Intertek | Architectural Testing

CSA A440.2-09 THERMAL PERFORMANCE
TEST REPORT

Rendered to:

C.R. LAURENCE CO., INC.

SERIES/MODEL: 45X - High Performance Dual Thermally Broken Storefront
TYPE: Glazed Wall Systems (Site-built)

Summary of Results			
Temperature Index - Frame (I_f)			53
Temperature Index - Glass (I_g)			64
Temperature Index			53
Unit Size:		2000 mm x 2000 mm	
Layer 1:	6 mm	PPG Solarban z75 (e=0.018*, #2)	
Gap 1:	13.5 mm	TS-D: Technoform TGI Wave Spacer	90% Argon*
Layer 2:	6 mm	Clear	

Reference must be made to Report No. F4786.06-116-46, dated 04/27/16 for complete test specimen description and data.

Intertek | Architectural Testing

CSA A440.2-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

C.R. LAURENCE CO., INC.
2503 E. Vernon Avenue
Los Angeles, California 90058-1826

Report Number:	F4786.06-116-46
Test Date:	03/11/16
Report Date:	04/27/16

Test Sample Identification:

Series/Model: 45X - High Performance Dual Thermally Broken Storefront

Type: Glazed Wall Systems (Site-built)

Overall Size: 2000 mm x 2000 mm

Test Sample Submitted by: Oldcastle BuildingEnvelope - Terrell, Texas

This report is a reissue of the original Report No. F4786.03-116-46. This report is reissued in the name of C.R. Laurence Co., Inc. through written authorization of Oldcastle BuildingEnvelope.

Test Procedure: Testing was performed in a Guarded Hot Box in accordance with CSA A440.2-09, *Test Procedure for Measuring the Steady-State Temperature Index of Fenestration Systems.*

Test Results Summary:

Temperature Index - Frame (I_f)	53
Temperature Index - Glass (I_g)	64
Temperature Index	53

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Test Sample Description:

Frame:

Material:	AT (6 mm): Aluminum with Thermal Breaks - All Members		
Size:	2000 mm x 2000 mm		
Daylight Opening:	924 mm x 1899 mm (x2)	**Glazing Method:**	Exterior
Exterior Color:	Clear	**Exterior Finish:**	Anodized
Interior Color:	Clear	**Interior Finish:**	Anodized
Corner Joinery:	Square Cut / Screws / Sealed		

Glazing Information:

Layer 1:	6 mm	PPG Solarban z75 (e=0.018*, #2)	
Gap 1:	13.5 mm	TS-D: Technoform TGI Wave Spacer	90% Argon*
Layer 2:	6 mm	Clear	
Gas Fill Method:		Single-Probe Method*	

**Stated per Client/Manufacturer*
N/A Non-Applicable

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
FG-1133 gasket	1 row	Interior and exterior glazing perimeter

Hardware:

Description	Quantity	Location
Aluminum glass stop	2	Exterior sill
AT (35 mm) vertical filler	3	Verticals

Drainage:

Drainage Method	Size	Quantity	Location
No visible weeps			

Temperature Index

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	291.80	W
2. Surround Panel Heat Flow (Q_{sp})	15.02	W
3. Surround Panel Thickness	203	mm
4. Surround Panel Conductance	0.1339	$W/m^2 \cdot k$
5. Metering Box Wall Heat Flow (Q_{mb})	3.43	W
6. EMF vs Heat Flow Equation (equivalent information)	0.0116*EMF + -0.102	
7. Flanking Loss Heat Flow (Q_{fl})	2.23	W
8. Net Specimen Heat Loss (Q_s)	271.13	W

Areas

1. Test Specimen Projected Area (A_s)	4.00	m^2
2. Metering Box Opening Area (A_{mb})	6.98	m^2
3. Metering Box Baffle Area (A_{bl})	6.58	m^2
4. Surround Panel Interior Exposed Area (A_{sp})	2.98	m^2

Test Conditions

1. Average Metering Room Air Temperature (T_h)	21.00	C
2. Average Cold Side Air Temperature (T_c)	-18.01	C
3. Average Guard/Environmental Air Temperature	21.81	C
4. Metering Room Average Relative Humidity	2.14	%
5. Measured Cold Side Wind Velocity (Perpendicular Flow)	20.37	kph
6. Measured Static Pressure Difference Across Test Specimen	0.00 mm ± 0.04 mm H_2O	

Results

1. Temperature Index - Frame (I_f)	53
2. Temperature Index - Glass (I_g)	64
3. Temperature Index	53

Test Duration

1. The environmental systems were started at 17:48 hours, 03/10/16.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:04 hours, 03/10/16 to 06:04 hours, 03/11/16.
3. The thermal performance test results were derived from 02:04 hours, 03/11/16 to 06:04 hours, 03/11/16.

Temperature Index

Pre-specified Thermocouples - Frame	
Thermocouple #	Temperature
7	3.87
8	5.99
9	5.84
10	5.04
11	2.67
12	6.19
13	5.05
14	5.33
15	8.80
16	11.06

Pre-specified Thermocouples - Glass	
Thermocouple #	Temperature
1	6.75
2	8.04
3	6.62
4	6.61
5	8.54
6	6.66

Roving Thermocouples - Frame*	
Thermocouple #	Temperature
23	2.87
24	2.90
25	5.06
26	5.17

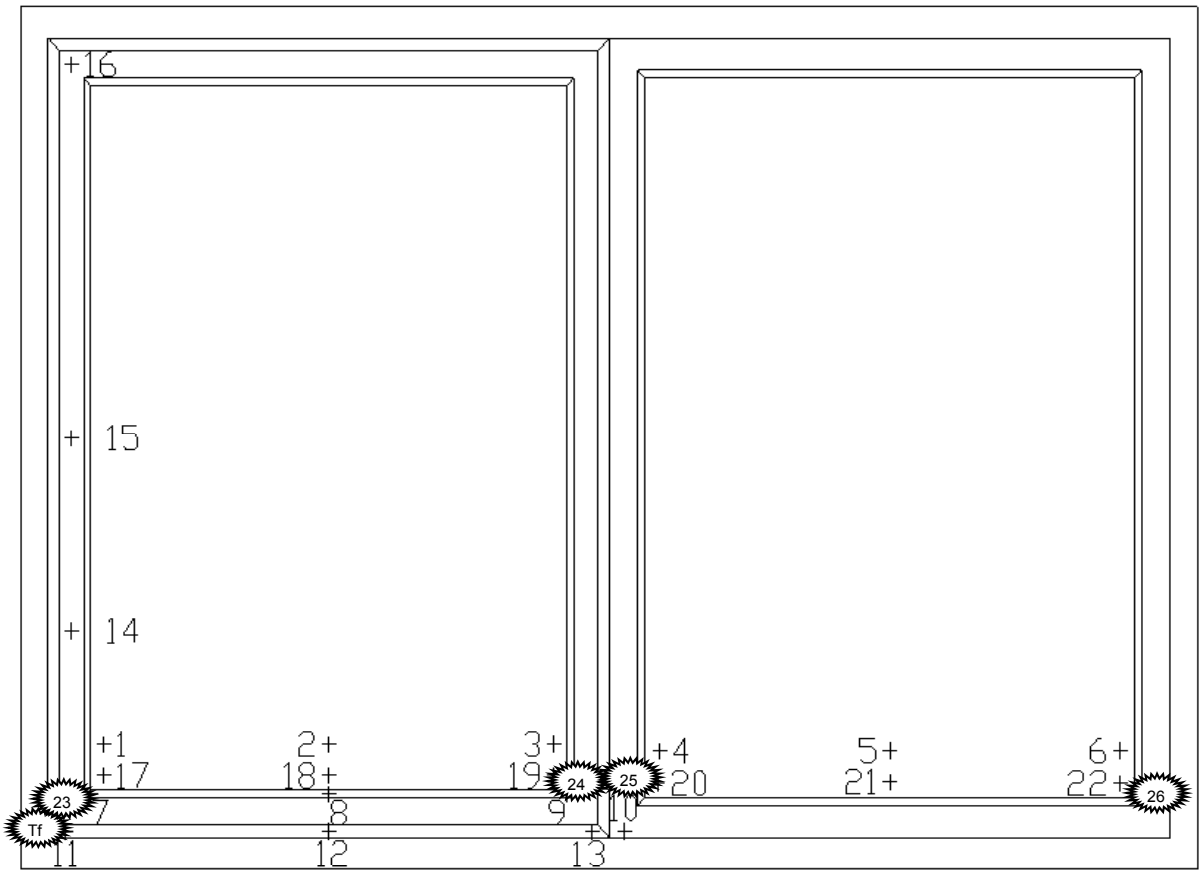
Roving Thermocouples - Glass*	
Thermocouple #	Temperature
17	2.32
18	4.36
19	3.26
20	2.74
21	5.09
22	2.13

Results

1. Average Metering Room Air Temperature (T_h)	21.00 C
2. Average Cold Side Air Temperature (T_c)	-18.01 C
3. Average of Coldest Glass Temperatures (T_g)	7.14 C
4. Coldest Frame Temperature (T_f)	2.67 C
5. Temperature Index - Frame (I_f)	53
6. Temperature Index - Glass (I_g)	64
7. Temperature Index	53

** Roving thermocouples are for information only and are not included in the calculation of theTemperature Index*

Thermocouple Location Diagram



Coldest Frame Temperature

Tf T_f 2.67

Glazing Deflection:

	Left Glazing	Right Glazing
Edge Gap Width	13.5 mm	13.5 mm
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	11.9 mm	12.7 mm
Center gap width at laboratory ambient conditions on day of testing	11.9 mm	12.7 mm
Center gap width at test conditions	10.4 mm	10.4 mm

Glass collapse determined using a digital glass and air space meter

Required annual calibrations for the Architectural Testing Inc., an Intertek company ("Intertek-ATI"), 'thermal test chamber' (ICN 000001) in York, Pennsylvania were last conducted in May 2015 in accordance with Intertek-ATI calibration procedure. A CTS Calibration verification was performed June 2015. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed July 2015.

This report is a reissue of the original Report No. F4786.03-116-46. This report is reissued in the name of C.R. Laurence Co., Inc. through written authorization of Oldcastle BuildingEnvelope.

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period. The test record retention end date for this report is March 11, 2020.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI

Tested By:

Digitally Signed by: Ryan P. Moser

Ryan P. Moser
Senior Technician

Reviewed By:

Digitally Signed by: Shon W. Einsig

Shon W. Einsig
Senior Technician

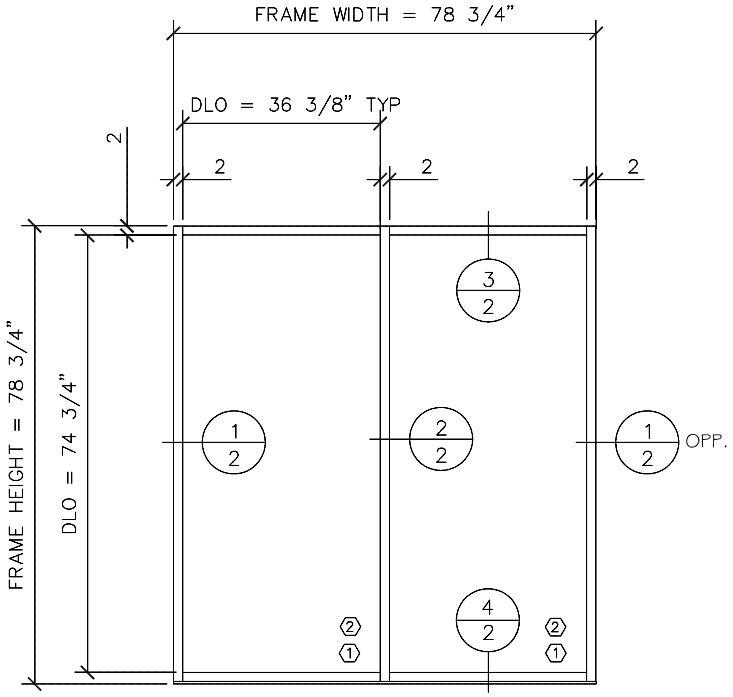
RPM:pam
F4786.06-116-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Drawings (13)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.06R0	04/27/16	All	Original Report Issue - Reissue of Report No. F4786.03-116-46 in the name of C.R. Laurence Co., Inc..

Appendix A: Drawings



TWO REQUIRED THUS
ONE (1) W/GLASS 1
ONE (1) W/GLASS 2

BILL OF MATERIAL

QTY	PART NO.	DESCRIPTION	LENGTH		NOTES
		EXTRUSIONS			
6	45XVA	Vertical/Jamb	78 3/4"	.	.
2	45XVE	Intermediate Vertical Filler	78 3/4"	.	.
4	45XVE	Head Horizontal	36 3/8"	.	.
4	45XHB	Sill Horizontal		.	.
4	45XHD	Glass Stop	36 3/8"	.	.
		ACCESSORIES			
8	45A3220	SETTING BLOCK	.	.	.
16	45ASF8	#14 X 1" SCREW	.	.	.
.	45A1133	GASKET	.	.	.

GLAZING CHART

SYM	QTY	DESCRIPTION
1	2	37 1/4" X 75 5/8", 1" CLEAR (1/4" CLR TEMP-1/2" ALUM SPCR-1/4" CLR TEMP)
2	2	37 1/4" X 75 5/8", 1" LOW E (1/4" TEMP SUNGLASS-1/2" TECHNOFORM SPCR-1/4" CLR TEMP)

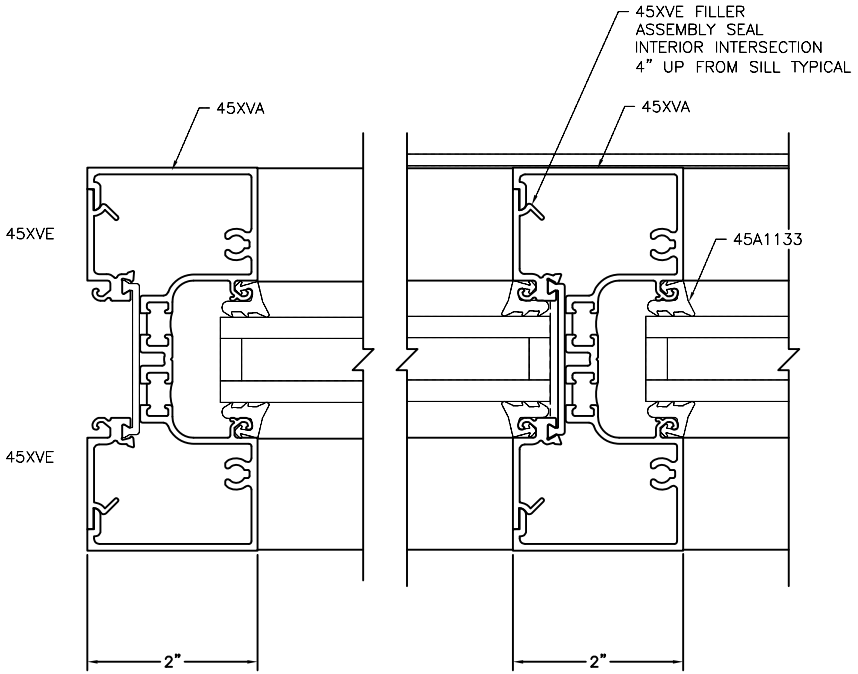
REVISIONS

C.R.LAURENCE CO.
ARCHITECTURAL PRODUCTS
2100 E. 38TH Street, Los Angeles, CA 90058
www.crlaurence.com

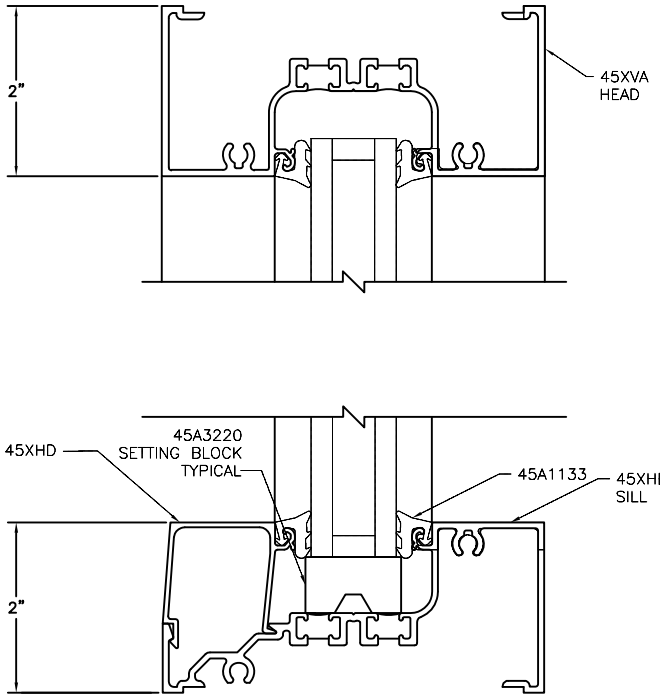
Job Name: CRL/US Aluminum ARCTICFRONT Series 45X–High Performance Dual Thermally Broken Storefront

Glazing Contractor:

DATE: 11/19/2015
DRAWN BY: GDO
CHECKED BY: XX
SCALE: AS SHOWN
JOB #:



1 2



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REVISIONS

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SHT 2 OF 2