

Fenestration Testing Laboratory, Inc.

10235 8th Street, Rancho Cucamonga, CA 91730

Report #: T20-016

REPORT SUMMARY

REPORT

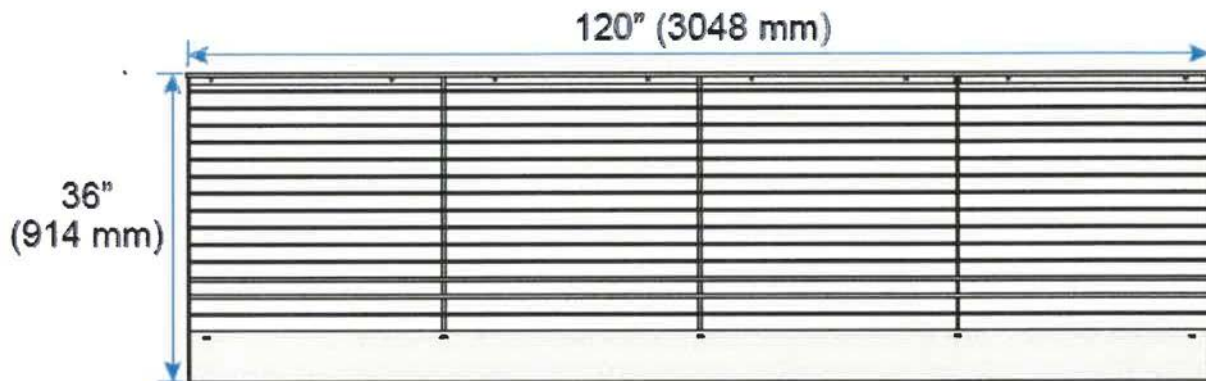
T20-016

TESTED FOR

C.R. Laurence Co., Inc.
2503 E. Vernon Ave.
Los Angeles, CA 90058-1897

SERIES & PRODUCT TYPE

7700 Sunshade 120" x 36" – Five (5) Outriggers – 14 blades and nose



Cat. No. 77103
CRL Metallic Silver 10' (3048 mm)
7700 Series Aluminum Sunshade

SPECIFICATION

AAMA 514-16 Standard Test Method for Static Loading and Impact on Exterior Shading Devices

PERFORMANCE LEVEL ACHIEVED

Static Design Load of 92.9 PSF - Load applied at Design Load = 2,787 lbs - Passed
Load applied at 2x Design Load = 5,574 lbs - Passed

Ice Impactor Energy of 400 joules - Passed

TEST COMPLETION DATE

March 13, 2020

REPORT DATE

March 23, 2020

Fenestration Testing Laboratory, Inc.

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1.0 Tested For: C.R. Laurence Co., Inc.
2503 E. Vernon Ave.
Los Angeles, CA 90058-1897

2.0 Purpose:
The purpose of this report is to present the testing methods employed and the test results obtained during the performance testing of one (1) Aluminum Sunshade described in paragraph 5.0 of this report.

3.0 Test References:

3.1 AAMA 514-16 Standard Test Method for Static Loading and Impact on Exterior Shading Devices

4.0 Compliance Statement: The test results in paragraph 6.0 indicate that the test sample described in paragraph 5.0 of this report met the performance requirements of the above specification for the static load design pressure and ice impactor energy shown in 4.1 below.

4.1 Design Static Load Pressure = 92.9 PSF
Ice Impact Energy = 400 Joules

5.0 Sample Submitted:

5.1 Product Type: Aluminum Sunshade

5.2 Series: 7700

5.3 Configuration: 5 outriggers, forming 4 sections, 14 blades, and a 6" nose

5.4 Product Dimensions:

	Millimeters	Inches
Width	3048 mm	120.00"
Extension	914.4 mm	36.00"

5.11 Construction: All Sunshade Parts were Aluminum and painted.

<i>Part</i>	<i>Quantity</i>	<i>Dimensions</i>	<i>Manner of attachment or support</i>
Anchoring Plate or Back Plate	One (1)	1/2" - 8" x 120"	All outriggers were welded to this plate. Prefabricated anchoring holes were located as shown on the attached drawings and photos
Outriggers	Five (5)	3/8" - 35.5" long from back plate to rounded end at the two end outriggers and 29.5" at the three field outriggers	Welded to the back plate with a 6" weld bead on each side of each of the three field outriggers and on the inside corner at the end outriggers. The outer face was seam filled.
Blades - 2" apart	Fourteen (14) in each bay of the four bays	1/4" - 2" x 29.5"	Fit into fabricated slots in the outriggers and seams at top filled. The seams on the outboard face of the outriggers were filled.

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5.11 Construction: All Sunshade Parts were Aluminum and painted.

<i>Part</i>	<i>Quantity</i>	<i>Dimensions</i>	<i>Manner of attachment or support</i>
6" wide nose	One (1)	See photos and drawing	The nose extrusion fit between the end outriggers and was welded to the outriggers full length vertical height at all inside corners. The nose was also fastened with three #10-32 x 3/4" PFH screws to each end outrigger

5.13 Installation/Support Method

<i>Location on frame</i>	<i>Anchor type</i>	<i>Spacing</i>
The sunshade was mounted to 10 x 2.60 x 0.240 A36 Steel Channel	3/8-16 x 2 Hex HD Bolts with lock washer, flat washers, and hex lock nuts with	A pair of bolts was located 3" from each end. In the field, a pair of bolts was located 6" from the center line of each outrigger; four (4) bolts per bay for a total of sixteen (16). Each pair was 5" vertically.
The 10 x 2.60 x 0.240 steel channel was welded to an 8 x 2.26 x .220 A-36 Steel Channel in-line with each outrigger. The 8 x 2.26 x 0.220 channel was in turn bolted to a 6" x 12" Douglas fir beam with two 1/2" diameter bolts, flat washers and 1/4" x 2.5" square steel washers on the wood side. The wood beam was clamped to the steel test chamber with steel screw clamps at bottom and right side. The top of the beam was supported with steel angle fastened to the top of the wooden beam with 6" x 3/8" hex head screws and fastened to the steel chamber on the other end with 3/8" hex head bolts approximately every 24". Additionally the left side was supported by a 4" x 6" post fastened to the end of the wooden beam with six 3/8" x 8" hex head screws; a wooden 2 x 4 was wedged between the post and a concrete curb to provide additional support.		

The Sunshade did not have a locking device or sealants.

6.0 - Test procedures and results: All testing procedures were performed in accordance with the performance requirements of the test specifications referenced in paragraph 3.0 of this report. The paragraph numbers shown are as shown in the AAMA 514-16 Test Method.

9.2 Static Load Test Testing (a 0.06" paper board was applied over the blades to keep the sand bags from tearing by being squeezed through the blades. The cardboard gave no addition structural support to the sunshade)

9.2.1 – FTL used 50 lb sand bags and 50 lb steel plates (6" x 30") laid over sand bags with the 30" dimension being perpendicular to the plane of the back plate to allow for deflection of the sunshade.

Square Footage: 120" x 36" = 30 sq ft

Design Load = 92.9 PSF x 30 sq ft = 2,787 lbs

9.2.2 – Deflection gages were placed at the end out riggers and at the center outrigger. At each outrigger, a gage was set at 6" from the baseplate face mounted to the steel channel ($d_{mullion}$) and 2" from the end (d_{end}). Additionally, deflection of the supporting 8" steel channel was measured at the center outrigger.

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9.2.3 Preload - The sunshade was preloaded with ½ of the design load or 1393.5 lbs for 30 seconds and then the load was released and after one minute the gages were zeroed.

9.2.4 Design Load - The design load of **2,787 lbs** was applied to the sunshade in a uniform manner. After 5 minutes, the readings were recorded at each outrigger. The left and right reference for the end outriggers is as seen standing at the end of the sunshade and facing the sunshade.

9.2.4.1 - The allowable net deflection (d_{net}) is calculated as $2L/120$ when "L" is the distance of the sunshade cantilever normal to the wall or 36".

$$\text{Allowable net deflection (dnet)} = 2 \times 36'' / 120 = 0.60''$$

$$d_{net} = d_{end} - d_{mullion}$$

Results for Net Deflection (d_{net}):

Left Outrigger -	$d_{end} = 0.36''$	$d_{mullion} = 0.09''$,	$d_{net} = 0.27''$	$< 0.60''$
Center Outrigger -	$d_{end} = 0.63''$	$d_{mullion} = 0.15''$,	$d_{net} = 0.48''$	$< 0.60''$
Right Outrigger -	$d_{end} = 0.63''$	$d_{mullion} = 0.19''$,	$d_{net} = 0.44''$	$< 0.60''$

9.2.4.2 - Residual Deflection (RD) was measured 1 minute after removal of design load :
(Allowable deflection was the greater of 1% of the cantilever span or 0.375" whichever was greater)

$$\text{Allowable} = 0.375''$$

Results for Residual Deflection (RD):

Left Outrigger =	0.01" < 0.375"
Center Outrigger =	0.02" < 0.375"
Right Outrigger =	0.02 < 0.375"

9.2.4.3 - The gages were not zeroed after the removal of the design load (as instructed in the test method) and testing proceeded.

9.2.5 - Two Times Design Load = **5,574 lbs**. The load was held for 5 minutes. One minute after removal of the load, permanent set at the end and mullion was recorded for the left, center, and right outrigger. $P.S._{net}$ for each outrigger is calculated $P.S._{net} = P.S._{end} - P.S._{mullion}$

Net Permanent Set (N.P.S.) is calculated as $N.P.S. = P.S._{net} - RD$

Results for N.P.S. of Outriggers:

$$\text{Allowable N.P.S.} = 1\% \text{ of Outrigger Span} = 36'' \times 0.01 = 0.36''$$

$$\text{N.P.S. Left Outrigger} - (P.S._{end} = 0.41'') - (P.S._{mullion} = 0.12'') - (RD = 0.01'') = P.S._{net} = 0.28'' < 0.36''$$

$$\text{N.P.S. Cen. Outrigger} - (P.S._{end} = 0.52'') - (P.S._{mullion} = 0.17'') - (RD = 0.02'') = P.S._{net} = 0.33'' < 0.36''$$

$$\text{N.P.S. Right Outrigger} - (P.S._{end} = 0.58'') - (P.S._{mullion} = 0.24'') - (RD = 0.02'') = P.S._{net} = 0.32'' < 0.36''$$

9.3 - Impact Testing - Energy of Ice Impactor to be 400 Joules

Per Appendix A - Velocity of impact $v = (2gh)^{1/2}$

When $g = 9.81 \text{ m/s}^2$ and $h = 4.49$ meters then $v = 9.386 \text{ m/s}$

Per Appendix A - Impact energy "W" = $\frac{1}{2}mv^2$

When $m = 9.07$ kilos and $v = 9.386 \text{ m/s}$ then $W = 400$ Joules

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The Sunshade was impacted with a 6" diameter ice cylinder with a mass of 9.07 Kilos and dropped from a height of 4.49 meters to produce the 400 Joules at impact.

The sunshade was impacted three times at each of the following locations:

Left side at the outermost projection, center at the outermost projection, and right side at the outermost projection.

10.1 - Impact Testing

Per 10.1, the shading device shall be deemed to pass the test if the following conditions are met:

- The impact test load has not resulted in total separation of the exterior shading device, its components, the system to which it is attached, glazing, hardware, or fasteners, which would cause parts of a combined weight greater than 28 grams (1 ounce) to fall.

Results:

Left side outermost projection - Pass

Center outermost projection - Pass

Right side outermost projection - Pass

Additional Comments: The impactors dented the extrusion forming the nose of the sunshade and produced some cracks in the paint at the top surface where blades fit into slots in outriggers (see attached photographs).

Testing was witnessed by: Jesus Gonzalez and Bladimir Ochoa with C.R. Laurence and by Jim Cruz and Daniel Orozco with FTL.

For a complete description of the tested sample, refer to the attached thirteen (13) pages consisting of manufacturer's installation instructions, detailed drawings, Sketches showing locations of deflection gages, and photographs. This report is complete only when all the above referenced pages are attached.


The above reference documents are on file. Drawings have been compared to the sample submitted. The above referenced documents, photographs, drawings and a copy of this report will be retained at the test laboratory for four years.

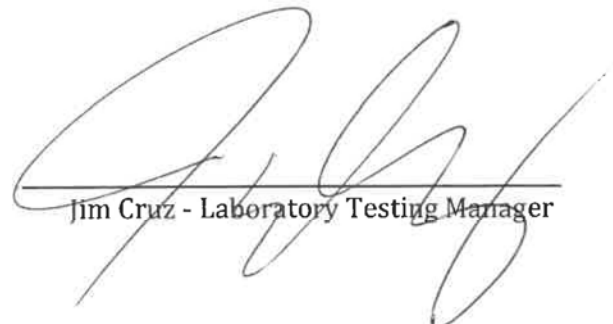
This test report may not be modified in any way without the written consent of Fenestration Testing Laboratory, Inc. (FTL).

The preceding test results relate only to the tested specimen and were obtained by using the applicable test methods listed in section 3.0 and 6.0 above. This report does not constitute certification of this product or an endorsement by this laboratory. It is the property of the client named in section 1.0 above. Certification can only be granted by an approved administrator and/or validator.

Test Completion Date: March 13, 2020

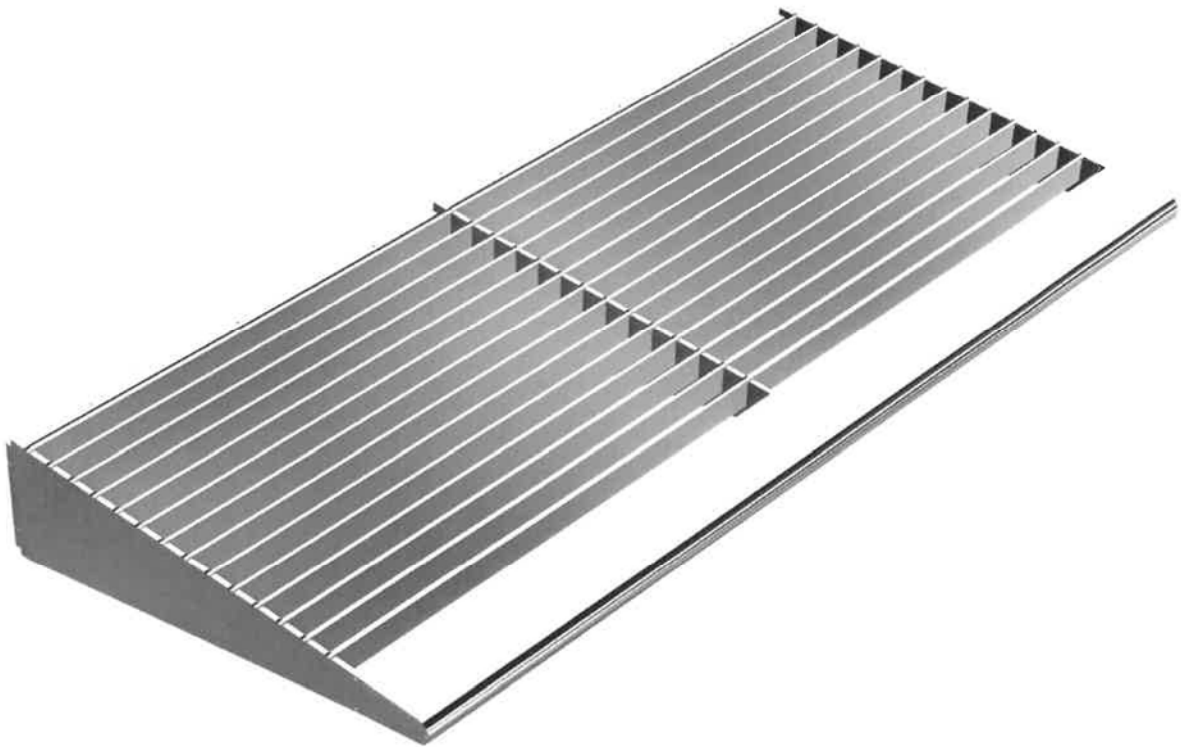
Report Completion Date: March 25 2020


Pete Cruz - Test Engineer


Jim Cruz - Laboratory Testing Manager

INSTALLATION INSTRUCTIONS

AW7700 SERIES ALUMINUM SUNSHADE SYSTEM



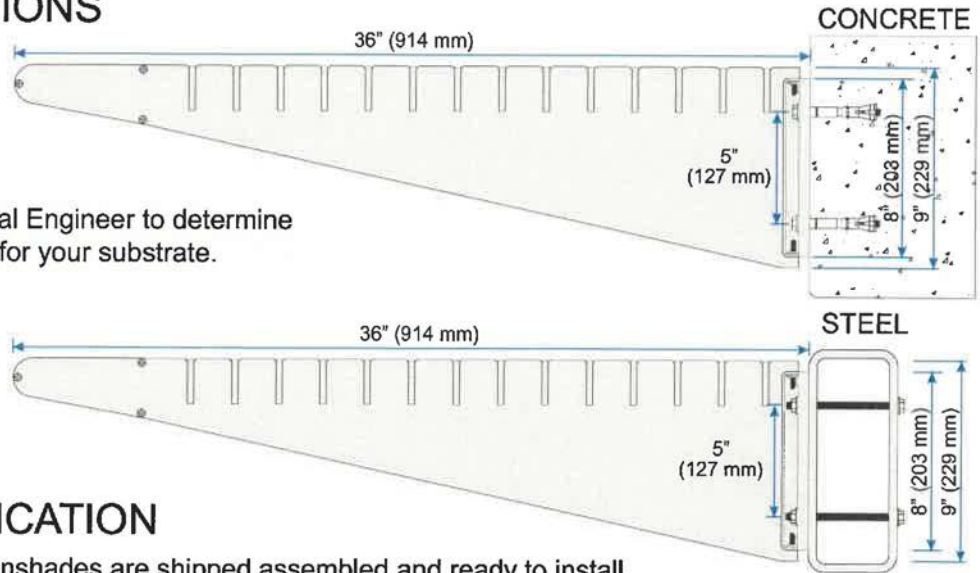
IMPORTANT: READ THIS MANUAL THOROUGHLY BEFORE BEGINNING INSTALLATION



Phone: (800) 228- 9203 • Fax: (800) 587-7501
Email: railings@crlaurence.com
crlaurence.com • usalum.com • crl-arch.com

11M0423_1-31-20

MOUNTING OPTIONS



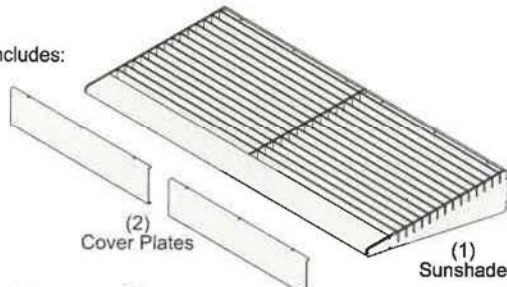
NOTE: Consult a Structural Engineer to determine the appropriate fasteners for your substrate.

MODEL IDENTIFICATION

AW7700 Welded Series Sunshades are shipped assembled and ready to install. Standard sizes are listed below. Custom sizes and finishes available upon request.

Cat. No. 7763 Includes:

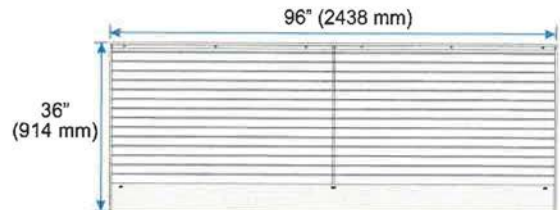
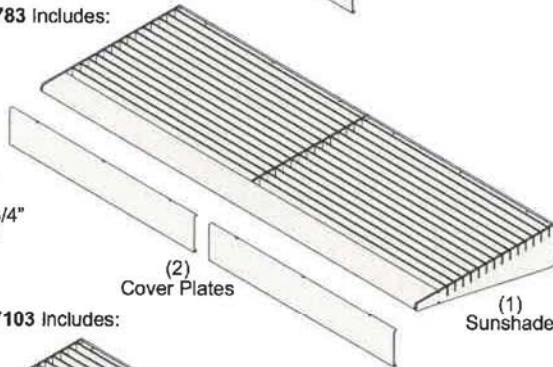
(12)
#10-32 x 3/4"
PFHMS



Cat. No. 7763
CRL Metallic Silver 6' (1829 mm)
7700 Series Aluminum Sunshade

Cat. No. 7783 Includes:

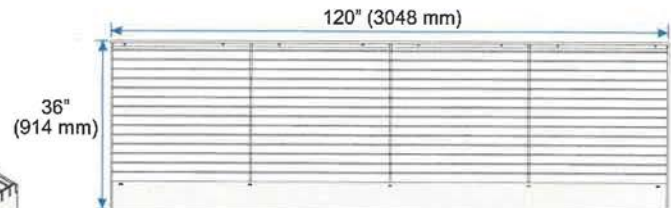
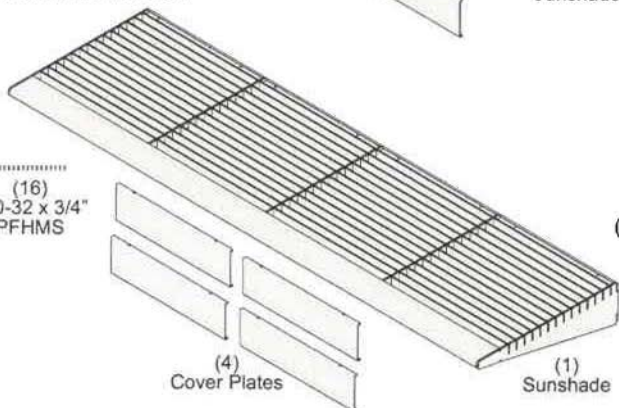
(12)
#10-32 x 3/4"
PFHMS



Cat. No. 7783
CRL Metallic Silver 8' (2438 mm)
7700 Series Aluminum Sunshade

Cat. No. 77103 Includes:

(16)
#10-32 x 3/4"
PFHMS



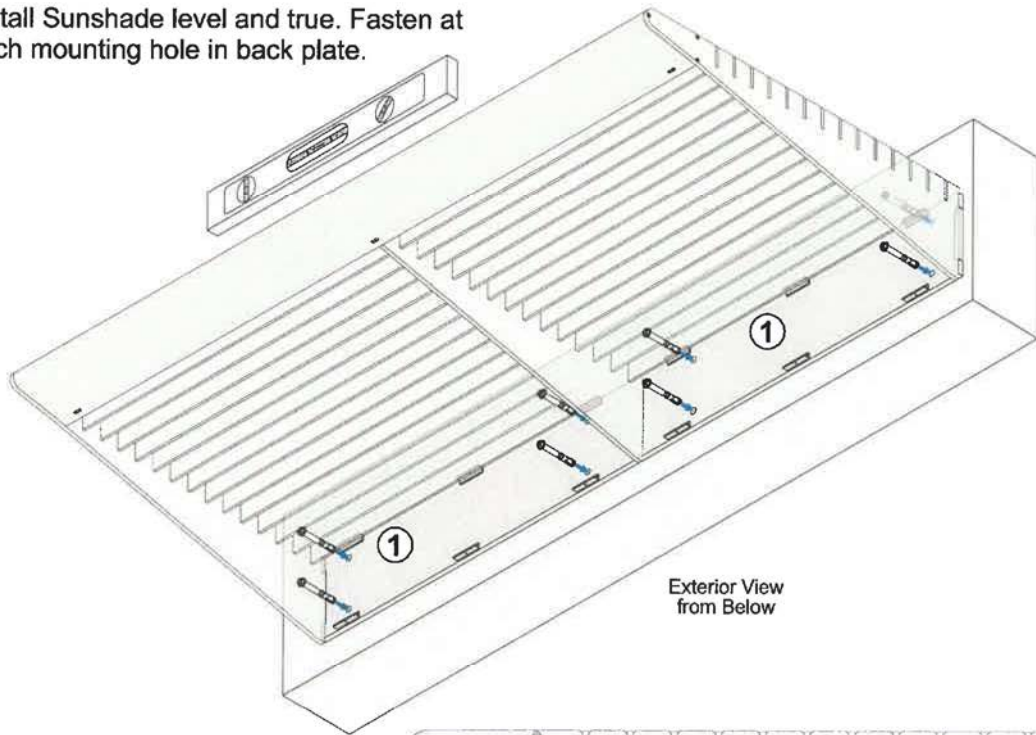
Cat. No. 77103
CRL Metallic Silver 10' (3048 mm)
7700 Series Aluminum Sunshade

INSTALLATION

Mount Sunshade

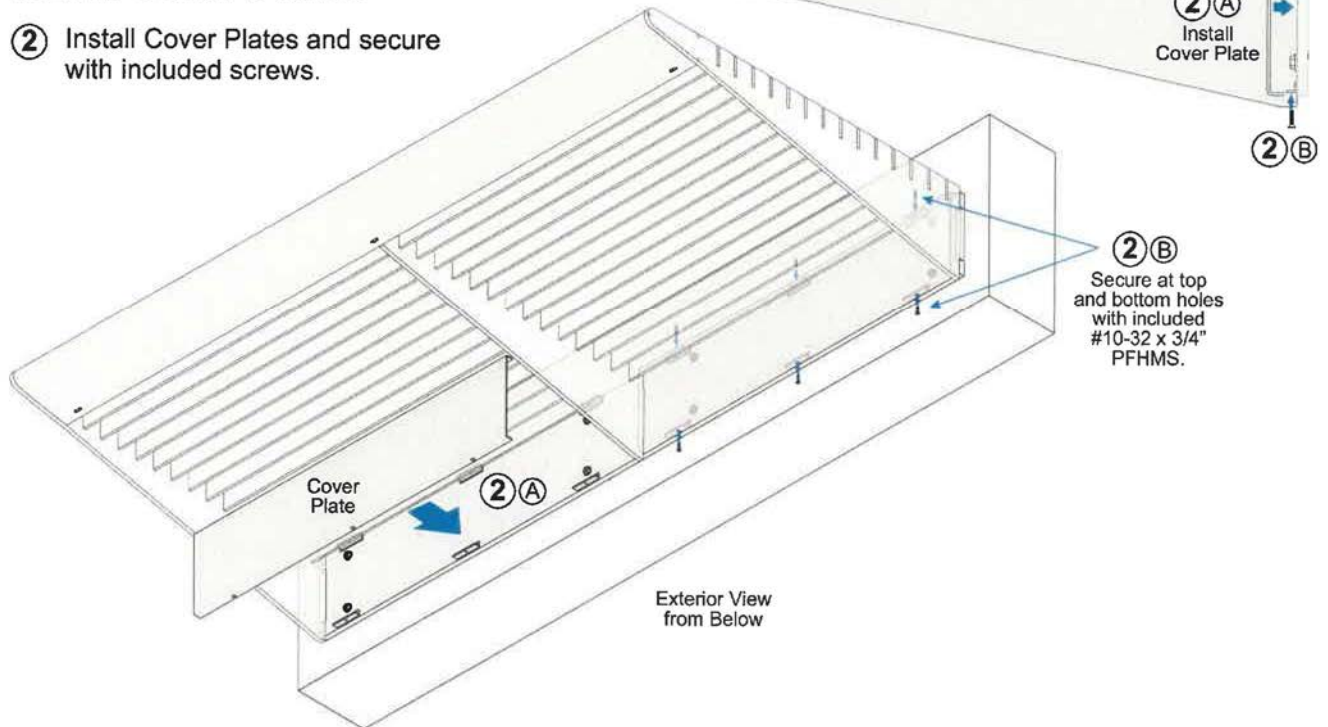
NOTE: Use fasteners specified by a Structural Engineer for your conditions. CRL EBA334 for concrete shown.

- 1 Install Sunshade level and true. Fasten at each mounting hole in back plate.



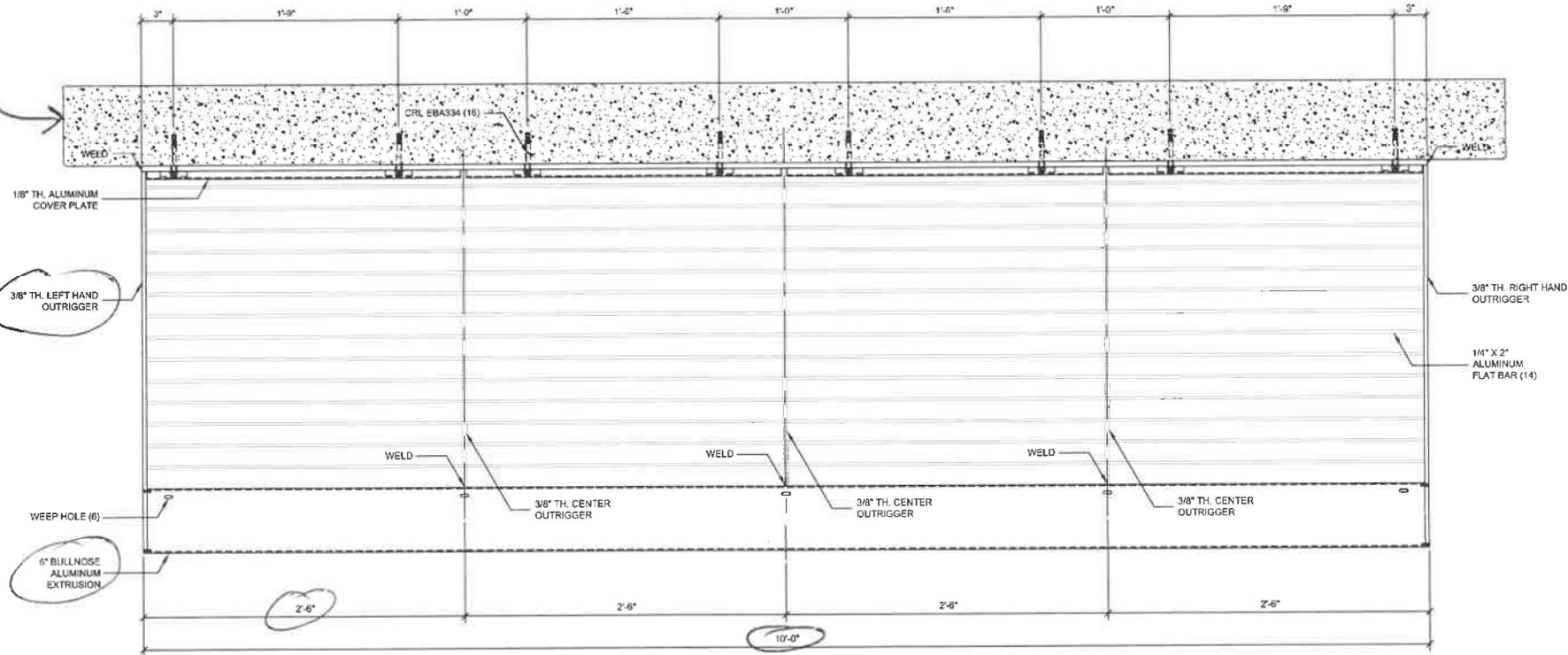
Install Cover Plates

- 2 Install Cover Plates and secure with included screws.



NOTE THAT THE TESTED SPECIMEN WAS ANCHORED TO STEEL. SEE REPORT & PHOTOS FOR MORE DETAILS

DATE:
 REPORT NO:
 FENESTRATION TESTING LAB



1 7700 SUNSHADE SYSTEM CATALOG NO. 77103

Scale: 1/2\"/>

STRUCTURAL DISCLAIMER:
 ALL CUSTOMERS WHO IN ANY WAY UTILIZE THIS PRODUCT ARE SOLELY RESPONSIBLE TO CONSULT A STRUCTURAL ENGINEER TO DETERMINE THE SUITABILITY OF THE PRODUCT FOR THE INTENDED USE AND SITE CONDITIONS. ALL INSTALLERS MUST BE QUALIFIED AND HAVE PROFESSIONAL KNOWLEDGE ABOUT COMPLIANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS, SAFETY FACTORS, AND THE APPROPRIATE CHOICE OF FIXING MATERIAL AND PROCEDURES.

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 REPORT NO: T20-016
 DATE: 3/26/2020

Revisions By:



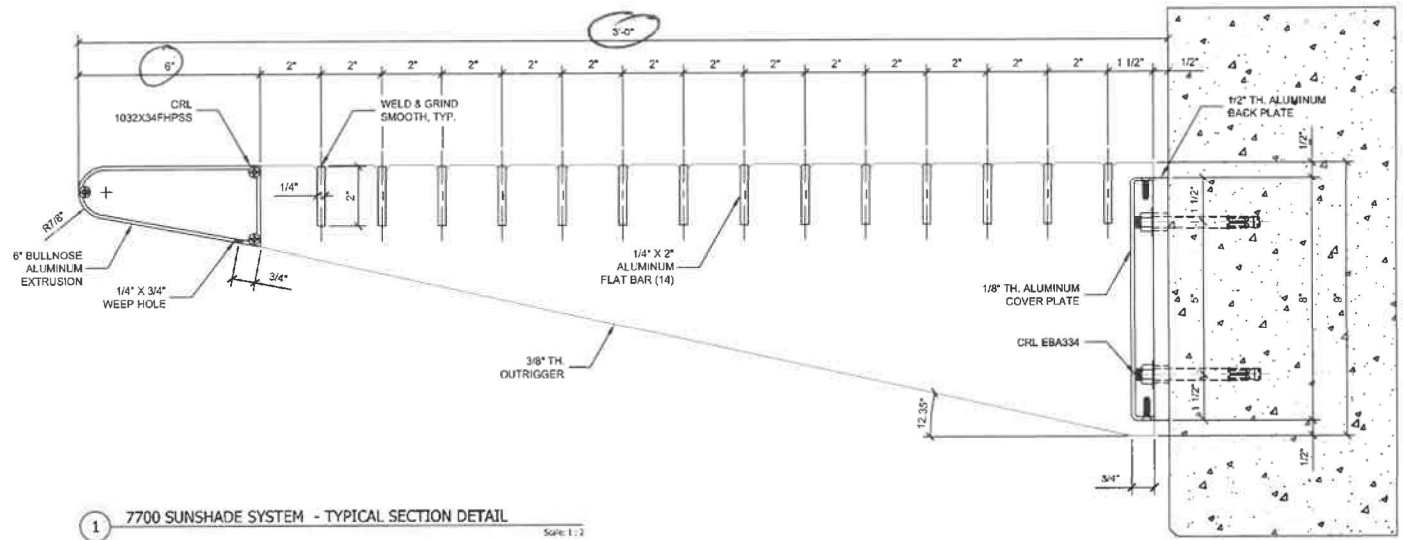
A CRH COMPANY
 7903 E. Arrow Ave., Suite 400, CA 90008-1897
 PH (800)-421-9144 FX (800)-567-7201 www.fenestration.com

Description:
 CRL AW7700
 ALUMINUM SUNSHADE SYSTEM
 CATALOG NO. 77103

Drawn By: 0
 Date: 01/31/2019
 Scale: AS NOTED
 File Name:
 SYS0097A_7700_SERIES_SUNSHADE


Sheet

3



1 7700 SUNSHADE SYSTEM - TYPICAL SECTION DETAIL
Scale: 1:2

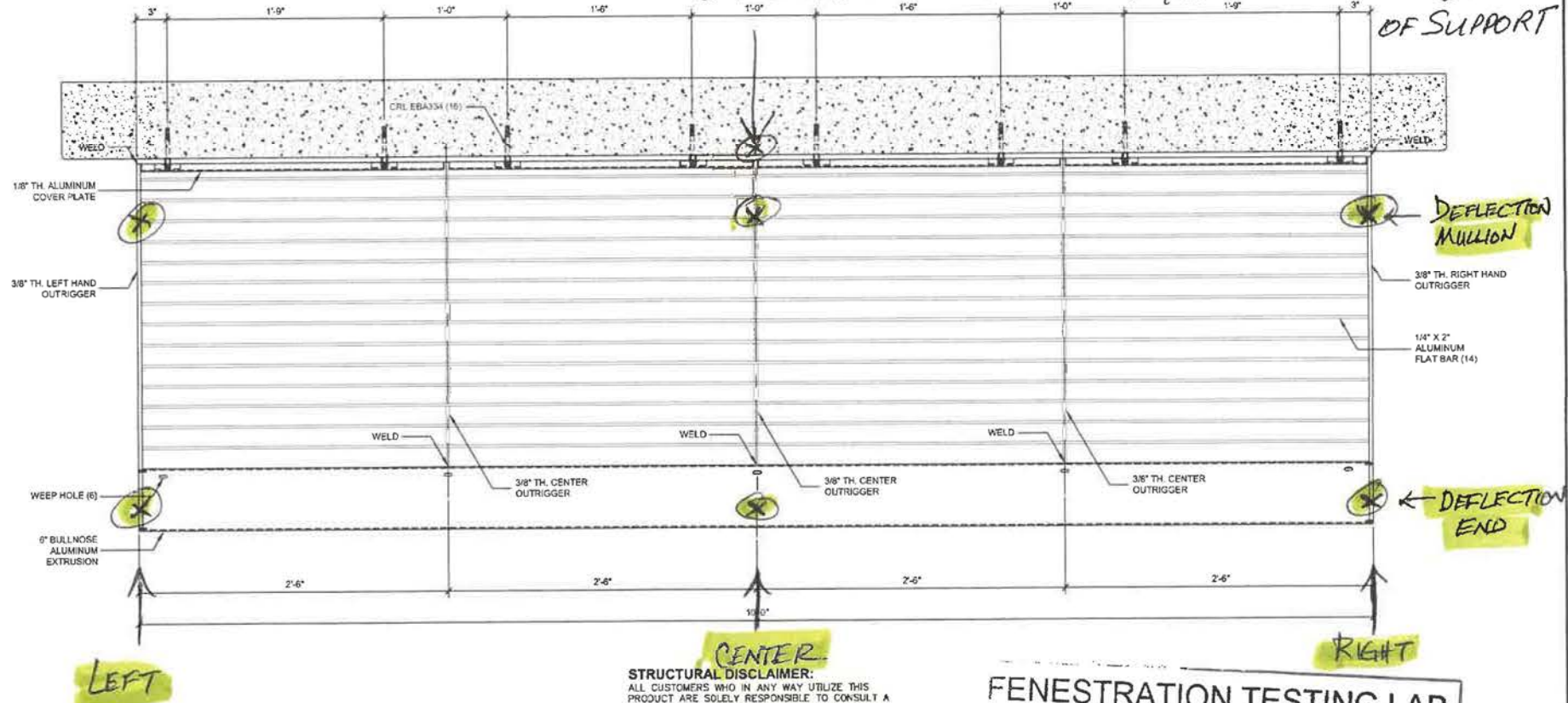
FENESTRATION TESTING LAB
 REPORT NO: T20-016
 DATE: 3/26/2020

Revisions By 	 <p style="font-size: 8px; margin-top: 5px;"> A CRL COMPANY CA 9200-1197 2033 E. Main - #147 PO. BOX 501-701, www.crlaluminum.com </p>
Description: CRL AW7700 ALUMINUM SUNSHADE SYSTEM	
Drawn By: D Date: 01/31/2019 Scale: AS NOTED File Name: S:\50097A_7700_SERIES_SUNSHADE	
Sheet <div style="font-size: 24px; font-weight: bold; margin-top: 10px;">4</div>	

LOCATION OF SIX DEFLECTION GAGES PLAN VIEW

FENESTRATION TESTING LAB
 REPORT NO:
 DATE:

ONE ADDITIONAL GAGE NOT REQUIRED - MEASURED DEFL OF SUPPORT



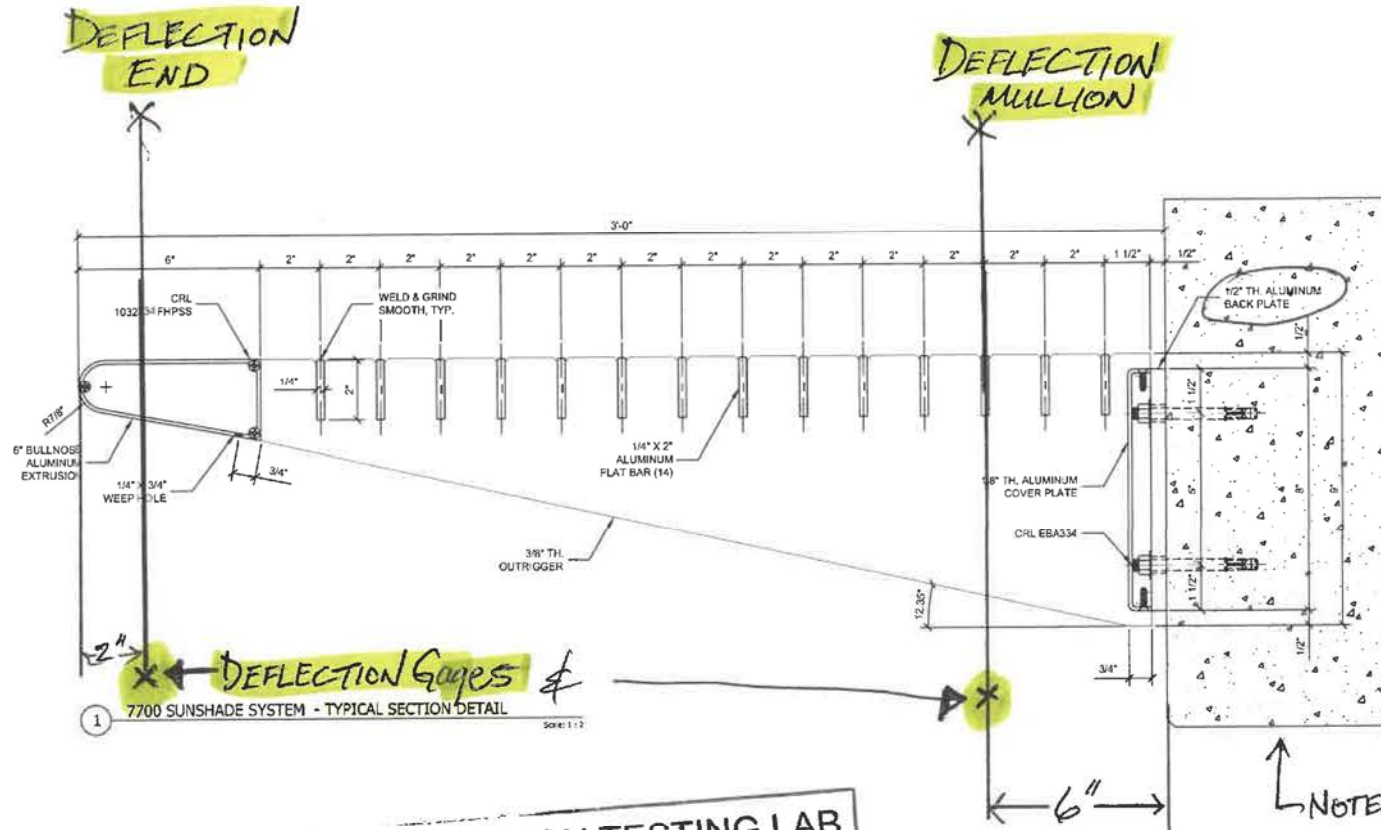
① 7700 SUNSHADE SYSTEM CATALOG NO. 77103 Scale: 1:15

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 ALL CUSTOMERS WHO IN ANY WAY UTILIZE THIS PRODUCT ARE SOLELY RESPONSIBLE TO CONSULT A STRUCTURAL ENGINEER TO DETERMINE THE SUITABILITY OF THE PRODUCT FOR THE INTENDED USE AND SITE CONDITIONS. ALL INSTALLERS MUST BE QUALIFIED AND HAVE PROFESSIONAL KNOWLEDGE ABOUT COMPLIANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS, SAFETY FACTORS, AND THE APPROPRIATE CHOICE OF FIXING MATERIAL AND PROCEDURES.

FENESTRATION TESTING LAB
 REPORT NO: T20-016
 DATE: 3/26/2020

Revisions By:
CRL ALUMINUM A. CRH COMPANY, CA 92604-1897 393 E. 101st Ave. #200, Denver, CO 80231-7501 www.crlaluminum.com
Description: CRL AW7700 ALUMINUM SUNSHADE SYSTEM CATALOG NO. 77103
Drawn By: JD
Date: 01/31/2019
Scale: AS NOTED
File Name: SYS007A_7700_SERIES_SUNSHADE
Sheet:
3

LOCATION OF DEFLECTION GAGES CROSS SECTION



FENESTRATION TESTING LAB

REPORT NO: T20-016

DATE: 3/26/2020

NOTE THAT THE TESTED SPECIMEN WAS ANCHORED TO STEEL. SEE REPORT & PHOTOS FOR DETAILS

Revisions By:
CRL ALUMINUM A. CRH COMPANY 2903 E. 121st Ave. Ste. 400-507-7501 www.crlaluminum.com
Description: CRL AW7700 ALUMINUM SUNSHADE SYSTEM
Drawn By: 0 Date: 01/31/2019 Scale: AS NOTED File Name: 5150097A_7700_SERIES_SUNSHADE Sheet
4



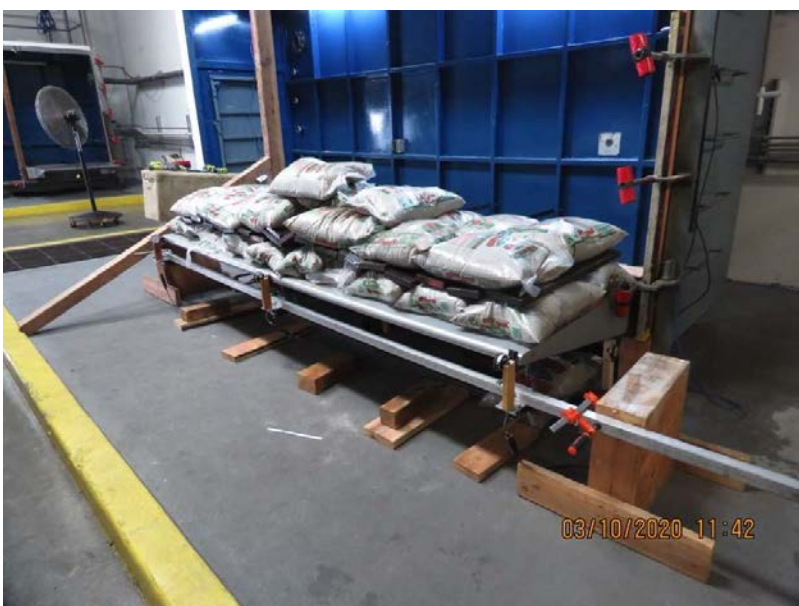
7700 Series Sunshade
Prior to load testing fully
supported in the test chamber.

Can see the aluminum square shaped extrusion under the outside edge of the sunshade that was used to support the deflection gages on the end of the outriggers.



7700 Series Sunshade
Prior to load testing

Steel supports from the top of the wood beam to the steel chamber approximately every 24"



7700 Series Sunshade
Shows the Preload testing



7700 Series Sunshade
Prior to load testing

Can see the dial gages to measure deflection 6" from the back plate of the sunshade



7700 Series Sunshade
Shows the Overload testing



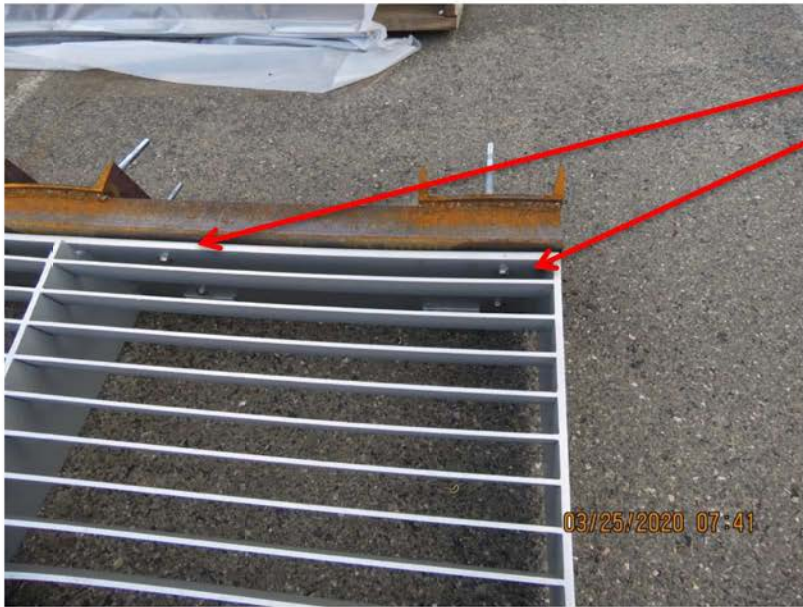
7700 Series Sunshade
Shows the Overload testing



Ice Impactor hitting right corner



Note steel support, 14 blades, 6" nose extrusion



Can see bolts through back plate and 10" channel



Can see 10" long 1/2" diameter bolts through back that went through the 6" x 12" wooden beam.



Shows how the steel is bolted to the wooden 6" x 12" beam.



Filler welds opened at the blade closest to the nose but nothing was disengaged



Outrigger were welded to the sunshade nose extrusion.



Outriggers were welded to the back plate with 6" long weld beads.



Dent in end nose extrusion where ice impactors hit. This was the damaged that did not result in any disengagement.