NFRC 102-2014 THERMAL PERFORMANCE
TEST REPORT

Rendered to:

COEUR D'ALENE WINDOW COMPANY

SERIES/MODEL: 3410 Fixed Casement Picture Window
TYPE: Fixed

Summary of Results			
Standardized Thermal Transmittance (U-Factor)			0.25
Unit Size:		47-3/8" x 59" (1203 mm x 1499 mm) (Model Size)	
Layer 1:	DS	Cardinal E270 (e=0.037*, #2)	
Gap 1:	0.28"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 2:	DS	Clear	
Gap 2:	0.28"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 3:	DS	Clear	

Reference must be made to Report No. F4225.01-901-46, dated 03/02/16 for complete test specimen description and data.

NFRC 102-2014 THERMAL PERFORMANCE TEST REPORT

Rendered to:

COEUR D'ALENE WINDOW COMPANY
3808 North Sullivan Road
Spokane Valley, Washington 99216

Report Number:	F4225.01-901-46
Test Date:	01/07/16
Report Date:	03/02/16

Test Sample Identification:

Series/Model: 3410 Fixed Casement Picture Window

Type: Fixed

Overall Size: 47-3/8" x 59" (1203 mm x 1499 mm) (Model Size)
NFRC Standard Size: 47.2" x 59.1" (1200 mm wide x 1500 mm high)

Test Sample Submitted by: Client

Test Sample Submitted for: Validation for Initial Certification (Production Line Unit) & Plant Qualification

Test Procedure: U-factor tests were performed in a Guarded Hot Box in accordance with NFRC 102-2014, *Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems* .

Test Results Summary:

Standardized U-factor (U_{st}): 0.25 Btu/hr·ft^2·F (CTS Method)

Test Sample Description:

Frame:

Material:	VY: Vinyl		
Size:	47-3/8" x 59" (Model Size)		
Daylight Opening:	42-7/8" x 54-5/8"	**Glazing Method:**	Exterior
Exterior Color:	White	**Exterior Finish:**	Vinyl
Interior Color:	White	**Interior Finish:**	Vinyl
Corner Joinery:	Mitered / Welds / Unsealed		

Glazing Information:

Layer 1:	DS	Cardinal E270 (e=0.037*, #2)	
Gap 1:	0.28"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 2:	DS	Clear	
Gap 2:	0.28"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 3:	DS	Clear	
Gas Fill Method:		Evacuated Chamber*	

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

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
No weatherstrip		

Hardware:

Description	Quantity	Location
No hardware		

Drainage:

Drainage Method	Size	Quantity	Location
No visible weeps			

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	565.45	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	198.11	Btu/hr
3. Surround Panel Thickness	4.00	inches
4. Surround Panel Conductance	0.0536	Btu/hr·ft^2·F
5. Metering Box Wall Heat Flow (Q_{mb})	-9.04	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0106*EMF + 0.000	
7. Flanking Loss Heat Flow (Q_{fl})	36.47	Btu/hr
8. Net Specimen Heat Loss (Q_s)	339.90	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	19.41	ft^2
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	20.16	ft^2
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	22.10	ft^2
4. Metering Box Opening Area (A_{mb})	75.11	ft^2
5. Metering Box Baffle Area (A_{b1})	69.33	ft^2
6. Surround Panel Interior Exposed Area (A_{sp})	55.70	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.80	F
2. Average Cold Side Air Temperature (t_c)	-0.40	F
3. Average Guard/Environmental Air Temperature	71.70	F
4. Metering Room Average Relative Humidity	0.75	%
5. Metering Room Maximum Relative Humidity	0.86	%
6. Metering Room Minimum Relative Humidity	0.68	%
7. Measured Cold Side Wind Velocity (Parallel Flow)	3.70	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.53	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"H_2O	

Average Surface Temperatures

1. Metering Room Surround Panel	67.26	F
2. Cold Side Surround Panel	0.90	F

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.25	Btu/hr·ft^2·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.25	Btu/hr·ft^2·F

Thermal Transmittance (U-factor)

Calculated Test Data

CTS Method

1.	Warm Side Emittance of Glass (e_1)	0.84	
2.	Cold Side Emittance of Glass	0.84	
3.	Warm Side Frame Emittance*	0.90	
4.	Cold Side Frame Emittance*	0.90	
5.	Warm Side Sash/Panel/Vent Emittance*	N/A	
6.	Cold Side Sash/Panel/Vent Emittance*	N/A	
7.	Warm Side Baffle Emittance (e_{b1})	0.92	
8.	Cold Side Baffle Emittance (e_{b2})	0.92	
9.	Equivalent Warm Side Surface Temperature	56.50	F
10.	Equivalent Cold Side Surface Temperature	2.97	F
11.	Warm Side Baffle Surface Temperature	68.93	F
12.	Cold Side Baffle Surface Temperature	0.36	F
13.	Measured Warm Side Surface Conductance (h_h)	1.32	Btu/hr·ft^2·F
14.	Measured Cold Side Surface Conductance (h_c)	5.19	Btu/hr·ft^2·F
15.	Test Specimen Thermal Conductance (C_s)	0.33	Btu/hr·ft^2·F
16.	Convection Coefficient (K_c)	0.32	Btu/(hr·ft^2·F$^{1.25}$)
17.	Radiative Test Specimen Heat Flow (Q_{r1})	184.34	Btu/hr
18.	Conductive Test Specimen Heat Flow (Q_{c1})	155.56	Btu/hr
19.	Radiative Heat Flux of Test Specimen (q_{r1})	9.50	Btu/hr·ft^2·F
20.	Convective Heat Flux of Test Specimen (q_{c1})	8.01	Btu/hr·ft^2·F
21.	Standardized Warm Side Surface Conductance (h_{sth})	1.21	Btu/hr·ft^2·F
22.	Standardized Cold Side Surface Conductance (h_{stc})	5.28	Btu/hr·ft^2·F
23.	Standardized Thermal Transmittance (U_{st})	0.25	Btu/hr·ft^2·F

Test Duration

1. The environmental systems were started at 10:24 hours, 01/06/16.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:26 hours, 01/06/16 to 06:26 hours, 01/07/16.
3. The thermal performance test results were derived from 02:26 hours, 01/07/16 to 06:26 hours, 01/07/16.

The reported Standardized Thermal Transmittance (Ust) was determined using CTS Method, per Section 8.2(A) of NFRC 102.

**Stated per NFRC 101*

Glazing Deflection:

	Frame
Edge Gap Width	0.28" / 0.28"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.28" / 0.29"
Center gap width at laboratory ambient conditions on day of testing	0.28" / 0.29"
Center gap width at test conditions	0.28" / 0.21"

Glass collapse determined using a digital glass and air space meter

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

"This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which are expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that have the potential to occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-situ measurements. Therefore, it is important to recognize that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects."

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen. The ratings were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy. The data acquisition frequency is 5 minutes.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 6.40%.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 63449) in Kent, Washington were last conducted in October 2015 in accordance with Architectural Testing Inc. calibration procedure.

"Ratings included in this report are for submittal to an NFRC licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes."

Architectural Testing, Inc. 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 Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is January 07, 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 Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Tested By:

Digitally Signed by: Brian L. Rasmussen

Brian L. Rasmussen
Technician
Individual-In-Responsible-Charge

Reviewed By:

Digitally Signed by:Kenny C. White

Kenny C. White
Laboratory Manager

BLR:ss
F4225.01-901-46

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: CTS Calibration Data (1)
- Appendix-B: Surround Panel Wiring Diagram (1)
- Appendix-C: Baffle Wiring Diagram (1)
- Appendix-D: Submittal Form and Drawings (6)

ACCREDITED

Architectural Testing, Inc. is accredited by the International Accreditation Service (IAS) under the specific test methods listed under lab code TL-144, in accordance with the recognized International Standard ISO/IEC 17025:2005. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by IAS.

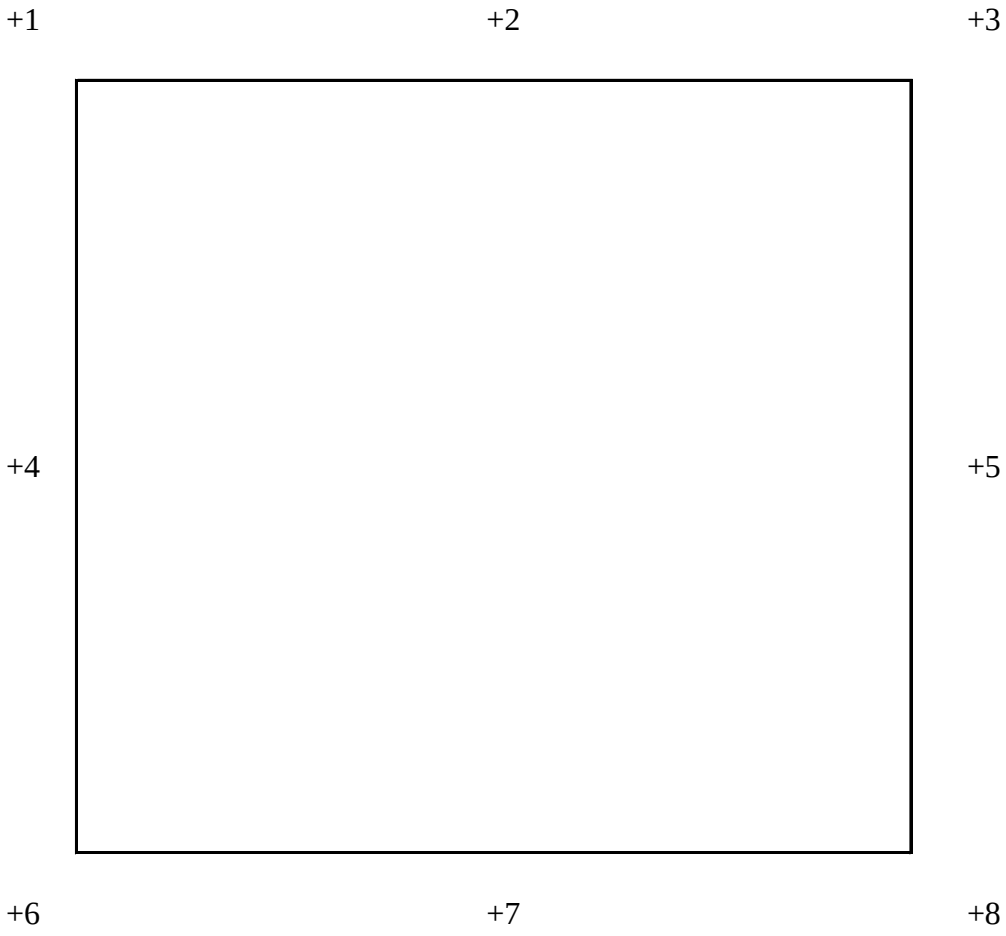
Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	03/02/16	All	Original Report Issue. Work requested by Blake Doll of Coeur D'Alene Window Company

Appendix A: CTS Calibration Data

1.	CTS Test Date	04/12/13	
2.	CTS Size	19.38	ft^2
3.	CTS Glass/Core Conductance	0.40	$Btu/hr \cdot ft^2 \cdot F$
4.	Warm Side Air Temperature	69.80	F
5.	Cold Side Air Temperature	-0.40	F
6.	Warm Side Average Surface Temperature	54.87	F
7.	Cold Side Average Surface Temperature	3.57	F
8.	Convection Coefficient (K_c)	0.33	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
9.	Measured Cold Side Surface Conductance (h_c)	5.17	$Btu/hr \cdot ft^2 \cdot F$
10.	Measured Thermal Transmittance	0.29	$Btu/hr \cdot ft^2 \cdot F$

Appendix B: Surround Panel Wiring Diagram



Appendix C: Baffle Wiring Diagram

+1	+2	+3	+4	+5	+6
+7	+8	+9	+10	+11	+12
+13	+14	+15	+16	+17	+18
+19	+20	+21	+22	+23	+24
+25	+26	+27	+28	+29	+30

Appendix D: Submittal Form and Drawings

NFRC PRODUCT CERTIFICATION PROGRAM

Submittal Form for Test Samples

National Fenestration Rating Council®

For use by Manufacturers, Lineal Suppliers and Fabricators

1. Information on Production of the Test Sample (complete **ALL** fields):

Manufacturer: Coeur d'Alene Window Co Date of sample manufacture: 12/18/2015

Plant Address where manufactured: 3808 N Sullivan Building 18i

City: Spokane Valley State: WA Zip Code: 99216

Name of IA: NAMI Phone: 804.684.5124 Fax: 804.684.5122

2. Product Information (complete **APPLICABLE** fields):

Existing Product Line ID (CPD) No.: _____ Product/Operator Type (Table 4-3 of NFRC 100): Fixed Casement Picture

Series/Model: 3410 Fixed Casement Picture Window

3. Test sample is being submitted for (select **ONE**):

a. ☐ Validation for Initial Certification (prototype only) no plant qualification

b. ■ Validation for Initial Certification or Recertification (production line unit) & plant qualification

c. ☐ Plant Qualification Only (production line unit)

d. ☐ Test Only Alternative (production line unit) & plant qualification

I, Blake Doll, as the designated agent for Coeur d'Alene Window Co do hereby attest that the foregoing information is true to the best of my information, knowledge, and belief. Further, if the unit is identified in Section 3 as a production line unit, I hereby authorize the NFRC-accredited testing laboratory to send a copy of the test report to the IA identified above for plant qualification purposes pursuant to the NFRC Product Certification Program.

Signature: [signature] Date: 1/08/2016

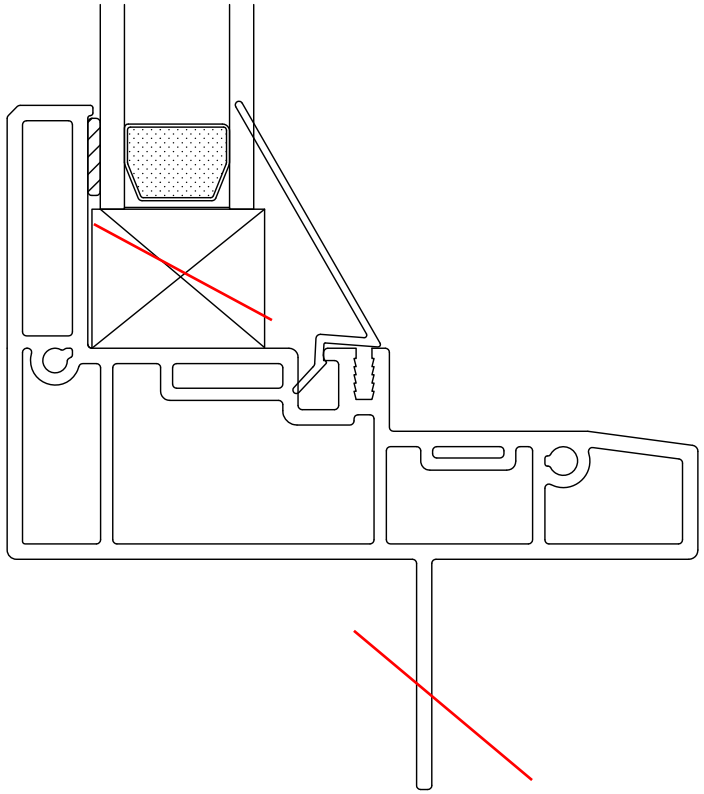
For Laboratory Use Only

1. Laboratory: Intertek-ATI
2. Date Sample Received: 12/23/15 Test Report #: F4225
3. Date Sample Tested: 1/05/16 By: Brian Rasmussen
4. Modifications made: —

3400 Picture Window	
Part	Part #
Casement Fixed Frame	KE2010
Glazing Bead	KE2046
Setting Block	6152
Setting Block Glue	IPS-56-1021
Glazing Tape	VG1216W-FC515

Intertek
Architectural Testing

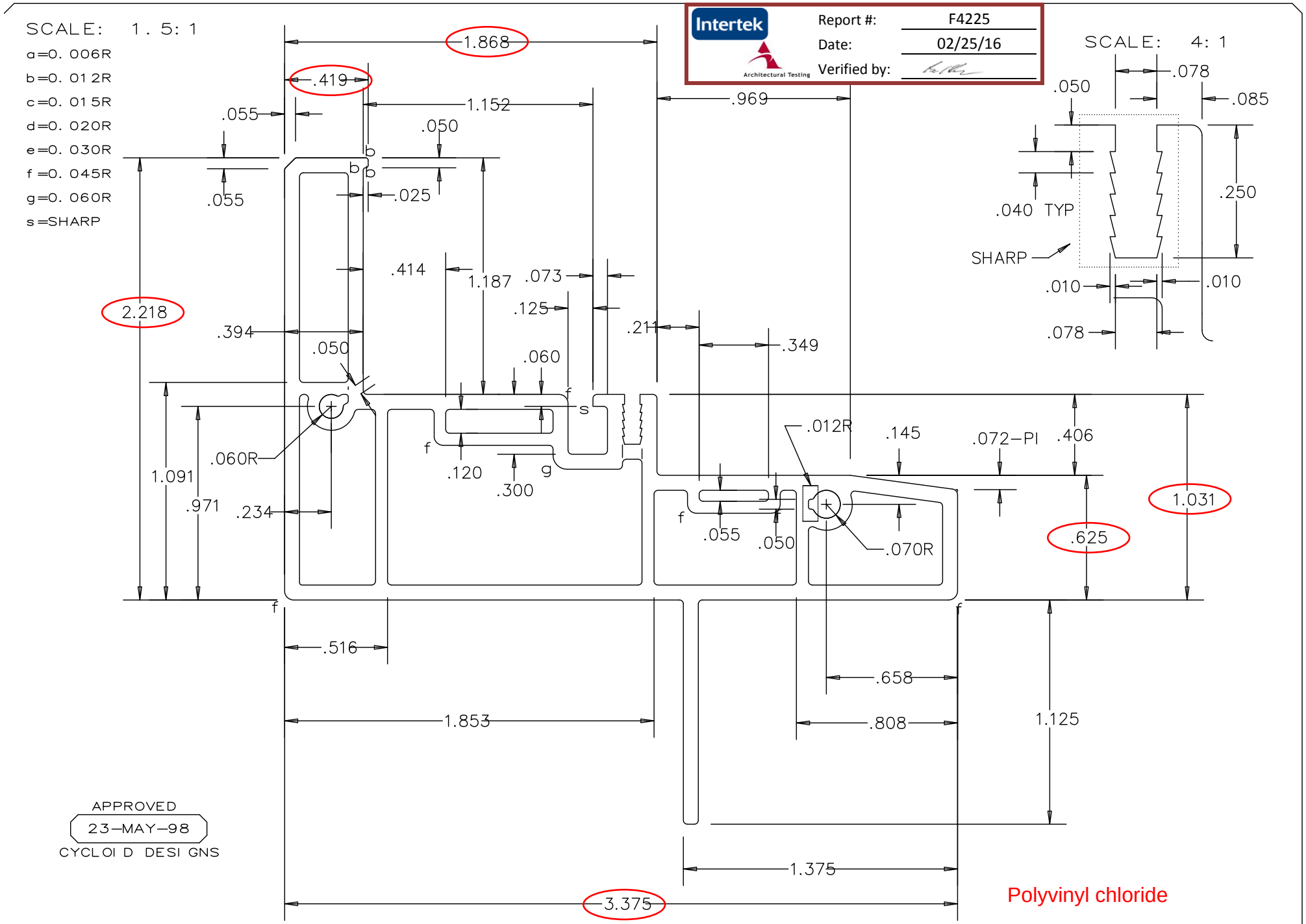
Report #: F4225
Date: 02/25/16
Verified by:



Intertek
Architectural Testing

Report #:	F4225
Date:	02/25/16
Verified by:	

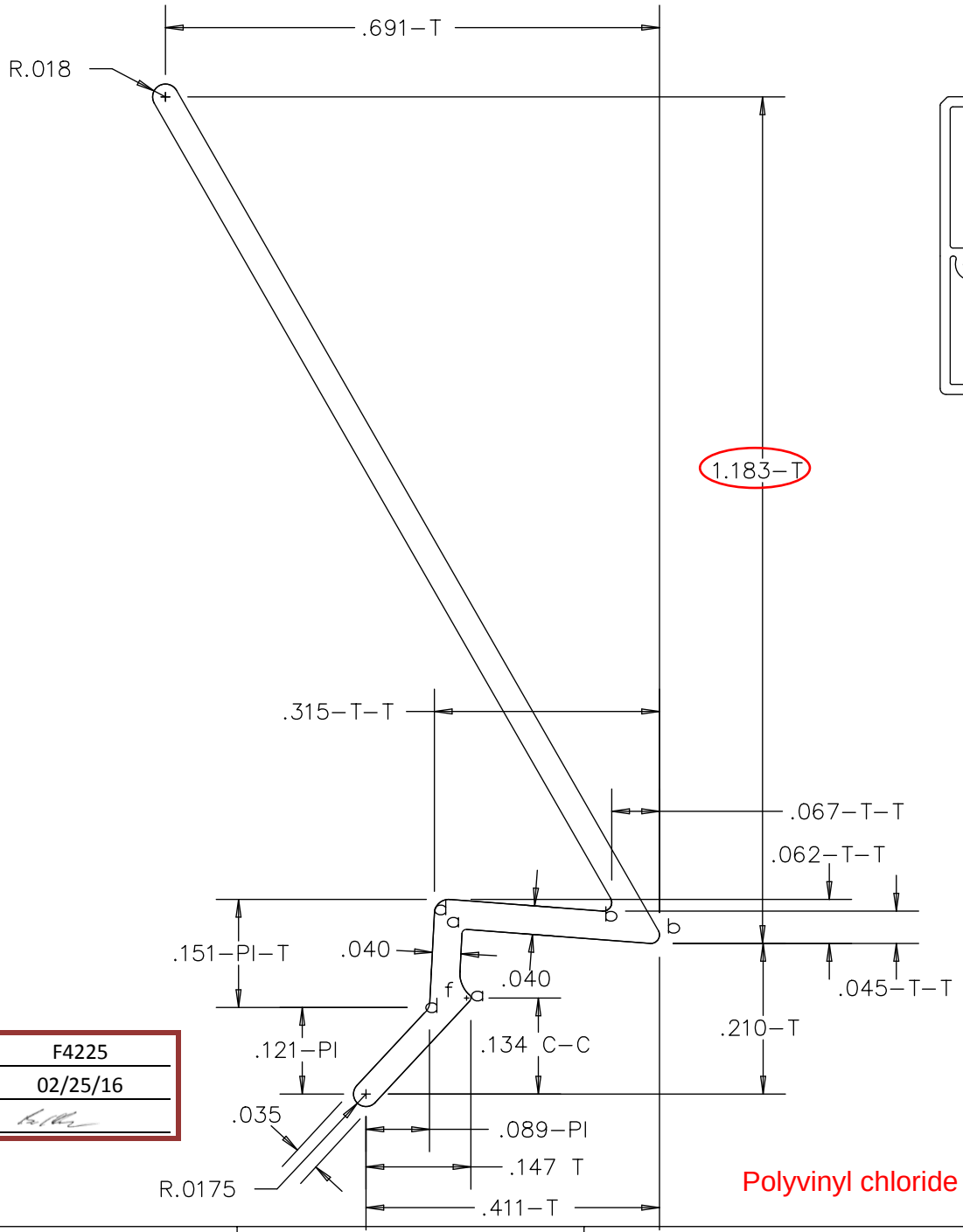
CYCLOID DESIGNS	DWG: 310-L4	DATE: 23-MAY-98		EXTERNAL WALL: X.XXX INTERNAL WALL: X.XXX CORNER TYP: X.XXXR WEIGHT: X.XXX LB/FT
TITLE: CASEMENT: FIXED SECTION				



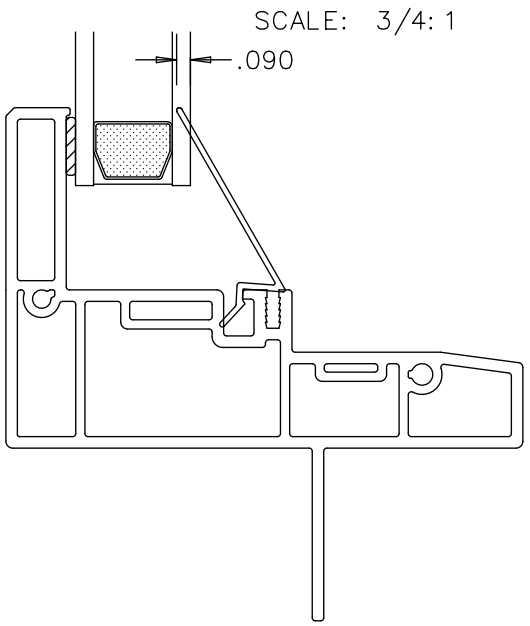
CYCLOID DESIGNS	DWG: 310–D1	DATE: 07–MAY–98	© 1998 COPYRIGHT KING EXTRUSIONS LTD EVERETT, WASHINGTON ALL RIGHTS RESERVED	EXTERNAL WALL: 0.075 INTERNAL WALL: 0.060 CORNER TYP: 0.020R WEIGHT: 0.746 LB/FT
TITLE: CASEMENT FRAME		KE2010		

SCALE: 4: 1

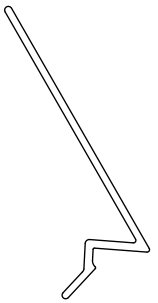
a=0.006R
b=0.012R
c=0.015R
d=0.020R
e=0.030R
f=0.040R
g=0.060R
s=SHARP



SCALE: 3/4: 1



APPROVED
29–JAN–99
CYCLOID DESIGNS

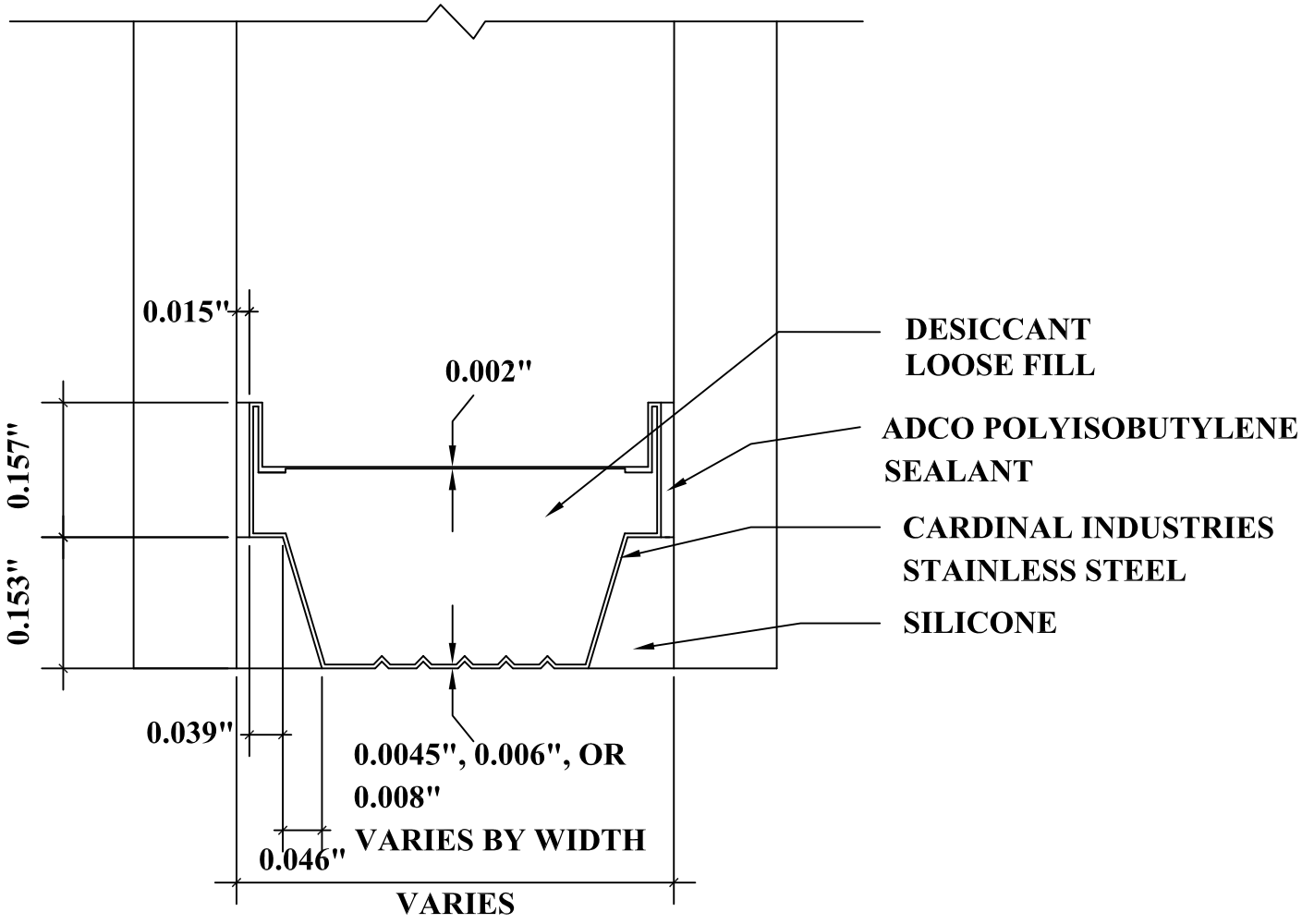


ACTUAL SI ZE

Intertek
Architectural Testing
Report #: F4225
Date: 02/25/16
Verified by:

Polyvinyl chloride

CYCLOID DESIGNS	DWG: 310–D11	DATE: 28–JAN–99	© 1999 COPYRIGHT KING EXTRUSIONS LTD EVERETT, WASHINGTON ALL RIGHTS RESERVED	EXTERNAL WALL: 0.XXX INTERNAL WALL: 0.XXX CORNER TYP: 0.XXXR WEIGHT: 0.044 LB/FT
TITLE: PW GLAZING BEAD .750 GLASS	KE2046			



DETAIL FOR THERMAL MODELING OF
CARDINAL ENDUR SPACER (SS-D)

Report #:	F4225
Date:	02/25/16
Verified by:	