² of area on coated surfaces.</td>
<td>No</td>
</tr>
</tbody>
</table>

**Comments**

Hinge completed 240 hours exposure time in salt spray chamber and remained in a satisfactory condition.

### FIRE DOOR USAGE. (Annex B)

Fire test evidence,

- FD timber doors  report no. 136418
- FD steel doors  report no.

**Details** - A sample of these hinges has successfully passed a fire test
BURGLARY RESISTANCE. (Annex C)

Fastenings not accessible from outside face.

Outward opening pins only removable when door is open or hinge bolts withstand shear test.

Details: N/A
8 Marking

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Result</th>
<th>P = Pass</th>
<th>F = Fail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hinges should be clearly marked with the following</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturers Name or Trademark</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Hinge grade according to clause 4.9</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The number of this European Standard</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The packaging in which the hinges are supplied should be clearly marked with the following</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The classification box</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of hinge</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finish of hinge</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The manufacturers reference number</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handling in accordance with ISO R - 1226</td>
<td>N/a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lubrication details **</td>
<td>Confirmed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** lubrication details can be included in technical literature.

Uncertainty of measurements

Where the tolerance given for a specified value is in one direction only, i.e. Mass + 5kg – 0kg.
The value to be measured must be adjusted to the mid tolerance value with a tolerance of ± ½ the Unidirectional tolerance, i.e. Mass + 5kg – 0kg. Becomes Mass + 2.5 kg ± 2.5 kg.
The uncertainty of measurements calculated for a confidence level of 95% throughout these tests are within the limits of the tolerances detailed in the standard.

Observations and Comments

Samples supplied successfully passed all aspects of testing undertaken