

TEST REPORT

Performance Evaluation of a
PROJECTED HINGE
“Heavy Duty Series 011SS- 28 in”
Performed in Accordance with AAMA 904-09

Report No. L11-783-2882

Report Date: November 14, 2011

Prepared for:
Acme Window Hardware Ltd.
4635 Burgoyne Street, Unit 20
Mississauga, ON L4W 1V9
Canada

Overall Hinge Rating

P-C-127 kg (280 lbs) - 2032 mm (80 in) High – LR – MOR (4.5 in Maximum Opening)

Respectfully submitted by:


**CANADIAN BUILDING ENVELOPE
Science and Technology (CAN-BEST)**

Tests Supervised by:



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- This report does not constitute certification of the test product. The reported test results refer only to the specimen tested. No representation is made that other samples of similar design will feature like performance.
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1. INTRODUCTION

Canadian Building Envelope Science and Technology (CAN-BEST) was retained by Acme Window Hardware Ltd. to test their Projected Hinge assembly.

This report covers tests carried out on one set of specimens of specific dimensions. Product performance is affected by variations in its properties, dimensions, assembly details and installation method. The reader is advised to ensure product conformity with all the details of the test sample described in this report.

2. HINGE DESCRIPTION

Four-bar, 28" Heavy Duty Non-Friction Hinge assembly having stainless steel bars with stainless steel track and sliding brass shoe.

- Designation:** 011SS Series Heavy Duty Hinge
Type: Four-bar Stainless Steel, 28" Hinge, Part Number 011SS
Construction: Corrosion resistance materials compatible with window framing materials. Affidavit of material compatibility, as requested in section 6.8 "Reporting", was not provided by the client.
Sampling: Three pairs of hinge specimens were selected by CAN-BEST at random from one Client-supplied box containing twenty four pairs.
Drawings: Copy of the following drawing(s), stamped "*Canadian Building Envelope Science and Technology*", is enclosed with this report:
- Heavy Duty 4-Bar Hinges (011SS Series)

3. TEST PROCEDURE

Hinge testing was conducted in accordance with the performance requirements outlined in AAMA 904-09, for the P-C Rating, as follows:

1. **Installation**-The four test specimens were divided into two pairs. Each pair was installed on a projected window provided by CAN-BEST. The projected sash weight was adjusted to match the required weight rating and its balance point was adjusted to match the required height rating.
2. **Load Test (Friction Hinges Only)** – After hinge installation and weight adjustment, the sash was opened completely to 45° angle and blocked to prevent it from sliding closed.
Horizontal Load: A 220 N (50 lbf) load was applied to the sash in the closing direction for 10 seconds. The load was applied to each stile at a distance from the top rail equals to the Height Rating.
3. **Zero Reading**- A 110 N (25 lbf) load was applied to the sash at each upper hinge corner, in an outward direction. With the load applied, the distance between the sash outer face and the frame outer face was measured at each point of load application.
4. **Cycling Test**- After the zero reading at each corner, the casement window was subjected to 8000 cycles of two-way travel, between the fully-open and fully closed positions. The cycling rate was set to 4 ± 1 cycles per minute.
5. **Final Reading**- After cycling, the 110 N load was reapplied to each upper hinge corner, in the same manner as the zero reading. With the load applied, the distance between the sash and frame faces was re-measured.

4. TEST RESULTS

Test Start Date: November 3, 2011		Test Finish Date: November 10, 2011		
SPECIFICATIONS	TEST RESULTS			
6.5 Cycling Test At the conclusion of 8000 cycles: • <i>There shall be no structural failure of any part of the hinge, and</i> • <i>The average of the two final readings shall not exceed the average of the two zero readings by more than 1.5 mm (0.060 in).</i>	Pair 1		Pair 2	
	<i>Zero Readings</i>			
	0.13 mm (0.005")	0.20 mm (0.008")	0.13 mm (0.005")	0.20 mm (0.008")
	Average: 0.18 mm (0.007")		Average: 0.18 mm (0.007")	
	<i>Final Readings</i>			
	0.25 mm (0.010")	0.230 mm (0.009")	0.30 mm (0.012")	0.25 mm (0.010")
	Average: 0.25 mm (0.010")		Average: 0.28 mm (0.011")	
	<i>Difference between Zero and Final Averages</i>			
	0.08 mm (0.003") PASS		0.10 mm (0.004") PASS	

5. CONCLUSION

Based on observations and test results, the hinge assembly fully complied with the performance requirements outlined in AAMA 904-09 with a rating of:

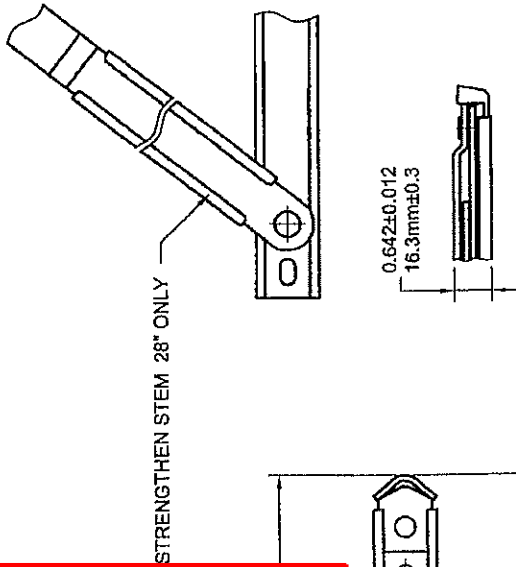
- P Projected
- C Commercial
- 127 kg (280 lbs) Weight Rating
- 2032 mm (80 in) Height Rating
- LR Lubrication Required
- MOR Mechanical Operator Required (4.5 in Maximum Opening)


Notes:

- *This report does not constitute certification of this product, which may only be granted by the AAMA Validator.*
- *The reported results were secured by using the designated test methods and they (DO) indicate compliance with the performance requirements of the referenced publication.*
- *The product tested is detailed in drawings, which were supplied by the manufacturer and annexed to this report. Any other descriptions were supplied verbally by the manufacturer. The general descriptions in this report are for reference only.*



HEAVY DUTY 4-BAR HINGES (011SS Series)



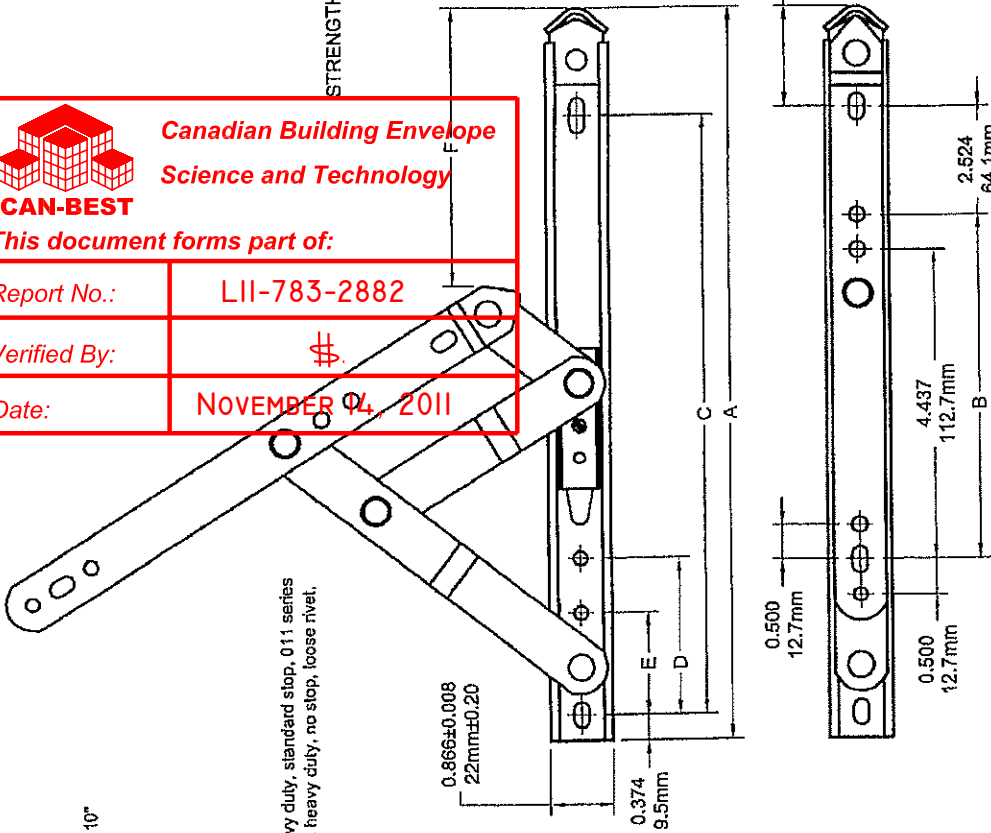


**Canadian Building Envelope
Science and Technology**

CAN-BEST

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Date:	NOVEMBER 04, 2011



Note

1. 77010—304 SST material four bar hinge, length 10"
2. 011—Four bar hinge series
3. HD—Heavy duty
4. SP—Standard stop
5. NP—No stop

Ordering example

77010-011HD-SP : 10" 304 SST four bar hinge, heavy duty, standard stop, 011 series
 77012-011HD-NP-100 : 12" 304 SST four bar hinge, heavy duty, no stop, loose rivet, 011 series

PART NUMBER	HINGE LENGTH	A					B					C					D					E					F					DEGREE OF OPENING	
		STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	STD. STOP	NO STOP	LOOSE RIVETS			
77010-011HD-SP	10" (254.0mm)	10.5" (266.7mm)	N/A	8.591 (218.2mm)	2.250 (57.2mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	1.375 (35.0mm)	4.000 (101.6mm)	58°	77°	100	
77012-011HD-SP	12" (304.8mm)	12.5" (317.5mm)	4.938 (125.4mm)	10.591 (269.0mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	1.625 (41.3mm)	4.000 (101.6mm)	52°	77°	100	
77014-011HD-SP	14" (355.6mm)	14.5" (368.3mm)	5.938 (150.8mm)	12.591 (319.8mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	5.656 (143.7mm)	2.125 (54.0mm)	48°	77°	100
77016-011HD-SP	16" (406.4mm)	16.5" (419.1mm)	6.938 (176.2mm)	14.591 (370.6mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	6.938 (176.2mm)	2.625 (66.7mm)	49°	77°	100
77018-011HD-SP	18" (457.2mm)	18.5" (469.9mm)	7.938 (201.6mm)	16.591 (421.4mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	8.312 (211.1mm)	3.125 (79.3mm)	49°	77°	100
77020-011HD-SP	20" (508.0mm)	20.5" (520.7mm)	8.938 (227.0mm)	18.591 (472.2mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	9.625 (244.4mm)	3.625 (92.0mm)	49°	77°	100
77024-011HD-SP	24" (609.6mm)	24.5" (622.3mm)	10.938 (277.8mm)	22.591 (573.8mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	13.500 (342.9mm)	4.625 (117.4mm)	45°	77°	100
77028-011HD-SP	28" (711.2mm)	28.5" (723.9mm)	12.938 (335.0mm)	26.591 (675.4mm)	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	17.000 (431.8mm)	N/A	40°	N/A	100