Fenestration Testing Laboratory, Inc.

10235 8th Street, Rancho Cucamonga, CA 91730

Report #: T20-015

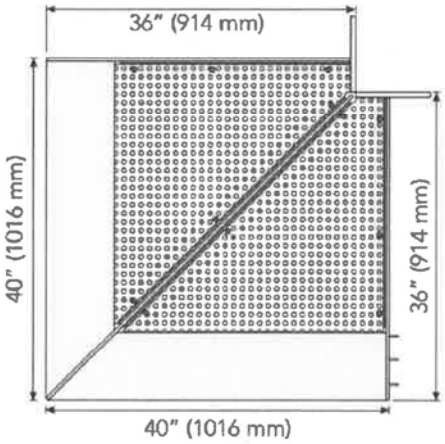
REPORT SUMMARY

REPORT #
T20-015

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

SERIES & PRODUCT TYPE
7750 Corner Panel Sunshade 40" x 36" Corner - Three (3) Outriggers with infill panels

AW7750CNR



40" (1016 mm) Corner Panel

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

PERFORMANCE LEVEL ACHIEVED
Static Design Load of 75 PSF - Load applied at Design Load = 825 lbs. – Passed
Load applied at 2x Design Load = 1,650 lbs. - Passed

Ice Impactor Energy of 400 joules - Passed

TEST COMPLETION DATE
March 13, 2020

REPORT DATE
March 25, 2020

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 = 75 PSF
Ice Impact Energy = 400 Joules

5.0 Sample Submitted:
5.1 Product Type: Aluminum Sunshade
5.2 Series: 7750 Corner Panel
5.3 Configuration: 3 outriggers forming corner and two bays each contained an infill panel
5.4 Product Dimensions:

	Millimeters	Inches
Width	1016 mm	40.00"
Extension	914.4 mm	36.00"

5.11 Construction: All Sunshade Parts were Aluminum and painted except for infill.

Part	*Quantity*	*Dimensions*	*Manner of attachment or support*
Anchoring Plate or Back Plate	Two(2) piece forming 90-degree angle	1/2" - 8" x 9-3/8" each piece	The two pieces were welded the full 8" corner joint. Each piece had two (2) anchoring holes as shown on the attached drawings and photos
Outriggers	Three (3)	Each end outrigger was 3/8" thick and extended out 35.5" from the back plate. The center outrigger extended out 50.5" from the back plate.	Each end outrigger was welded to the back plate with a 6" weld bead on each side. The center outrigger was welded the full length 8" length on each side to the back plate.
8" wide nose or fascia	Two (2)	See photos and drawing	Each fascia extrusion fit between its respective outriggers and was welded to the outriggers full perimeter.
Metal infill corrugated sheet and perforated	Two (2) infills	Filled in the two bays that formed the corner - see photos and drawing	Each infill was fastened to aluminum angle supports along the end and center outriggers with ¼-14 x 7/8" Self-Drilling Hex Washer Head Screws. Two at the ends and three at center.
Aluminum "L" angle	Four (4) pieces	1/4" x 1.75" x 1.75" "L" angle	The "L" angles were all fastened to their respective outrigger with #10 x 0.5" PFH screws.

5.13 Installation/Support Method

Location on Sunshade	*Anchor type*	*Spacing*
The sunshade was mounted to 10 x 2.60 x 0.240 A36 Steel Channel	1/2-13 x 2 Hex HD Bolts with lock washer, flat washers, and hex lock nuts	A pair of bolts was located 2" from each end of each plate forming the corner shaped back plate; four (4) bolts total.
The 10 x 2.60 x 0.240 steel channel was mitered welded to form a corner and the corner shape was welded to another channel of the same size that was a steel back plate for the corner shape steel (see photos). The steel back plate was welded to two 12" long pieces of 8 x 2.26 x .220 A-36 Steel Channel set 5" each way from the center line of the corner shaped steel. Each 8 x 2.26 x 0.220 channel was 12" long and each was 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 anchored to the steel chamber (see photos).		

The Sunshade did not have a locking device and no sealant was used.

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 Testing (A strip of duct tape was applied along each of the rough edges of the metal corrugated and perforated infill panels to keep the sand bags from tearing. The tape gave no addition structural support to the sunshade)

9.2.1 – FTL used 50 lbs. sand bags to apply the static load onto the sunshade. Note that the 4" x 4" area deducted is the corner section.

Square Footage: (40" x 40") – (4" x 4")/144 in^2 per ft^2 = 11 ft^2
Design Load = 75 PSF x 11 ft^2 = 825 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}).

9.2.3 Preload - The sunshade was preloaded with ½ of the design load or **412.5 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 **825 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" for the end outriggers and 51" for the center outrigger.

Allowable Net Deflection (dnet) for the left and right end outriggers = 2*36"/120 = 0.60"
$d_{net} = d_{end} - d_{mullion}$

Allowable Net Deflection (dnet) for the center outrigger = 2*51"/120 = 0.85"
$d_{net} = d_{end} - d_{mullion}$

Results for Net Deflection (d_{net}):

Left Outrigger -	d_{end} = 0.66"	$d_{mullion}$ = 0.21",	**d_{net} = 0.45"**	< 0.60"
Center Outrigger -	d_{end} = 1.10"	$d_{mullion}$ = 0.30",	**d_{net} = 0.80"**	< 0.85"
Right Outrigger -	d_{end} = 0.47"	$d_{mullion}$ = 0.19",	**d_{net} = 0.28"**	< 0.60"

9.2.4.2 - Residual Deflection 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)
Allowable = 0.375" for left and right end outriggers
Allowable = 0.51" for center outrigger

Results for Residual Deflection (RD):

Left Outrigger =	0.20"	< 0.375"
Center Outrigger =	0.42"	< 0.51"
Right Outrigger =	0.11	< 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 = 1650 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 each 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 $N.P.S. = P.S._{net} - RD$

Results for N.P.S. of Outriggers:

Allowable N.P.S. for left and right-side outriggers = 1% of Outrigger Span = 36" x 0.01 = 0.36"
Allowable N.P.S. for center outrigger = 1% of Outrigger Span = 51" x 0.01 = 0.51"

N.P.S Left Outrigger - ($P.S._{end}$ = 0.51") – ($P.S._{mullion}$ = 0.17") – (RD = 0.20") = **$P.S._{net}$ = 0.14"** < 0.36"
N.P.S. Cen. Outrigger - ($P.S._{end}$ = 0.56") – ($P.S._{mullion}$ = 0.28") – (RD = 0.42") = **$P.S._{net}$ = -0.14"** < 0.51"
N.P.S Right Outrigger - ($P.S._{end}$ = 0.37") – ($P.S._{mullion}$ = 0.15") – (RD = 0.02") = **$P.S._{net}$ = 0.11"** < 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 m/s*s and h = 4.49 meters then v = 9.386 m/s

Per Appendix A – Impact energy "W" = $\frac{1}{2}mv^2$
When m = 9.07 kilos and v = 9.386 m/s then W = 400 Joules

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 or fascia of the sunshade and produced some cracks in the paint at the top surface where the fascia was joined at 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).

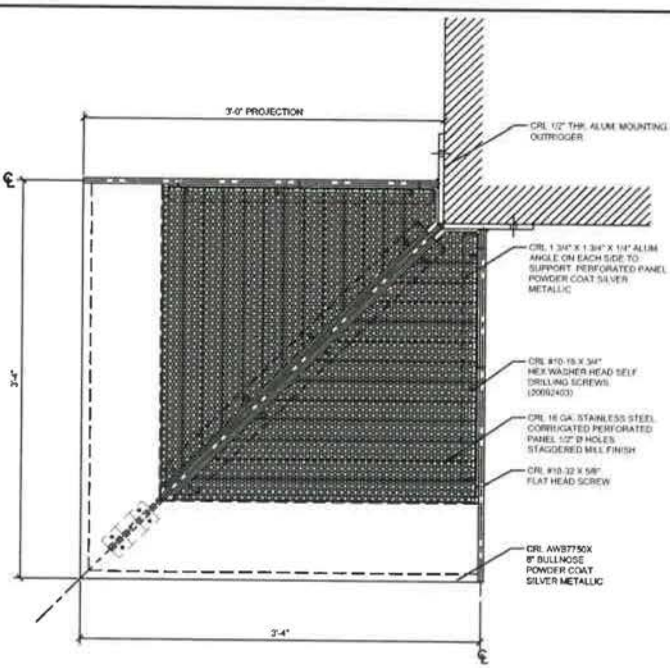
The preceding test results relate only to the tested specimen and were obtained by using the applicable test methods listed in section 3.0 and 6.0 above. This report does not constitute certification of this product or an endorsement by this laboratory. It is the property of the client named in section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



(1) CORNER PANEL CATALOG NO. AW7750CNR

HAVE THIS INFO. READY TO ORDER:

AW7750CNR	
*FINISH/ COLOR:	
QTY:	

*PWDR. COAT SILVER METALLIC IS STANDARD UNLESS NOTED

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.

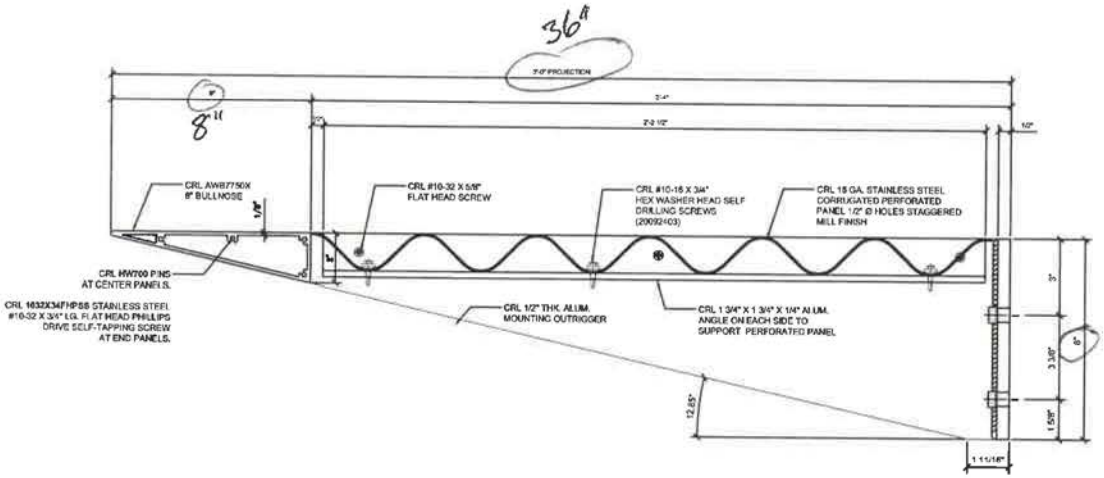
FENESTRATION TESTING LAB
REPORT NO: T20-015
DATE: 3/27/2020

Revisions By:

CRL ALUMINUM
A CRH COMPANY

Description:
CRL 7750
ALUMINUM SUNSHADE SYSTEM
CATALOG NO. 7750

Drawn By: BC
Date: 03/21/19
Scale: AS NOTED
File Name: SYS00970_7750_SERIES_SUNSHADE
Sheet
2



A 7750 SECTION

SCALE 1:2

FENESTRATION TESTING LAB

REPORT NO: T20-015

DATE: 3/27/2020

Revisions By:

CRL-U.S. ALUMINUM
A CRH COMPANY
3501 E. Vernon Ave., Vernon, CA 90058-1987
PH: (800) 421-6144 FX: 800 967-7500 www.crlaluminum.com

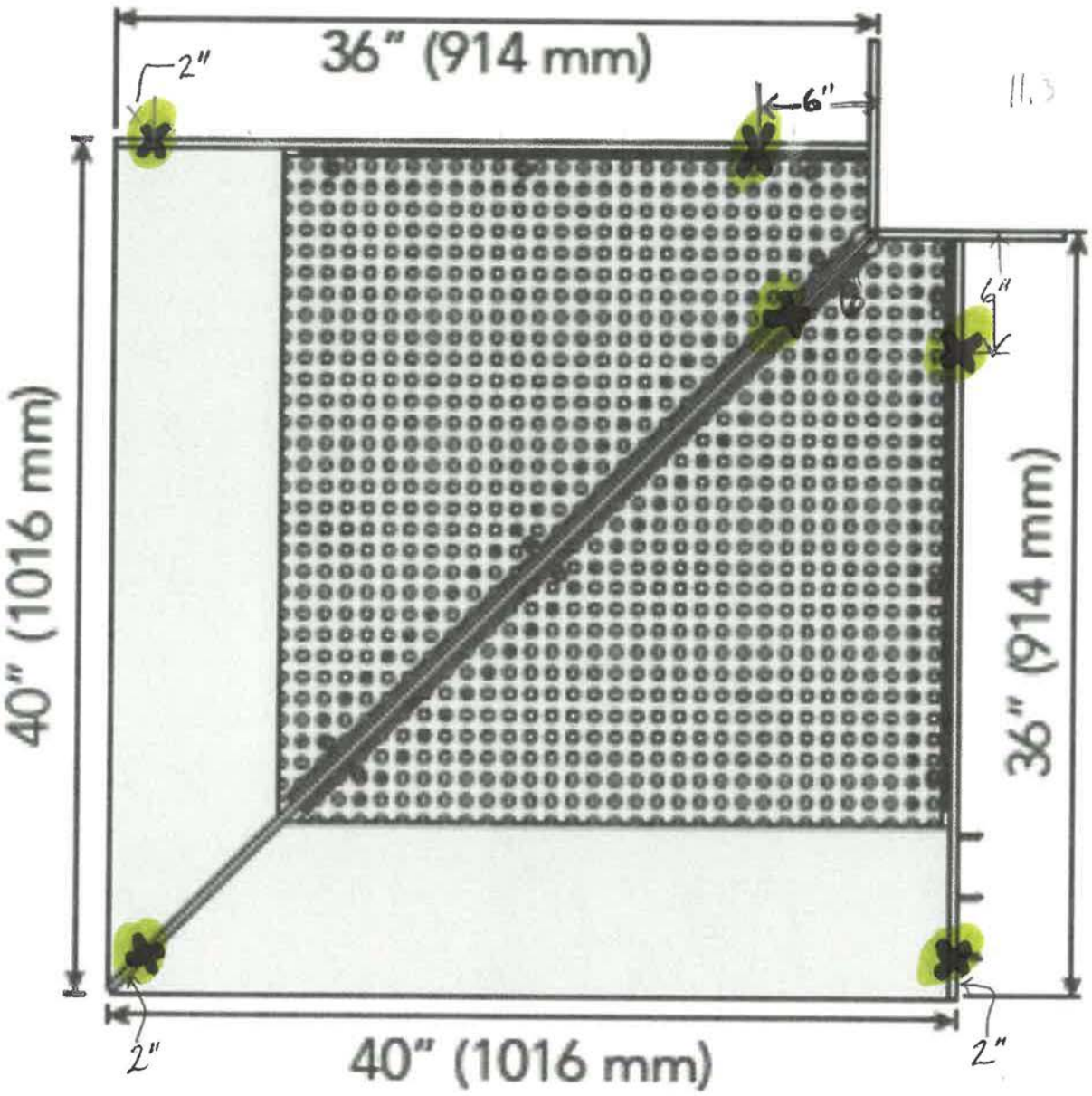
Description:
CRL 7750
ALUMINUM SUNSHADE SYSTEM
CATALOG NO. 7750

Drawn By: BC
Date: 03/21/19
Scale: AS NOTED
File Name:
SYS00978_7750_SERIES_SUNSHADE

Sheet
A

AW7750CNR

FENESTRATION TESTING LAB
REPORT NO: T20-015
DATE: 3/27/2020

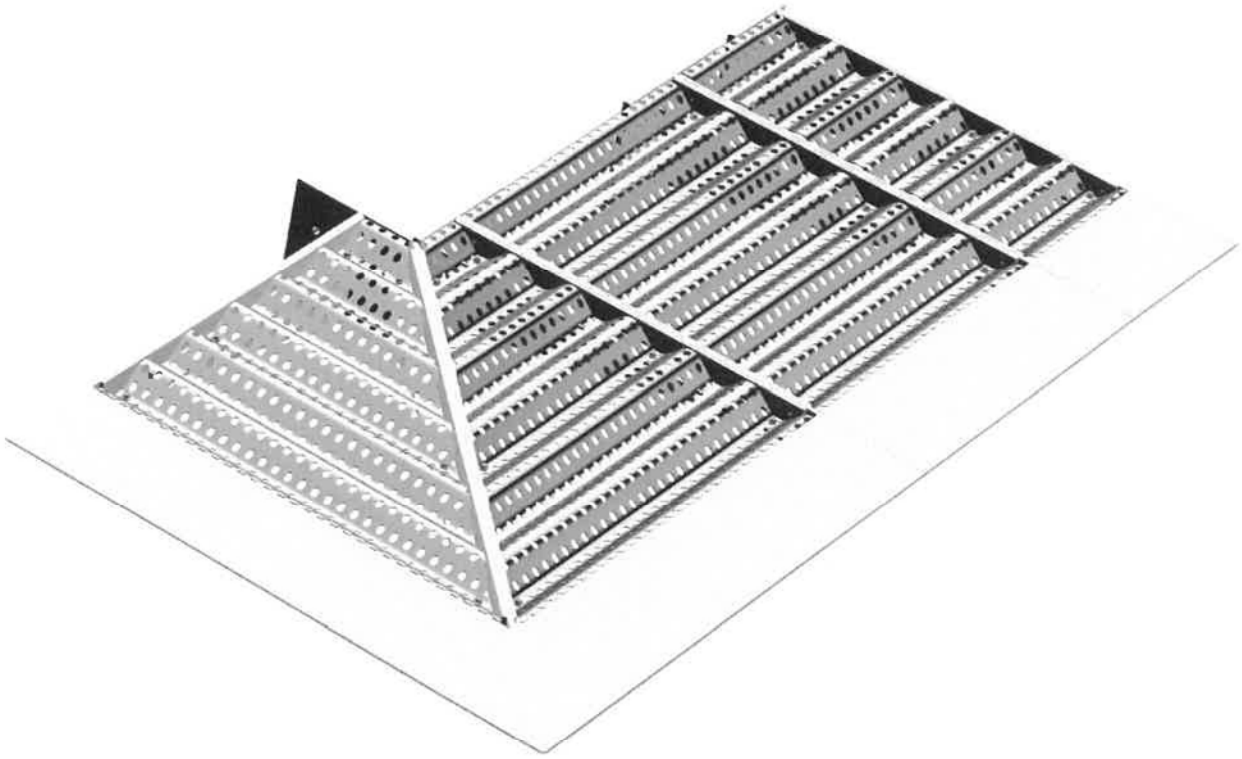


40" (1016 mm) Corner Panel

DEFLECTION GAGES WERE SET @ 6" FROM THE BACK PLATE & 2" FROM THE OUTSIDE TIP AS MARKED WITH AN 'X' IN THE ABOVE DRAWING

INSTALLATION INSTRUCTIONS

AW7750 SERIES ALUMINUM SUNSHADE SYSTEM



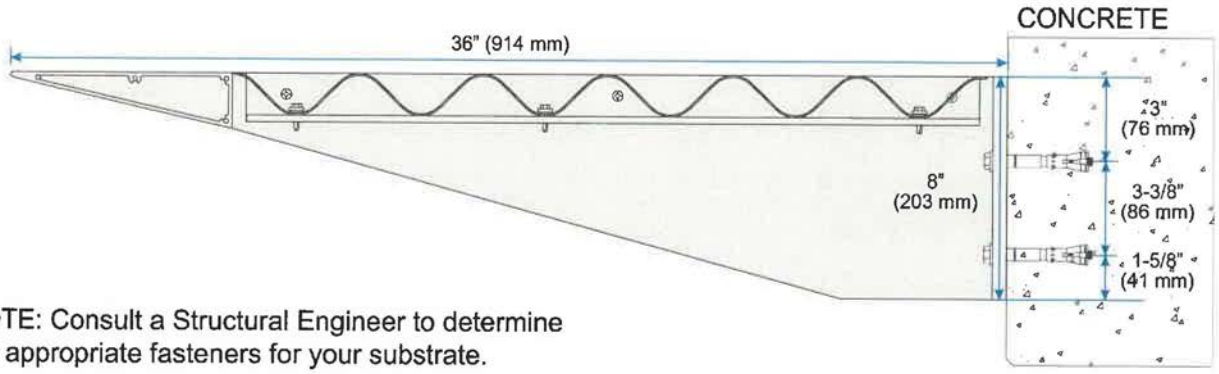
A CRH COMPANY

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

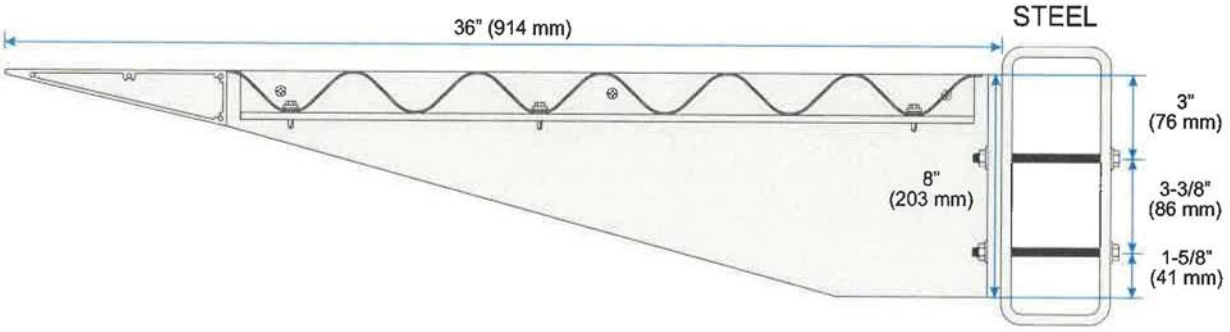
11M0424_2-14-20

MOUNTING OPTIONS

AW7750 Series Sunshades can also be mounted to curtain walls. Contact CRL Technical Sales for details.



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



IMPORTANT: READ THIS MANUAL THOROUGHLY BEFORE BEGINNING INSTALLATION

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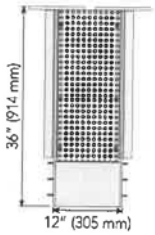
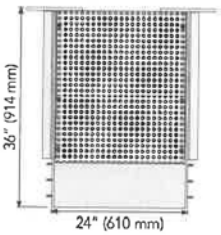
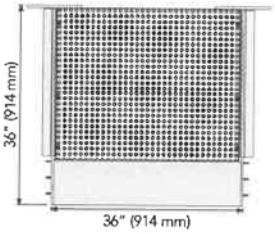
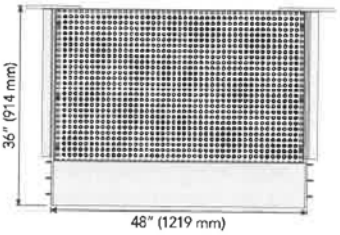
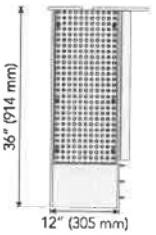
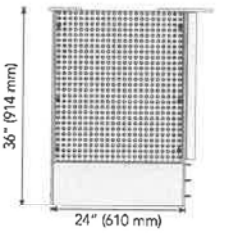
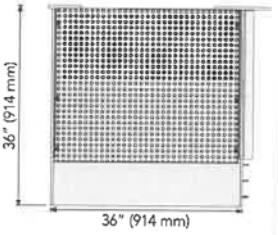
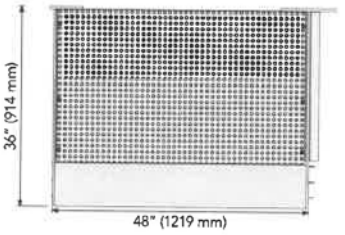
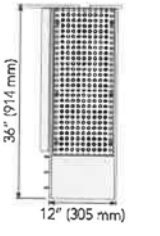
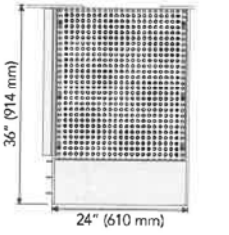
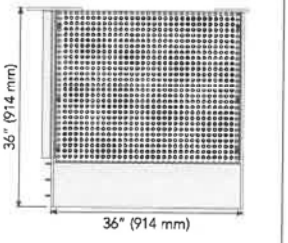
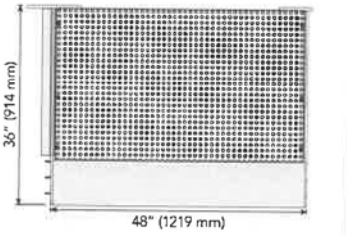
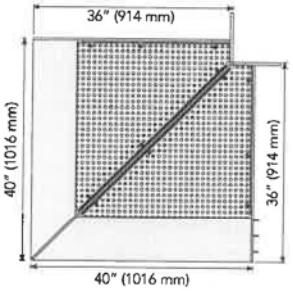
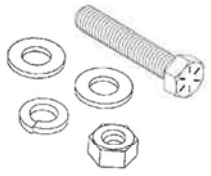
- Assemble and Install First Panel 4
- Install Center Outriggers and Fascia for Center Panels 5
- Install End Outrigger and Fascia for Last Panel 5
- Install Infill Panels 6

MODEL IDENTIFICATION

AW7750 Series Sunshades Standard sizes are listed below. Custom sizes and finishes available upon request.

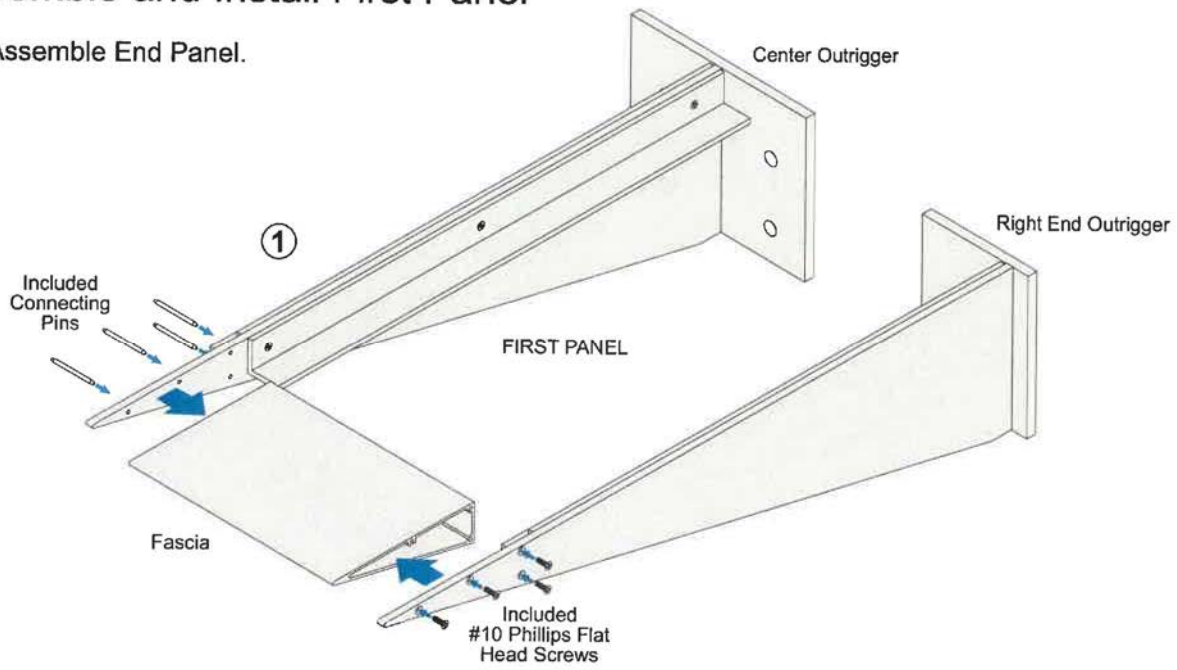
AW7750C12  12" (305 mm) Center Panel	AW7750C24  24" (610 mm) Center Panel	AW7750C36  36" (914 mm) Center Panel	AW7750C48  48" (1219 mm) Center Panel
AW7750L12  12" (305 mm) Left End Panel	AW7750L24  24" (610 mm) Left End Panel	AW7750L36  36" (914 mm) Left End Panel	AW7750L48  48" (1219 mm) Left End Panel
AW7750R12  12" (305 mm) Right End Panel	AW7750R24  24" (610 mm) Right End Panel	AW7750R36  36" (914 mm) Right End Panel	AW7750R48  48" (1219 mm) Right End Panel
AW7750CNR  40" (1016 mm) Corner Panel	EBA334  M8 3-7/8" Long HSL-3 Expansion Anchor	AWS38BA  CRL Bolt Assembly for Aluminum Sunshades	14X78HWSD  1/4-14 x 7/8" Self-Drilling HWHS install Perforated Corrugated Infill

INSTALLATION

Begin at one end. Assemble and install first panel, and then install Outriggers and Fascia for each connecting panel. For short runs, all panels may be assembled and installed as a unit. Corner Outriggers are welded together with the Fascia. For installations with corners, begin with Corner Outrigger.

Assemble and Install First Panel

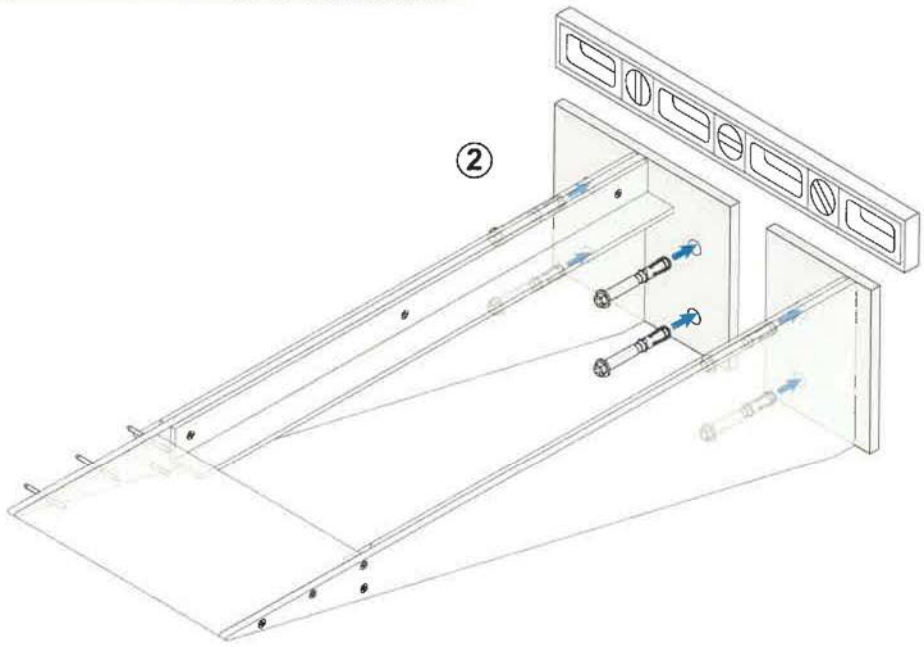
① Assemble End Panel.



② Anchor Outriggers to substrate.

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

NOTE: Ensure Outriggers are plumb and level. Shim as needed.



INSTALLATION (CONTINUED)

Install Center Outriggers and Fascia for Center Panels

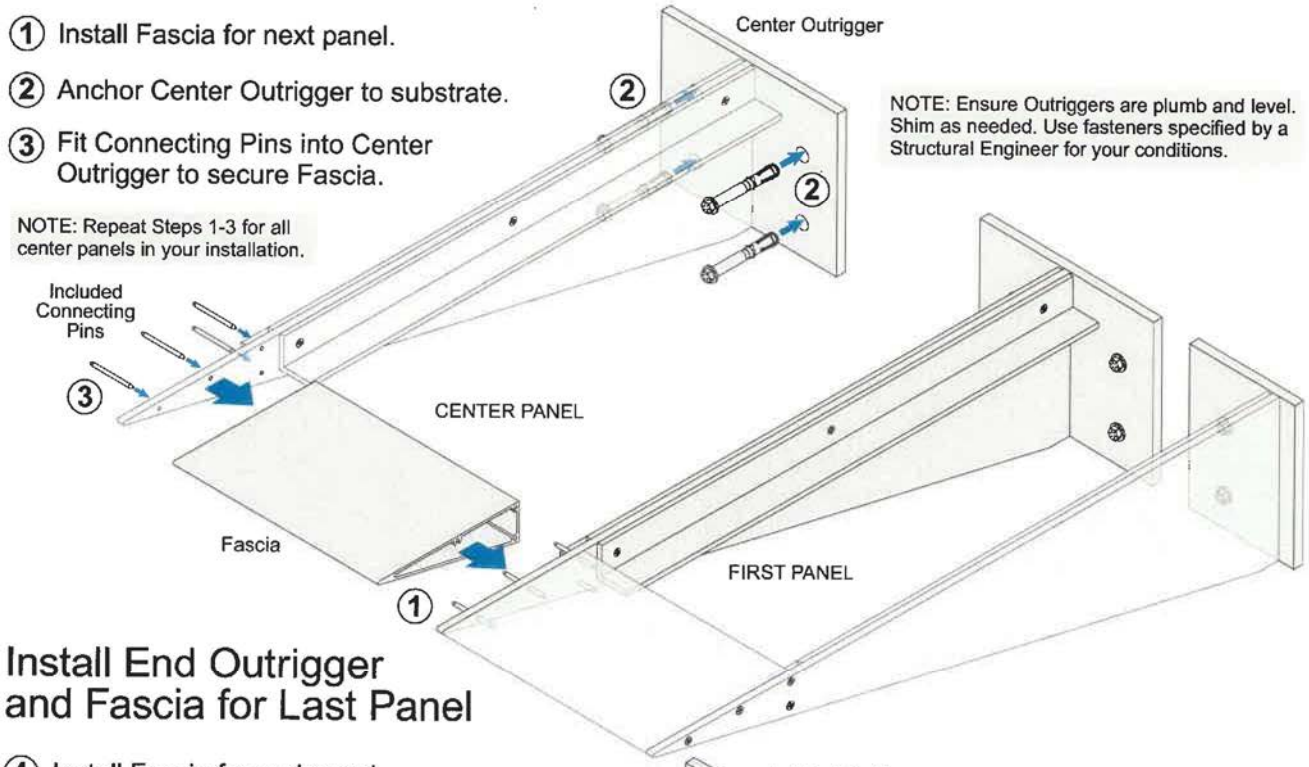
① Install Fascia for next panel.

② Anchor Center Outrigger to substrate.

③ Fit Connecting Pins into Center Outrigger to secure Fascia.

NOTE: Repeat Steps 1-3 for all center panels in your installation.

NOTE: Ensure Outriggers are plumb and level. Shim as needed. Use fasteners specified by a Structural Engineer for your conditions.

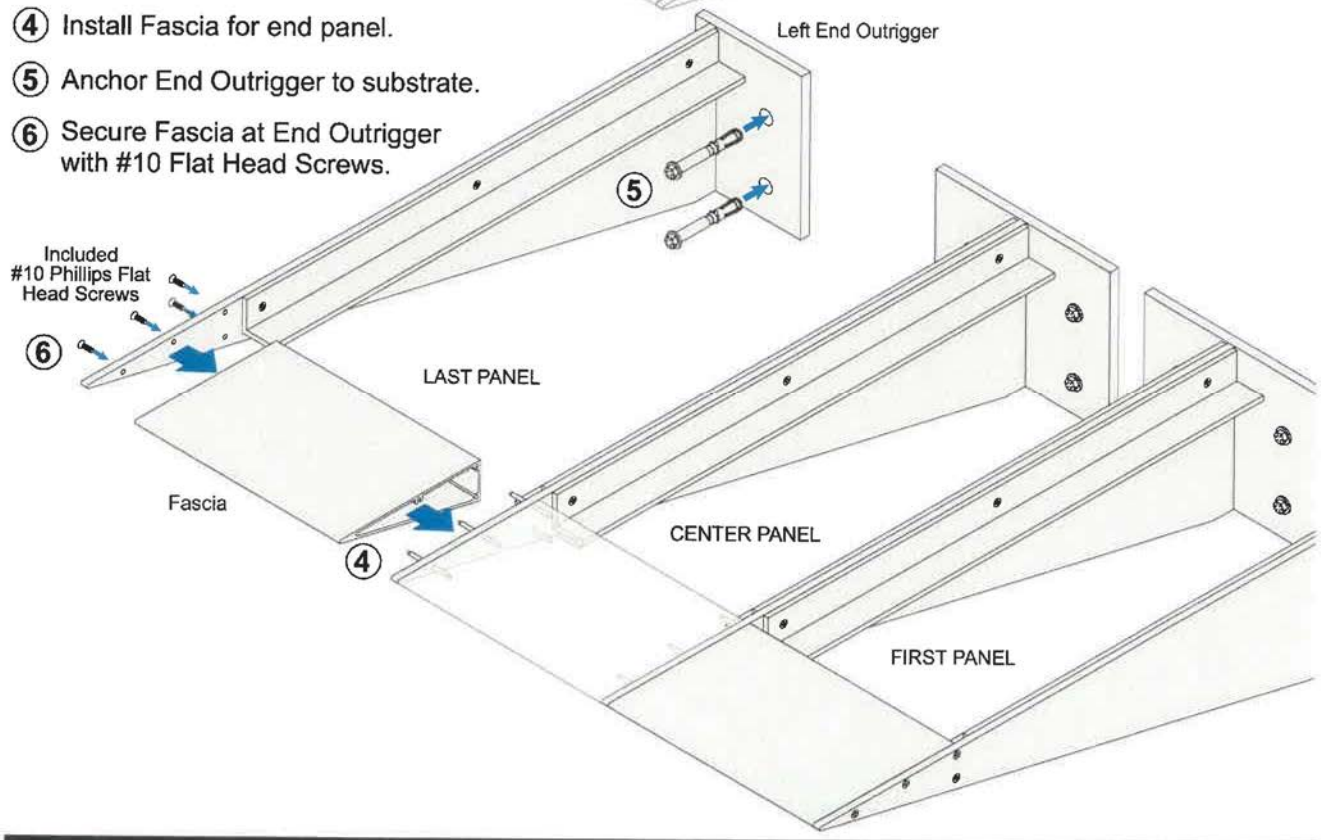


Install End Outrigger and Fascia for Last Panel

④ Install Fascia for end panel.

⑤ Anchor End Outrigger to substrate.

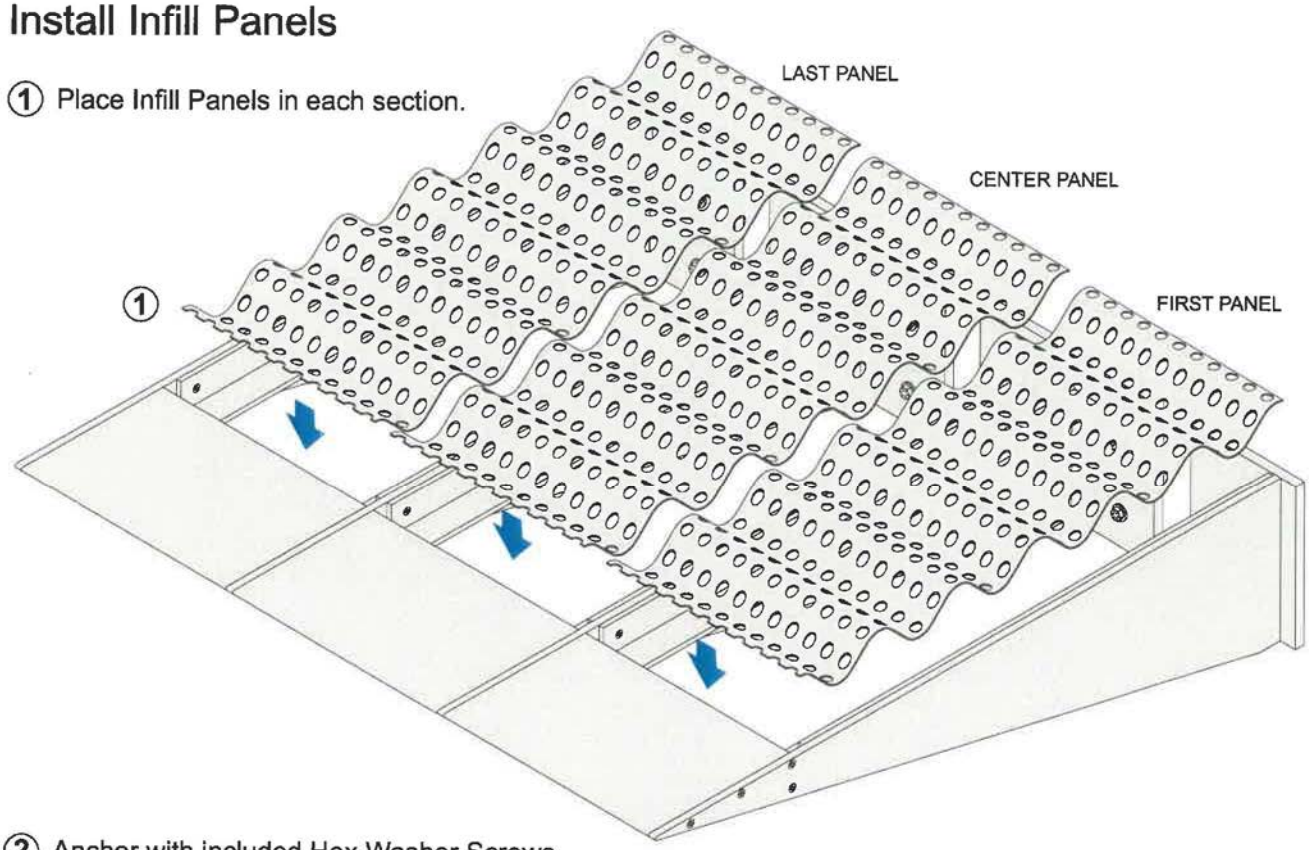
⑥ Secure Fascia at End Outrigger with #10 Flat Head Screws.



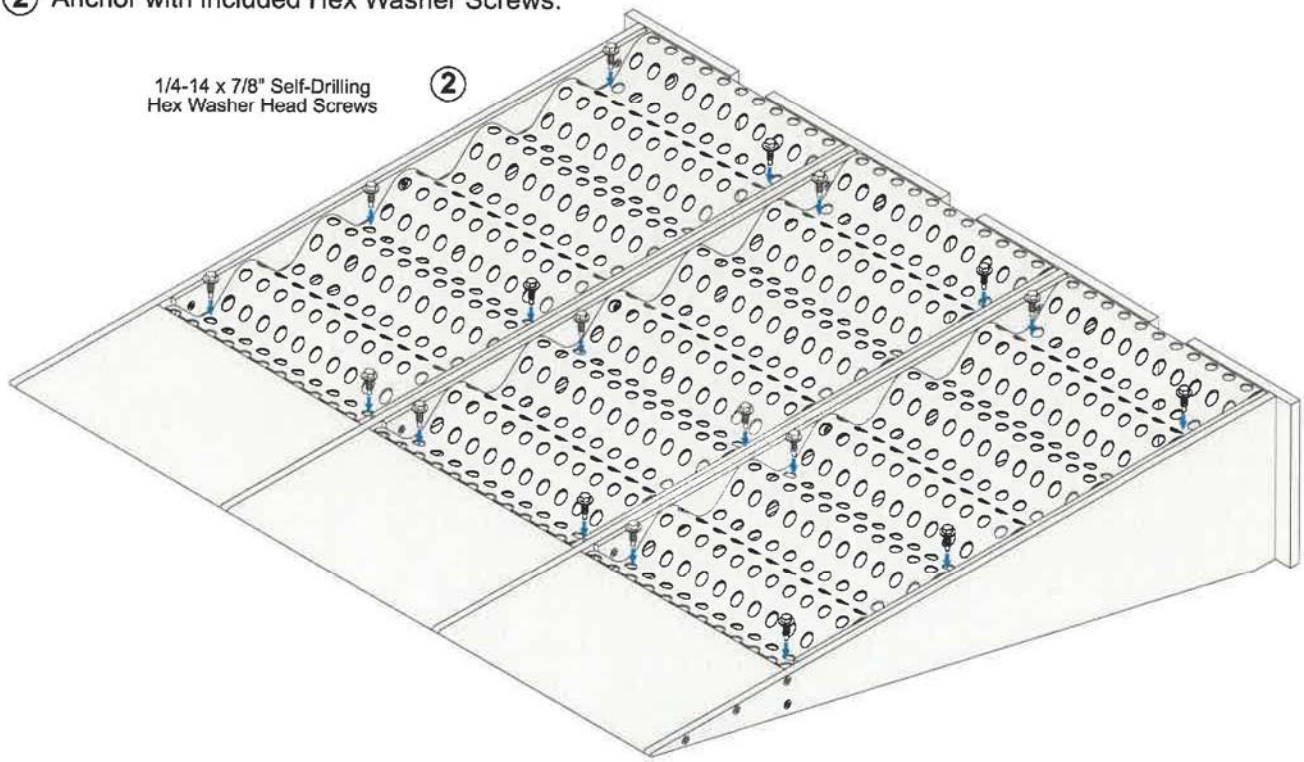
INSTALLATION (CONTINUED)

Install Infill Panels

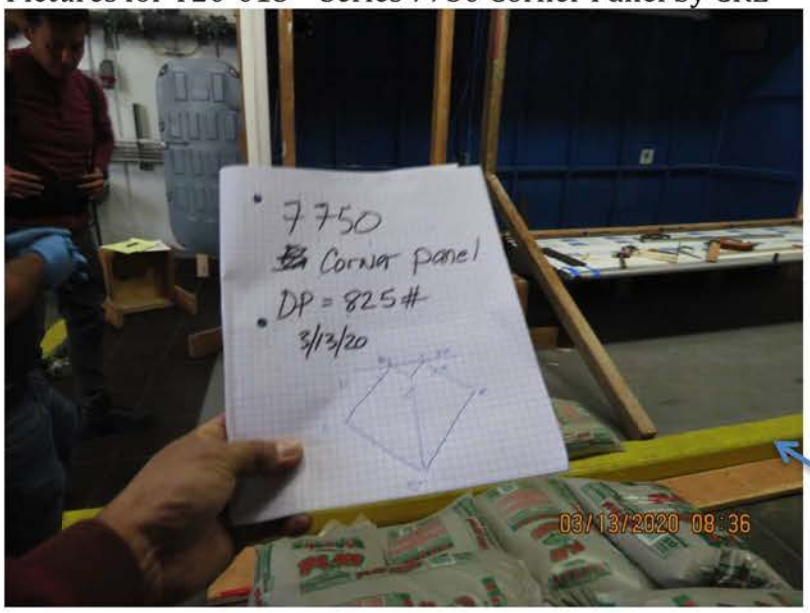
① Place Infill Panels in each section.



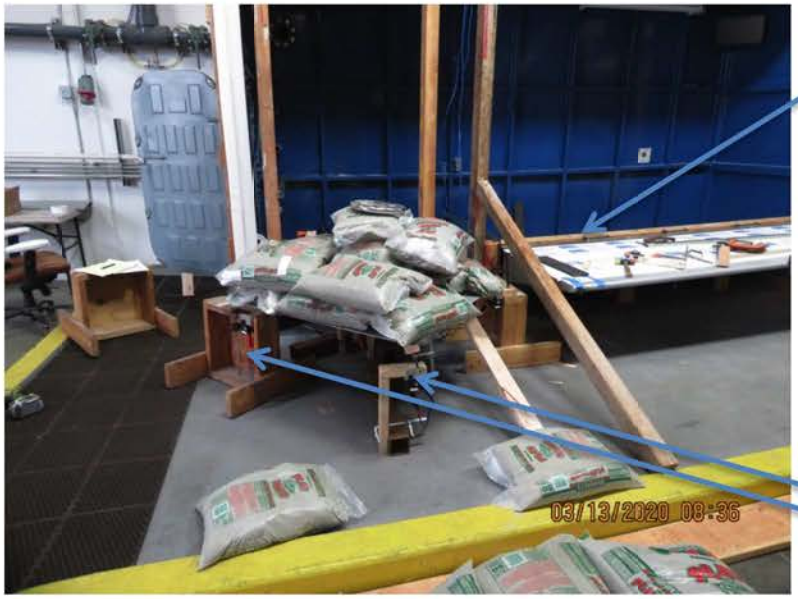
② Anchor with included Hex Washer Screws.



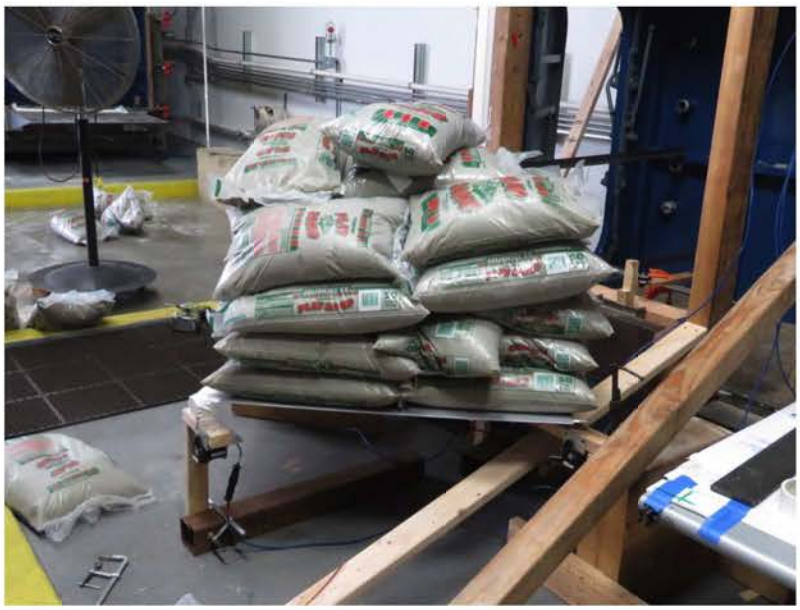
Pictures for T20-015 – Series 7750 Corner Panel by CRL



825 lbs design load with sand bags



Deflection gages seen under each outrigger



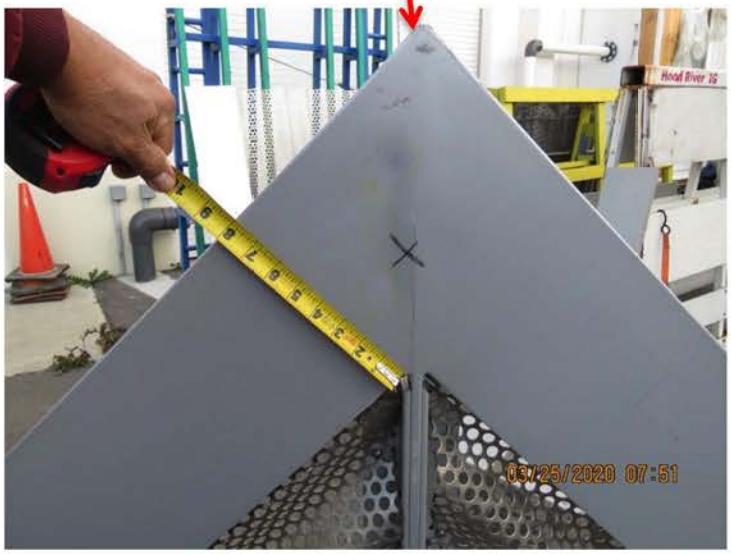
1650 lbs 2x design load with sand bags

Pictures for T20-015 – Series 7750 Corner Panel by CRL

Ice impactor hitting outrigger on right end.

Pictures for T20-015 – Series 7750 Corner Panel by CRL

Ice impactor hitting outrigger at center outrigger



Dented outrigger fascia from impacts and crack on surface of miter joint from impacts.

Pictures for T20-015 – Series 7750 Corner Panel by CRL

Dented outrigger fascia from impacts and crack on surface

Washer head screw used to hold metal infill to 1.75" x 1.75" x ¼" aluminum angle. Aluminum angle was fastened to the outrigger

Left and right end outriggers were welded to back plate with 6" weld bead on each side. Center outrigger was welded the full 8" of the back plate. Notice the two holes for mounting to steel.

Pictures for T20-015 – Series 7750 Corner Panel by CRL

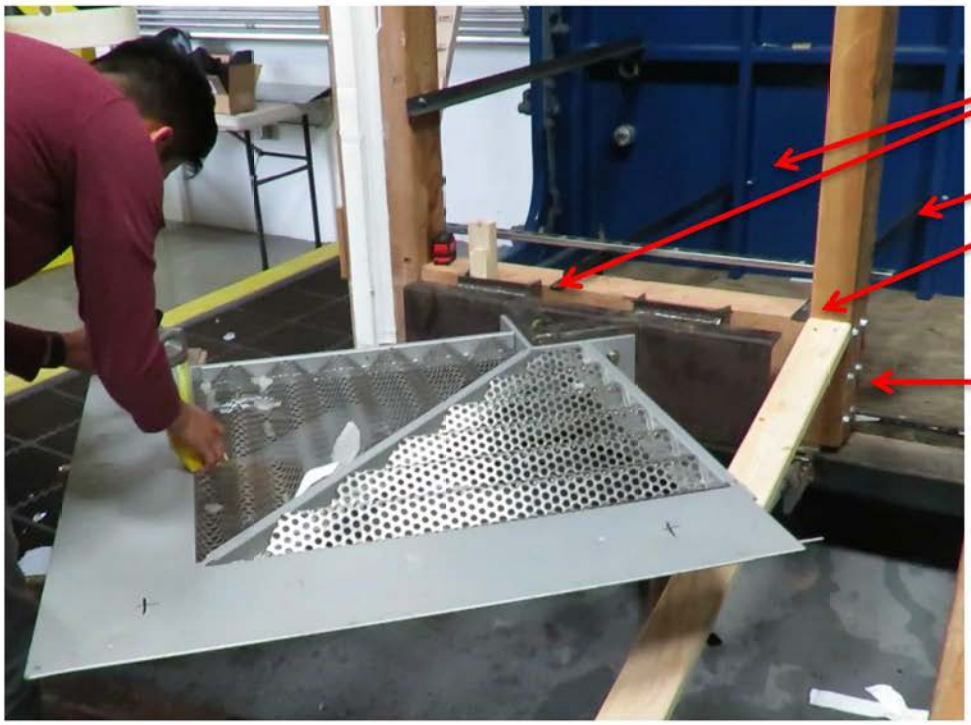
Underside of the sunshade - notice 1.75" "L" angle leg to support the metal infill and a screw going through it.

The center outrigger extended out 51". The end outriggers extended out 36" each.

Steel to which the sunshade was anchored. Can see the 10" steel channel forming the corner welded to a 10" steel back plate and that was welded to the 8" channels that were bolted to the 6" x 12" wooden beam. Notice the 1/2" bolts that fastened the assembly to the wooden beam.

Pictures for T20-015 – Series 7750 Corner Panel by CRL

Notice the ½" bolts that fastened the assembly to the wooden beam and the ¼" x 2" x 2" square washers



Steel angle bolted to steel chamber on one end and bolted with screws to the wood beam on the other

Wood 6" x 4" post bolted to end of beam and supported by wood and clamps to chamber. Same on the other end.