NFRC 102-2014 THERMAL PERFORMANCE
TEST REPORT

Rendered to:

COEUR D'ALENE WINDOW COMPANY

SERIES/MODEL: 3411 Casement
TYPE: Casement

Summary of Results			
Standardized Thermal Transmittance (U-Factor)			0.22
Unit Size:		23-5/8" x 59-1/8" (600 mm x 1502 mm) (Model Size)	
Layer 1:	SS	Cardinal E270 (e=0.037*, #2)	
Gap 1:	0.32"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 2:	SS	Clear	
Gap 2:	0.32"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 3:	SS	Clear	

Reference must be made to Report No. F4224.01-901-46, 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:	F4224.01-901-46
Test Date:	01/05/16
Report Date:	03/02/16

Test Sample Identification:

Series/Model: 3411 Casement

Type: Casement

Overall Size: 23-5/8" x 59-1/8" (600 mm x 1502 mm) (Model Size)
NFRC Standard Size: 23.6" x 59.1" (600 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}): 0.22 Btu/hr·ft^2·F (CTS Method)

Test Sample Description:

Frame:

Material:	VY: Vinyl		
Size:	23-5/8" x 59-1/8" (Model Size)		
Daylight Opening:	N/A	**Glazing Method:**	N/A
Exterior Color:	White	**Exterior Finish:**	Vinyl
Interior Color:	White	**Interior Finish:**	Vinyl
Corner Joinery:	Mitered / Welds / Unsealed		

Vent:

Material:	VY: Vinyl		
Size:	22-1/8" x 57-1/2"		
Daylight Opening:	17-3/4" x 53"	**Glazing Method:**	Exterior
Exterior Color:	White	**Exterior Finish:**	Vinyl
Interior Color:	White	**Interior Finish:**	Vinyl
Corner Joinery:	Mitered / Welds / Unsealed		

Glazing Information:

Layer 1:	SS	Cardinal E270 (e=0.037*, #2)	
Gap 1:	0.32"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 2:	SS	Clear	
Gap 2:	0.32"	SS-D: Stainless Steel Spacer	90% Argon*
Layer 3:	SS	Clear	
Gas Fill Method:		Evacuated Chamber*	

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

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
Polypile with center fin	1 Row	Vent, full perimeter
Wrapped foam gasket	1 Row	Vent, full perimeter
Wrapped foam gasket	1 Row	Frame, full perimeter

Hardware:

Description	Quantity	Location
Multi-point lock assembly	1	Jamb
Metal keeper	3	Stile
Multi-arm hinge	2	Head / sill
Snubber	1 pair	Jamb / stile
Plastic lift block	1	Sill

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})	421.61	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	231.15	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})	2.05	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)	151.94	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	9.70	ft^2
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	11.06	ft^2
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	10.39	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})	65.41	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.80	F
2. Average Cold Side Air Temperature (t_c)	-0.37	F
3. Average Guard/Environmental Air Temperature	70.70	F
4. Metering Room Average Relative Humidity	0.25	%
5. Metering Room Maximum Relative Humidity	0.26	%
6. Metering Room Minimum Relative Humidity	0.25	%
7. Measured Cold Side Wind Velocity (Parallel Flow)	3.70	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.45	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"H_2O	

Average Surface Temperatures

1. Metering Room Surround Panel	67.01	F
2. Cold Side Surround Panel	1.08	F

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.22	Btu/hr·ft^2·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.22	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*	0.90	
6.	Cold Side Sash/Panel/Vent Emittance*	0.90	
7.	Warm Side Baffle Emittance (e_{b1})	0.92	
8.	Cold Side Baffle Emittance (e_{b2})	0.92	
9.	Equivalent Warm Side Surface Temperature	57.89	F
10.	Equivalent Cold Side Surface Temperature	2.65	F
11.	Warm Side Baffle Surface Temperature	69.18	F
12.	Cold Side Baffle Surface Temperature	0.35	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)	0.28	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})	84.10	Btu/hr
18.	Conductive Test Specimen Heat Flow (Q_{c1})	67.84	Btu/hr
19.	Radiative Heat Flux of Test Specimen (q_{r1})	8.67	Btu/hr·ft^2·F
20.	Convective Heat Flux of Test Specimen (q_{c1})	6.99	Btu/hr·ft^2·F
21.	Standardized Warm Side Surface Conductance (h_{sth})	1.20	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})	0.22	Btu/hr·ft^2·F

Test Duration

1. The environmental systems were started at 12:36 hours, 01/04/16.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:55 hours, 01/04/16 to 06:55 hours, 01/05/16.
3. The thermal performance test results were derived from 02:55 hours, 01/05/16 to 06:55 hours, 01/05/16.

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:

	Gap 1	Gap 2
Edge Gap Width	0.32"	0.32"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.30"	0.30"
Center gap width at laboratory ambient conditions on day of testing	0.30"	0.30"
Center gap width at test conditions	0.28"	0.29"

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 15.67%.

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 05, 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
F4224.01-901-46

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 (10)

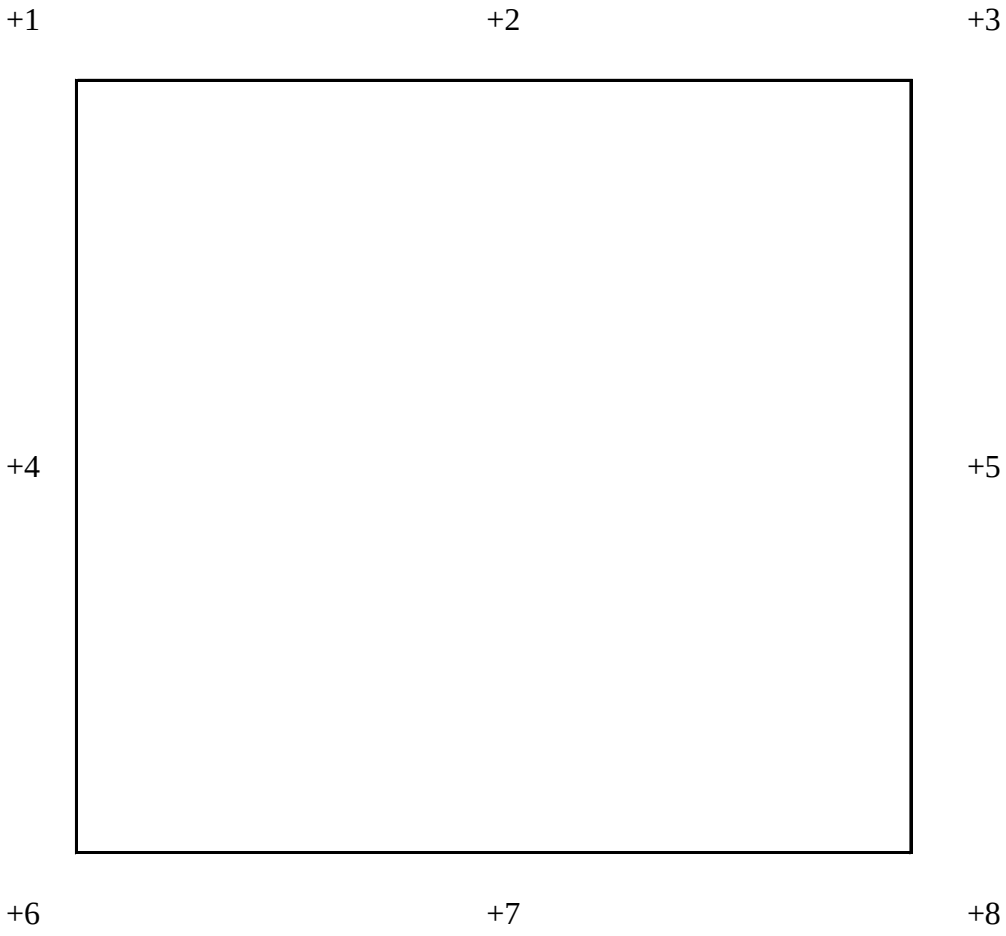
Revision Log

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

For use by Manufacturers, Lineal Suppliers and Fabricators

National Fenestration Rating Council®

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

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

Plant Address where manufactured: 3808 N Sullivan BLDG 18i

City: Spokane Valley State: WA Zip Code: 99202

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): Casement - Single Vent

Series/Model: 3411 Casement

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: 1/06/2016

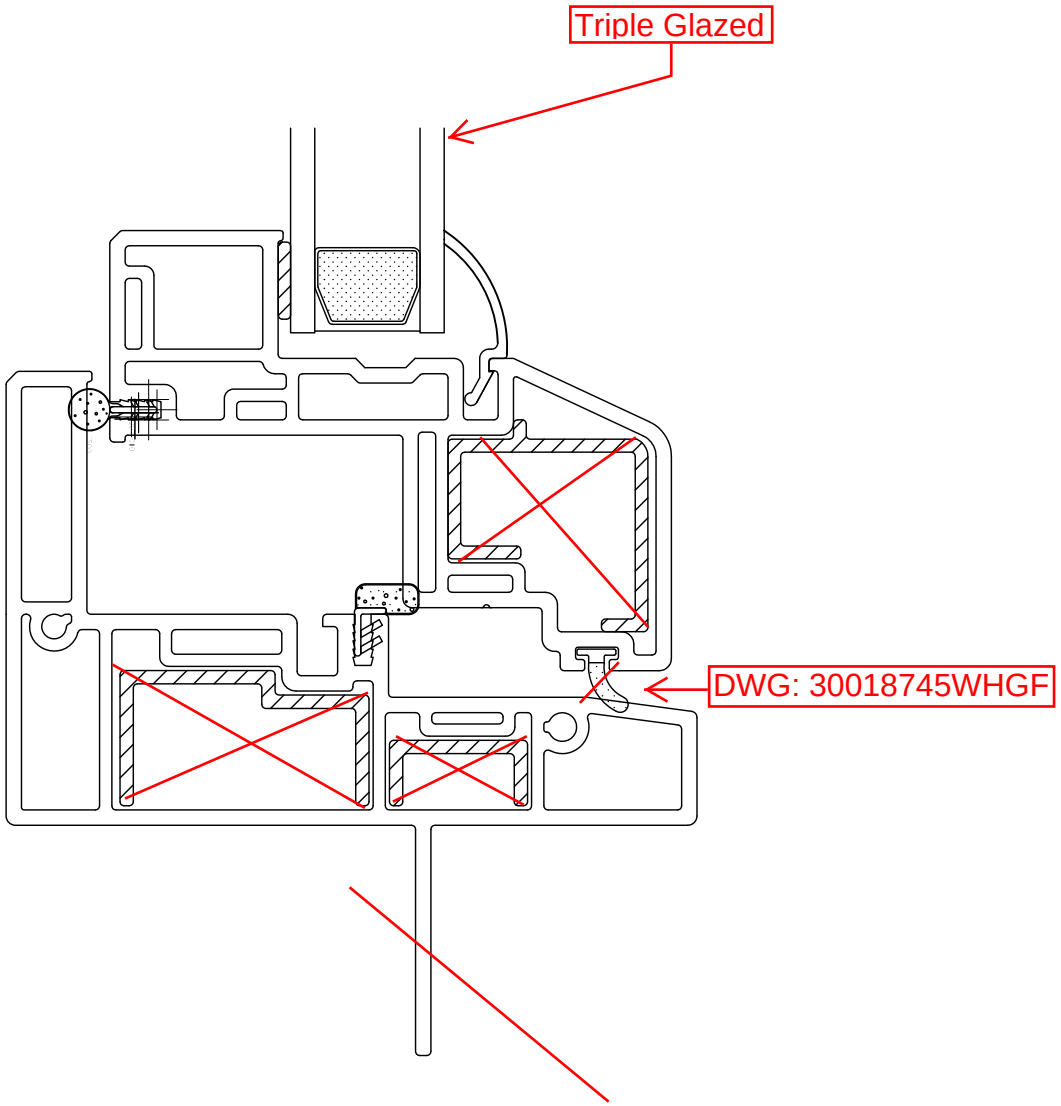
For Laboratory Use Only

1. Laboratory: Intertek-ATI
2. Date Sample Received: 12/23/15 Test Report #: F4224
3. Date Sample Tested: 12/30/15 By: Brian Rasmussen
4. Modifications made: —

3411 Casement	
Part	Part #
Casment Main Frame	KE2010
Casement Sash	KE2011
Glazing Bead	KE1994
Setting Block	6152
Setting Block Glue	IPS-56-1021
Glazing Tape	VG1216W-FC515
Handle/Cover Kit	OP08-7900-00
Sash Bracket Assy	OP05-8000
Track Assy (13" facemount)	OP05-8100
Dual Arm Operator	OP08-7504
14" Hinge Arm Podwer LH	HG06-7554
14" Hinge Arm Podwer RH	HG06-7555
14" Hinge Track H SS Left Hand	HG06-7564
14" Hinge Track H SS Right Hand	HG06-7565
Lock Handle	LH18-7524-00
8-32x1/2" Trilobe Truss Head Screw	M13026
Plastic Handle Plate	G2-HNDLPLT-03
Lock Bar Assy 47.9" 4 Pin	LB10-7512
G5 Guide Housing 1005	LB05-1005-29
G6 Nylon Striker 1013	LB06-1013-50
Weather Stripping	E51218KN3020
Weather Stripping	U3532-00000
Weather Stripping	30018745WHGF

Intertek
Architectural Testing

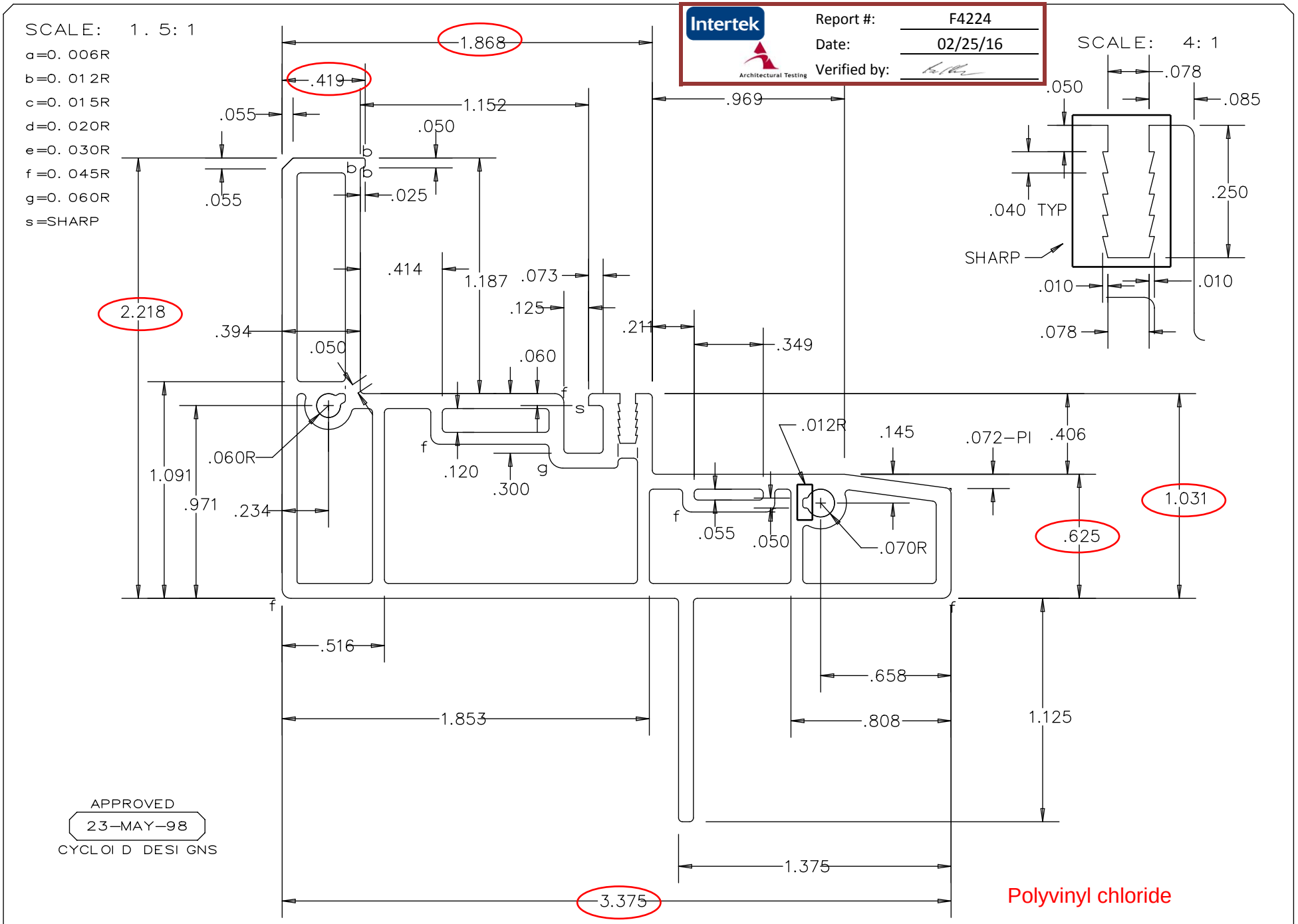
Report #: F4224
Date: 02/25/16
Verified by:



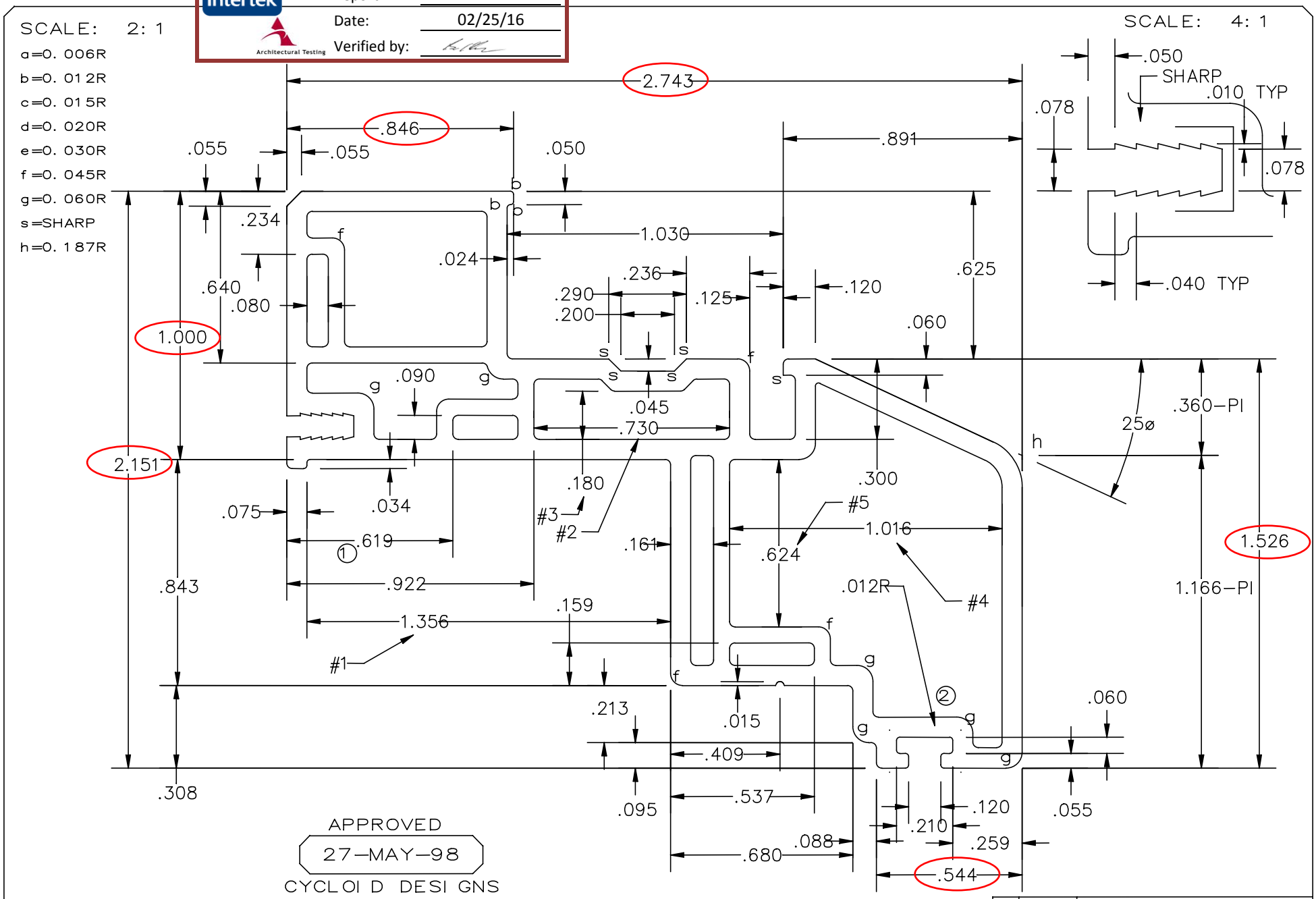
Intertek
Architectural Testing

Report #: F4224
Date: 02/25/16
Verified by:

CYCLOID DESIGNS	DWG: 310-L2	DATE: 23-MAY-98		EXTERNAL WALL: X.XXX INTERNAL WALL: X.XXX CORNER TYP: X.XXXR WEIGHT: X.XXX LB/FT
TITLE: HINGE				



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		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Architectural Testing
Report #: F4224
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Verified by:
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27–MAY–98
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Polyvinyl chloride
2 07–16–98 WALL CORRECTED; WT WAS . 599
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DWG: 310–D2
DATE: 23–MAY–98
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KE2011
© 1998 COPYRI GHT
KI NG EXTRUSI ONS LTD
EVERETT, WASHI NGTON
ALL RI GHTS RESERVED
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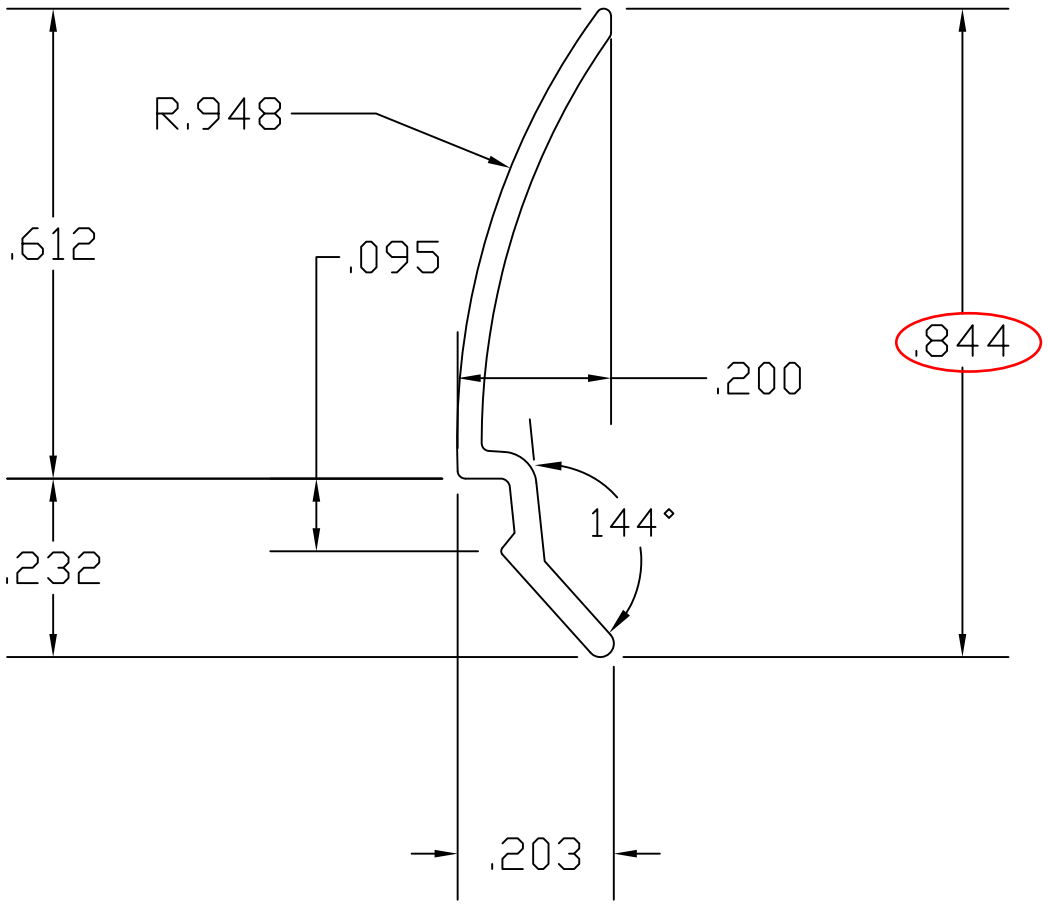
I NTERNAL WALL: 0. 060
CORNER TYP: 0. 020R
WEI GHT: 0. 603 LB/FT



Customer Approval
By: _____
Date:_____

Intertek
Architectural Testing

Report #: F4224
Date: 02/25/16
Verified by:

Polyvinylchloride

REV #	DATE	REVISION NOTES

External Walls = .065
Internal Walls = ..045

Layout Name: Base
Drawn BY: gmc
SCALE 4:1

DATE: 4-25-08
ACAD#: R1994 Bead

100A Royal Group Crescent
Woodbridge, Ontario
Canada L4L 8Z7

CUSTOMER RSE

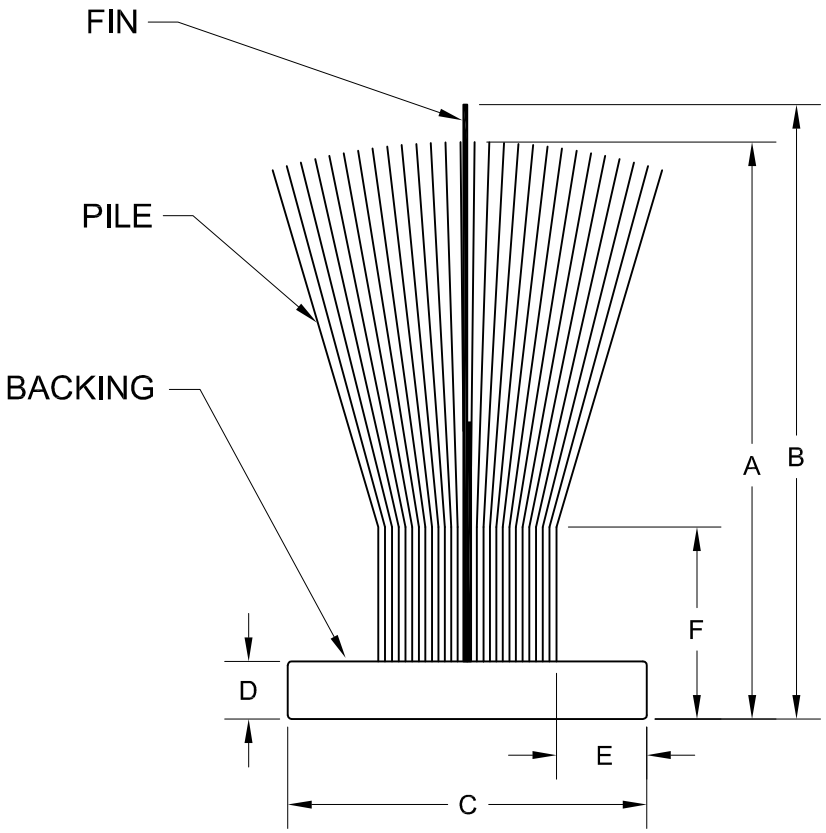
PROJECT: Sierra Classic SlimLine

TITLE ***Clam Shell Bead***

AREA = .0323 WT/FT = ..020

GLIDE FIT 187 FLATBACK

Ref	Description	Dimension	Tolerance
A	Pile Height	.300	+.010 -.005
B	Fin Height	.320	+/-.010
C	Backing Width	.187	+/-.005
D	Backing Thickness	.030	+/-.003
E	Centering	.040 MIN	REFERENCE
F	GlideFit	.100	REFERENCE



Intertek Architectural Testing

Report #: F4224

Date: 02/25/16

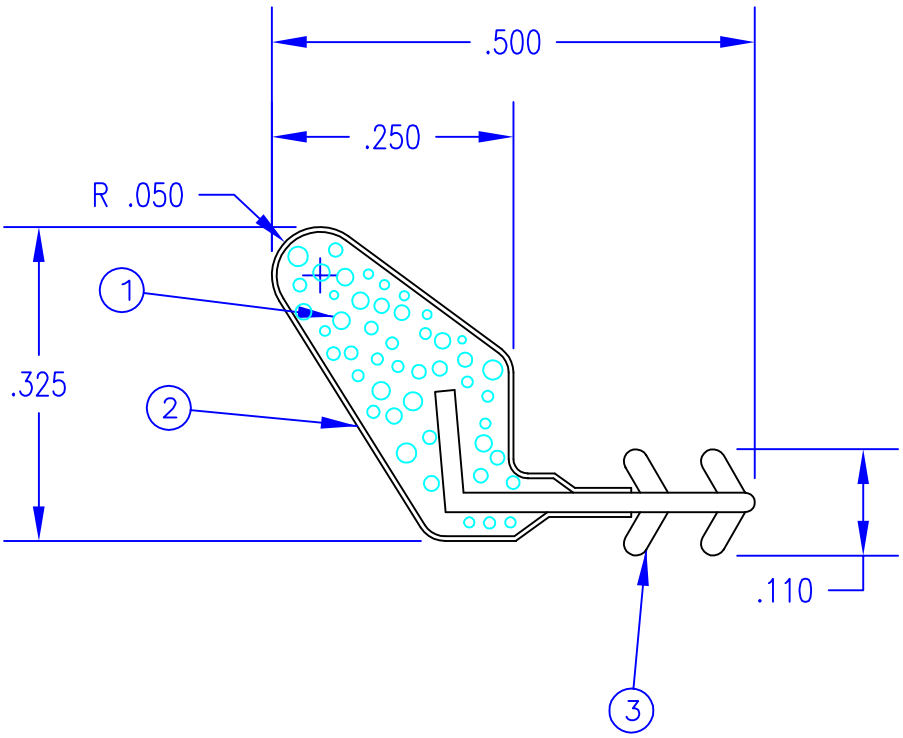
Verified by:

Mohair

DATE:	REVISION:	TITLE: GLIDE FIT 187 FLATBACK	DIMENSIONS ARE IN INCHES UNLESS INDICATED OTHERWISE TOLLERANCES-UNLESS INDICATED OTHERWISE Fractions ±1/64" Angles ±0.5° Decimals .X ±.020" .XX ±.010" .XXX ±.005"	Amesbury Truth Engineered Solutions. Trusted Results. 159 WALKER RD. STATESVILLE NC 28625
		DRAWN: JM CHECKED:		
		DATE: 1/15/16 SCALE: 10:1		
		MATERIAL: Polypropylene	DRAWING/PART No.: 30018745WHGF	REV.

ROCHESTER DIVISION PRODUCT PRINT

Revisions			
Lev	Description	Date	By
A	THIS PART SUPERSEDES UC302671	6/30/04	EJL
B			
C			



Intertek Architectural Testing

Report #: F4224
Date: 02/25/16
Verified by:

Foam
Weatherstripping/
Polyvinyl chloride

DO NOT SCALE THIS DRAWING
UNLESS PRINTER IS QUALIFIED

DE0021FM.dwg

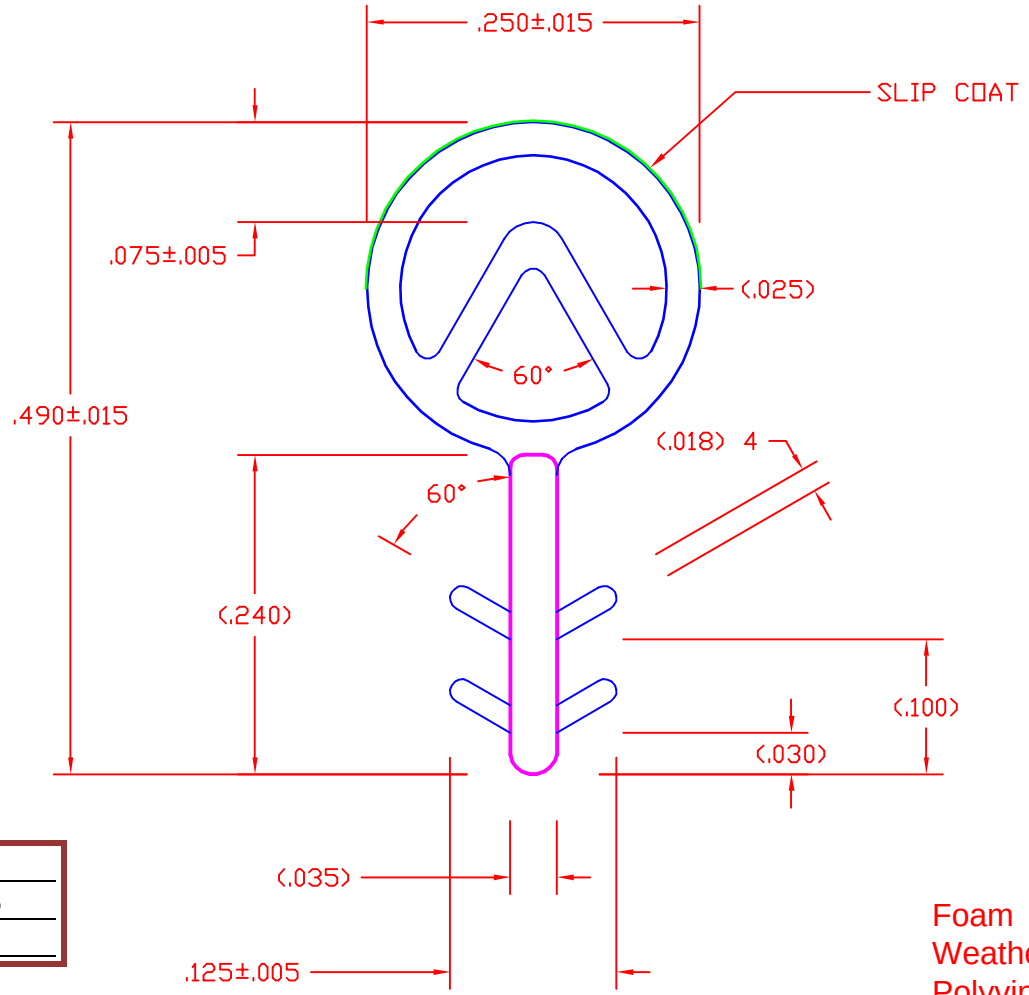
Item	R.M. Number	Material Description
4		
3	SEE B.O.M.	INSERT PC20819
2	SEE B.O.M.	PE LINER
1	SEE B.O.M.	URETHANE FOAM

DECIMAL DIMENSIONS ± _____
UNLESS OTHERWISE SPECIFIED
mm. ☒ Inch ☒

Date: 3/2/01
Sheet 1 of 1
Drawn Scale: 5 : 1
Approved:
Drawn: ED LEE
Title: QEZD-250

Cad File No. UC26711A
Part No. U35__-_____
Dwg. No. UC302671

REV	DESCRIPTION	ECR #



Foam
Weatherstripping/
Polyvinyl chloride

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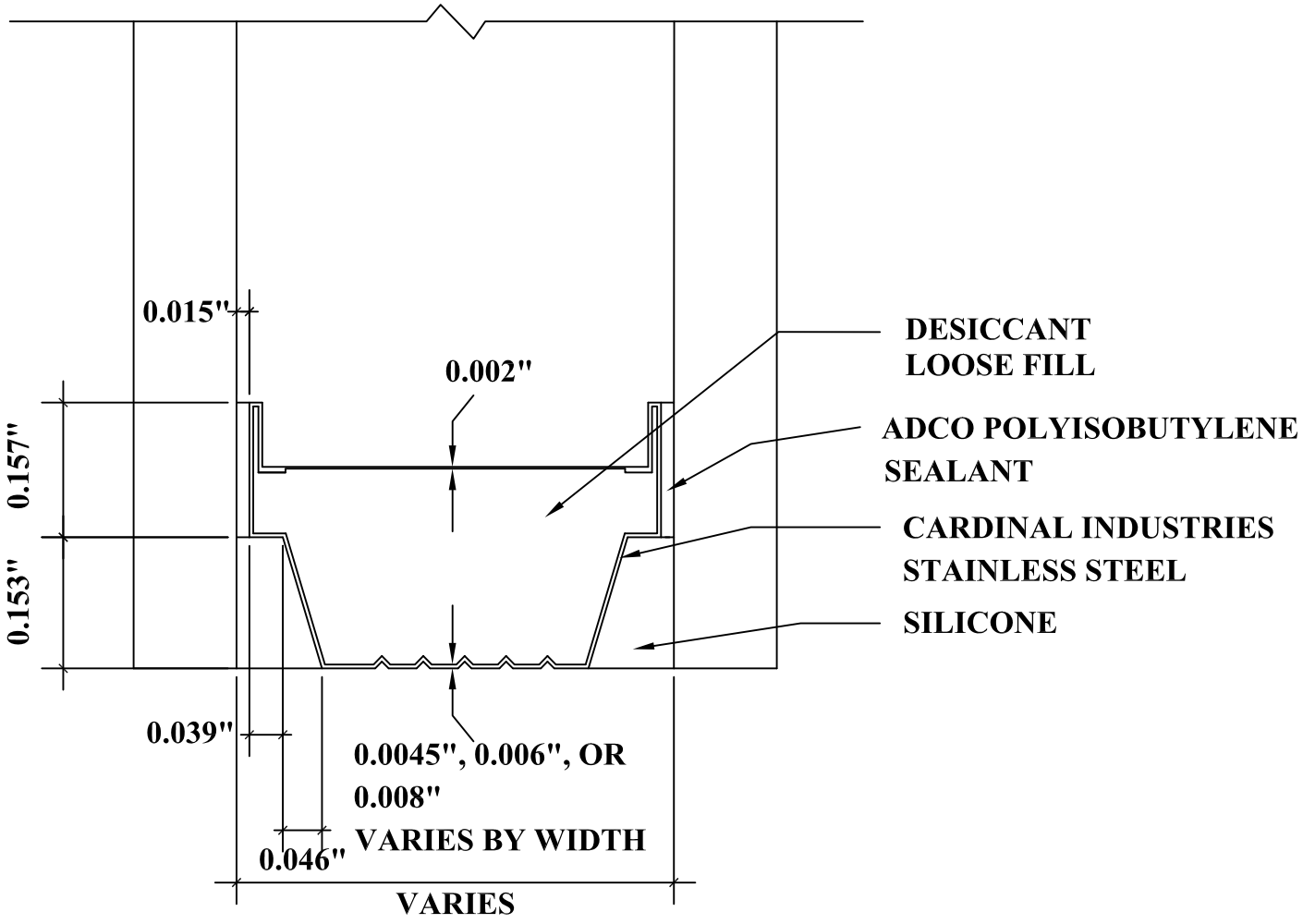
Report #: F4224
Date: 02/25/16
Verified by:

DRAWN CAB 02/01/12
CHECKED
ENGINEER
MAT'L: POLYPROPYLENE/TPE

ULTRAFAB
www.ultrafab.com
UCx DIVISION

1050 HOOK ROAD
FARMINGTON, NY 14425
PHN (585) 924-2186
FAX (585) 924-7680
WWW.ULTRAFAB.COM

TITLE E512
SIZE | DWG NO | REV
SCALE: DO NOT SCALE DRAWING | SHEET OF



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

Intertek
Architectural Testing

Report #: F4224
Date: 02/25/16
Verified by: