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NFRC U-FACTOR, SHGC, VT & CONDENSATION RESISTANCE COMPUTER SIMULATION REPORT FOR WINDSPEC INC. HORIZONTAL SLIDING STORM WINDOW "925 SERIES RS SIDE SLIDER"

Report to:	Windspec Inc. 1310 Creditstone Road Concord, ON L4K 5T7
Attention:	Oren Anava
Telephone: Fax:	905-738-8311 905-738-6188
Email:	oren@windspec.com
Original Report No.:	20-06-B0095-S1 7 Pages, 1 Appendix
Report Type:	New
Proposal No.:	20-006-173629
Original Issued Date:	July 23, 2020

1.0 INTRODUCTION

At the request of Windspec Inc., Element was retained to conduct U-factor, Solar Heat Gain Coefficient (SHGC), Visible Transmittance (*VT)* and Condensation Resistance* *(CR)* computer simulations of a horizontal sliding storm window unit identified as the "925 Series RS Side Slider". The computer simulation was conducted in accordance with the National Fenestration Rating Council (NFRC) as outlined in proposal number 20-006-173629

** The Condensation Resistance results obtained from this procedure are for controlled laboratory conditions and do not include the effects of air movement through the specimen, solar radiation, and the thermal bridging that may occur due to the specific design and construction of the fenestration system opening.*

Report Type:	New
Element Simulation No.:	20-06-B0095-S1
Window Type:	Horizontal Sliding Window
Series Model:	925 Series RS Side Slider
Simulation Window Size:	1500 mm (wide) x 1200 mm (high)
Simulation CR Cavity Height:	1100 mm
Frame Material / Finish:	AT (Aluminium frame members with thermal breaks)
Sash Material / Finish:	AL (Aluminium sash members – non-thermally broken)
Thermal Break Type:	P – Polyamide, double walled
Operator Type:	HSXX

Simulation Glazing Options Outline:

No.1: *Exterior Sash*: SG – 4 mm Guardian Clear - *Interior Sash*: SG - 4 mm Guardian Clear

No.2: *Exterior Sash*: SG - 4 mm Guardian Clear - *Interior Sash*: SG - 4 mm Pilkington EnergyAdvantage[2]

No.3: *Exterior Sash*: SG - 4 mm Guardian CrystalGray - *Interior Sash*: SG - 4 mm Guardian Clear

No.4: *Exterior Sash*: SG - 4 mm Guardian CrystalGray - *Interior Sash*: SG - 4 mm Pilkington EnergyAdvantage[2]

No.5: *Exterior Sash*: SG - 4 mm Guardian Clear - *Interior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear

No.6: *Exterior Sash*: SG - 4 mm Guardian Clear - *Interior Sash*: DG - 4 mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[4]

No.7: *Exterior Sash*: SG - 4 mm Guardian Clear - *Interior Sash*: DG - 4 mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear

No.8: *Exterior Sash*: SG - 4 mm Guardian CrystalGray - *Interior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear

No.9: *Exterior Sash*: SG - 4 mm Guardian CrystalGray - *Interior Sash*: DG - 4 mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[4]

No.10: *Exterior Sash*: SG - 4 mm Guardian CrystalGray - *Interior Sash*: DG - 4 mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear

No.11: *Exterior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / Guardian Clear - *Interior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear

No.12: *Exterior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / Guardian Clear - *Interior Sash*: DG - 4 mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[4]

No.13: *Exterior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR/ Guardian Clear - *Interior Sash*: DG - 4 mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear

No.14: *Exterior Sash*: DG - 4 mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - *Interior Sash*: DG - 4 mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear

No.15: *Exterior Sash*: DG - 4 mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - *Interior Sash*: DG – 4 mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington Energy Advantage[4]

No.16: *Exterior Sash*: DG - 4 mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - *Interior Sash*: DG - 4 mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear

Note: Square brackets, [#], denote surface layer of coating

Glazing Layers Created in Optics 6: No glazing layers created *(NFRC 303 & 304)*

Gas Fill and Method:

Gas Fill: Air
Gas Fill Method: N/A

Spacer Type:

Type: Technoform TGI® Spacer – Box
Code: TS-D (Thermoplastic spacer with stainless steel substrate - dual sealed)
Dimension (WxH), mm (in): 6.20 x 6.85 (0.244 x 0.270)
Primary Sealant: Polyisobutylene (PIB)
Secondary Sealant: Butyl, Hot Melt
Desiccant: Silica Gel – Loose Fill

Requested Grid Options (Using NFRC Standard Grid Pattern):

None

Glazing Method:

Glazing Method: Channel glazed with EPDM spline

Weatherstripping Configuration:

	Type:	Quantity Installed:	Location:
Sash:	Pile	2 Rows,	Rails and Pull Stile
	Pile	1 Rows	Meeting Stile

**Note: Assembly detatil drawings for the above simulationed window unit as provided by the manufacturer have been included in Appendix A.*

2.0 PROCEDURE

The Building Performance Centre at Element evaluated the above window in accordance with the procedures outlined in the following standards:

ANSI/NFRC 100-2017: Procedure for Determining Fenestration Product U-factors
ANSI/NFRC 200-2017: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
NFRC 500-2017: Procedure for Determining Fenestration Product Condensation Resistance Values

Software Employed:

- International Glazing Database Version: 72
- Frame and Edge Modelling Software: Therm Version: 7.4.4
- Centre of Glass Calculation Software: Window Version: 7.4.14
- Total Window Unit Calculation Software: Window Version: 7.4.14

Simulation Notes:

- Simulation Date: July 14, 2020
- Continuous Hardware Modelled: None
- Any model additions and removals: Modelled without interior wood jamb extensions
- The solar absorptance of dividers and frames is 0.3 for SHGC calculation, unless otherwise stated
- The exterior boundary condition used unless otherwise stated was ANSI/NFRC 100-2017.
- Grouping Details of Products: No

3.0 DETAILED SIMULATION RESULTS

NFRC 100-2017, 200-2017 & 500-2017 Simulation Summary

Manufacturer: Windspec Inc.
Element Report Number: 20-06-B0095-1
Product Series / Model: 925 Series RS Side Slider
Window 7.4 File Name: 20-06-B0095-1S 925 DS
Date: 2020.07.14
Simulation Revision No.:

Operator Type: Horizontal Slider Storm Window (HSXX)
Simulation Window Size: 1500 Width (mm) x 1200 Height (mm)
Frame Type: AT - Anodized Aluminum with Thermal Breaks
Sash Type: AL - Anodized Aluminum (non-thermally broken)
Thermal Break Type: P - Polyamide, double Walled
Simulation Laboratory Code: SEVA (NFRC)

Product Code	Glazing Option ID Number	Grouping ID Number	Total IGU Thickness, Sash 1 (mm)	Total IGU Thickness, Sash 1 (in)	Total IGU Thickness, Sash 2 (mm)	Total IGU Thickness, Sash 2 (in)	Exterior Sash Pane #1 Thickness (mm)	Exterior Sash Pane #1 Thickness (in)	Exterior Sash Pane #2 Thickness (mm)	Exterior Sash Pane #2 Thickness (in)	Interior Sash Pane #1 Thickness (mm)	Interior Sash Pane #1 Thickness (in)	Interior Sash Pane #2 Thickness (mm)	Interior Sash Pane #2 Thickness (in)	Exterior Sash Gap Space (mm)	Exterior Sash Gap Space (in)	Interior Gap Space (mm)	Interior Gap Space (in)	Gas Information: Exterior Gas Fill	Gas Information: Interior Gas Fill	Gas Information: % of Gas Fill 1	Gas Information: % of Gas Fill 2	Interior Sash Emissivity: Surface 2	Surface 3	Surface 4	Surface 5	Surface 6	Spacer Type	Tint	C-O-G U-Factor (W/m²-K)	C-O-G U-Factor (Btu/h.ft².F)	C O G SHGC	C-O-G VT	Grid Type	Grid Size (in)	Total Product U-Factor (W/m²-K)	Total Product U-Factor (Btu/h.ft².F)	CR-Value	SHGC NO GRID	SHGC GRID<1"	SHGC GRID >= 1"	VT NO GRID	VT GRID < 1"	VT GRID >= 1"
1[A]	1		4.00	0.157	4.00	0.157	4.00	0.157			4.00	0.157		0.000				0.000												2.78	0.49	0.77	0.82	N	-	3.15	0.56	47	0.58	-	-	0.60	-	-
2[A]	2		4.00	0.157	4.00	0.157	4.00	0.157			4.00	0.157		0.000				0.000					0.184						GRY	2.06	0.362	0.70	0.78	N	-	2.61	0.46	30	0.52	-	-	0.58	-	-
3[A]	3		4.00	0.157	4.00	0.157	4.00	0.157			4.00	0.157		0.000				0.000												2.78	0.49	0.62	0.65	N	-	3.15	0.56	47	0.46	-	-	0.48	-	-
4[A]	4		4.00	0.157	4.00	0.157	4.00	0.157			4.00	0.157		0.000				0.000					0.184						GRY	2.06	0.362	0.56	0.60	N	-	2.61	0.46	30	0.42	-	-	0.44	-	-
5[B]	5		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR										1.95	0.344	0.70	0.74	N	-	2.56	0.45	46	0.52	-	-	0.55	-	-
6[B]	6		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR					0.164					1.54	0.271	0.65	0.70	N	-	2.26	0.40	40	0.49	-	-	0.52	-	-
7[B]	7		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR			0.039							1.55	0.273	0.42	0.63	N	-	2.31	0.41	44	0.32	-	-	0.46	-	-
8[B]	8		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR									GRY	1.95	0.344	0.56	0.59	N	-	2.56	0.45	46	0.42	-	-	0.43	-	-
9[B]	9		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR					0.164				GRY	1.25	0.22	0.49	0.52	N	-	1.82	0.32	51	0.37	-	-	0.38	-	-
10[B]	10		4.00	0.157	14.29	0.563	4.00	0.157			4.00	0.157	4.00	0.157			6.29	0.248		AIR			0.039						GRY	1.55	0.273	0.35	0.50	N	-	2.31	0.41	44	0.27	-	-	0.37	-	-
11[C]	11		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR										1.51	0.265	0.63	0.68	N	-	2.20	0.39	51	0.47	-	-	0.50	-	-
12[C]	12		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR					0.164					1.03	0.181	0.57	0.60	N	-	1.62	0.29	57	0.43	-	-	0.44	-	-
13[C]	13		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR				0.039						1.28	0.225	0.41	0.57	N	-	2.05	0.36	50	0.31	-	-	0.42	-	-
14[C]	14		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR									GRY	1.51	0.265	0.50	0.54	N	-	2.20	0.39	51	0.38	-	-	0.40	-	-
15[C]	15		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR					0.164				GRY	1.24	0.215	0.46	0.51	N	-	2.01	0.35	49	0.35	-	-	0.37	-	-
16[C]	16		14.29	0.563	14.29	0.563	4.00	0.157	4.00	0.157	4.00	0.157	4.00	0.157	6.29	0.248	6.29	0.248	AIR	AIR				0.039					GRY	1.28	0.225	0.34	0.45	N	-	2.05	0.36	50	0.26	-	-	0.33	-	-

Glazing Options:

1 Exterior Sash: SG 4mm Guardian Clear - Interior Sash: SG 4mm Guardian Clear
2 Exterior Sash: SG 4mm Guardian Clear - Interior Sash: SG 4mm Pilkington EnergyAdvantage[2]
3 Exterior Sash: SG 4mm Guardian CrystalGray - Interior Sash: SG 4mm Guardian Clear
4 Exterior Sash: SG 4mm Guardian CrystalGray - Interior Sash: SG 4mm Pilkington Energy Advantage[2]
5 Exterior Sash: SG 4mm Guardian Clear - Interior Sash: DG - 4mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear
6 Exterior Sash: SG 4mm Guardian Clear - Interior Sash: DG - 4mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[1]
7 Exterior Sash: SG 4mm Guardian Clear - Interior Sash: DG - 4mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear
8 Exterior Sash: SG 4mm Guardian CrystalGray - Interior Sash: DG 4mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear
9 Exterior Sash: SG 4mm Guardian CrystalGray - Interior Sash: DG 4mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[1]
10 Exterior Sash: SG 4mm Guardian CrystalGray - Interior Sash: DG 4mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear
11 Exterior Sash: DG 4mm Guardian Clear / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear
12 Exterior Sash: DG 4mm Guardian Clear / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington EnergyAdvantage[4]
13 Exterior Sash: DG 4mm Guardian Clear / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Guardian SN68[2] / 6.3 mm AIR / 4 mm Guardian Clear
14 Exterior Sash: DG 4mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Guardian Clear / 6.3 mm AIR / 4 mm Guardian Clear
15 Exterior Sash: DG 4mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Pilkington Clear / 6.3 mm AIR / 4 mm Pilkington Energy Advantage[1]
16 Exterior Sash: DG 4mm Guardian CrystalGray / 6.3 mm AIR / Guardian Clear - Interior Sash: DG - 4mm Guardian SN68[2] / 6.3 mm AIR / 4mm Guardian Clear

Divider Options: None

Spacer Options:
TS-D Thermoplastic;polypropylene;with stainless steel substrate, dual sealed

Frame Options:
(A) AP - Anodized Aluminum Alloy - partially thermally broken, Single - Single Glazed Sash Configuration
(B) AP - Anodized Aluminum Alloy - partial thermally broken, Single - Double Glazed Sash Configuration
(C) AP - Anodized Aluminum Alloy - partial thermally broken, Double - Double Glazed Sash Configuration

REV1- 2014-08-20

4.0 TERMS AND CONDITIONS

This report is related only to the fenestration product simulated and shall not be reproduced, except in full, without the approval of Element Canada Inc.

Ratings values included in this report are for submittals to an NFRC licensed IA and are not meant to be used directly for labeling purposes. Only those values identified on a valid Certificate of Authorization (CA) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes.

The values stated in this reported were rounded as per NFRC 601, NFRC Unit and Measurement Policy.

5.0 REPORT REVISION SUMMARY

Report No:	**Date:**	**Description of Revisions:**
20-06-B0095-S1	July 23, 2020	Original report

Reviewed by:

Jordan M. Church, B.Tech, Ext. 11546
Operations Manager
Building Science & Fire Testing

Simulated & Authorized by:

Scott Hallam, B.Eng. Ext 11511
Building Systems Specialist, Building Systems Simulator-In-Responsible Charge
Building Science Division

APPENDIX A

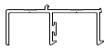
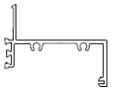
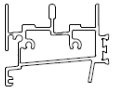
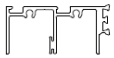
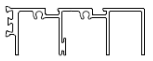
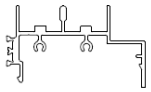
Simulation Detail Drawings Supplied by Windspec Inc.
(Reviewed and Authorized by Element)

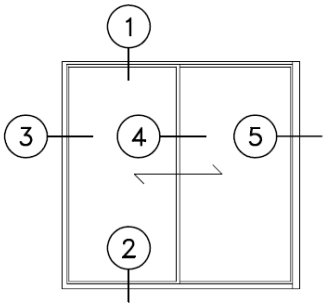
(6 Pages)

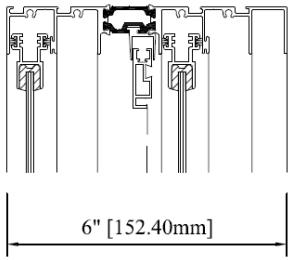
Note: Dimensioned profile details were not provided and thermal modeling was conducted using supplied AutoCAD assemblies.

SERIES 925 RS (rain screen) SIDE SLIDER TYPE 1

element APPROVED

#	PROFILE	DESCRIPTION	DIE #
1		SUSH RAIL	W-92005
2		MEET RAIL	W-92006
3		PULL RAIL	W-92007
4		EXTERIOR JAMB ADAPTOR LEFT SIDE	W-92010
5		INTERIOR JAMB ADAPTOR RIGHT SIDE	W-92011
6		EXTERIOR JAMB ADAPTOR RIGHT SIDE	W-92012
7		CENTER SCREEN	W-92027
8		EXTERIOR MALE	W-92504
9		EXTERIOR SLIDER SILL	W-92507
10		EXTERIOR S.S HEAD	W-92509
11		INTERIOR MALE	W-92601
12		INTERIOR HEAD	W-92605
13		INTERIOR SLIDER SILL	W-92606





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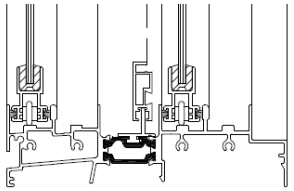

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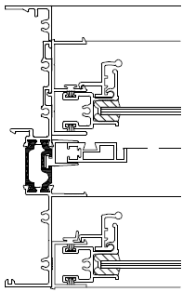

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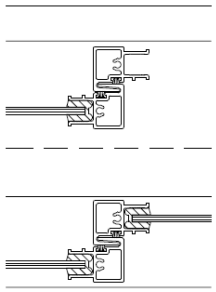

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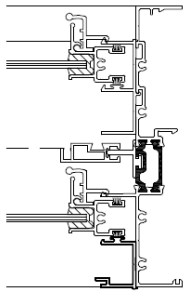


5

WINDSPEC INC.
Telephone (905) 738 -8311
Fax (905) 738 - 6188

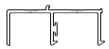
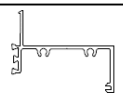
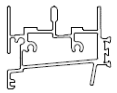
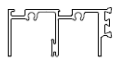
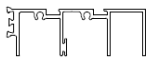
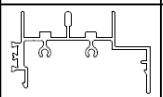
DESCRIPTION :	DRAWING NO. :
925RS SERIES WINDOW	001

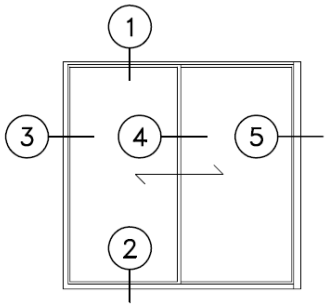
element

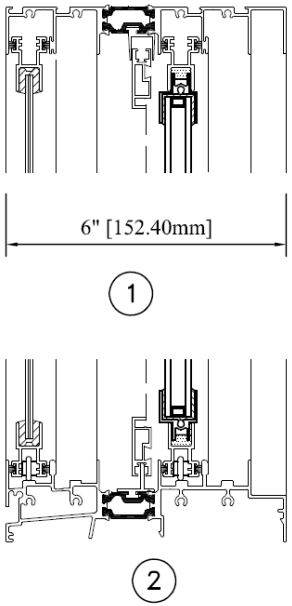
SERIES 925 RS (rain screen) SIDE SLIDER TYPE 2

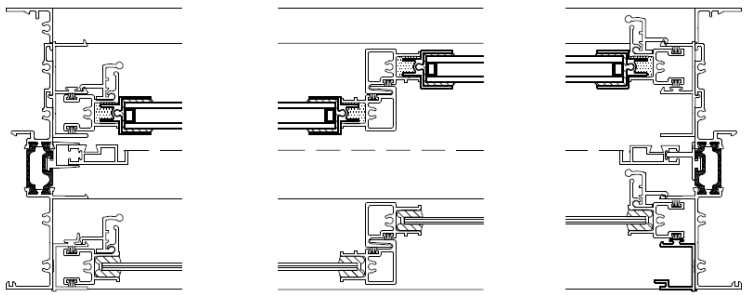
element

APPROVED

#	PROFILE	DESCRIPTION	DIE #
1		SUSH RAIL	W–92005
2		MEET RAIL	W–92006
3		PULL RAIL	W–92007
4		EXTERIOR JAMB ADAPTOR LEFT SIDE	W–92010
5		INTERIOR JAMB ADAPTOR RIGHT SIDE	W–92011
6		EXTERIOR JAMB ADAPTOR RIGHT SIDE	W–92012
7		CENTER SCREEN	W–92027
8		S/U SASH ADAPTOR	W–92028
9		EXTERIOR MALE	W–92504
10		EXTERIOR SLIDER SILL	W–92507
11		EXTERIOR S.S HEAD	W–92509
12		INTERIOR MALE	W–92601
13		INTERIOR HEAD	W–92605
14		INTERIOR SLIDER SILL	W–92606







WINDSPEC INC.
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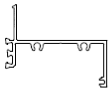
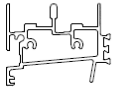
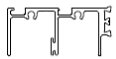
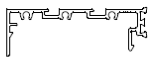
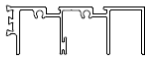
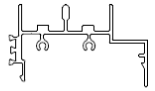
DESCRIPTION : 925RS SERIES WINDOW

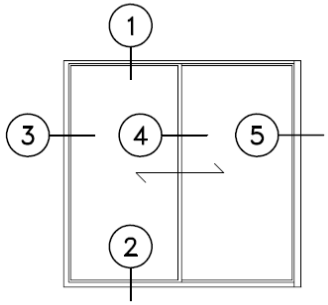
DRAWING NO. : 002

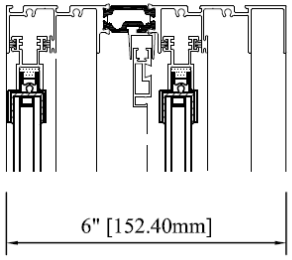
element

SERIES 925 RS (rain screen) SIDE SLIDER TYPE 3

element APPROVED

#	PROFILE	DESCRIPTION	DIE #
1		SUSH RAIL	W–92005
2		MEET RAIL	W–92006
3		PULL RAIL	W–92007
4		EXTERIOR JAMB ADAPTOR LEFT SIDE	W–92010
5		INTERIOR JAMB ADAPTOR RIGHT SIDE	W–92011
6		EXTERIOR JAMB ADAPTOR RIGHT SIDE	W–92012
7		CENTER SCREEN	W–92027
8		S/U SASH ADAPTOR	W–92028
9		EXTERIOR MALE	W–92504
10		EXTERIOR SLIDER SILL	W–92507
11		EXTERIOR S.S HEAD	W–92509
12		INTERIOR MALE	W–92601
13		INTERIOR HEAD	W–92605
14		INTERIOR SLIDER SILL	W–92606





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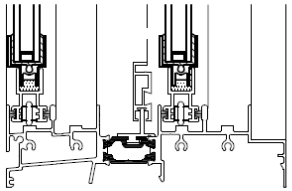

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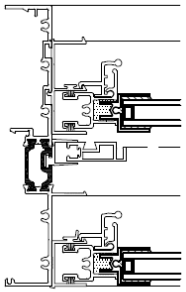

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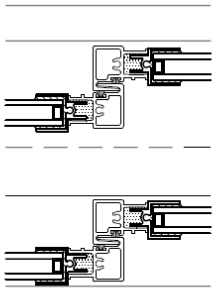

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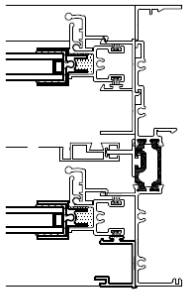

5

WINDSPEC INC.
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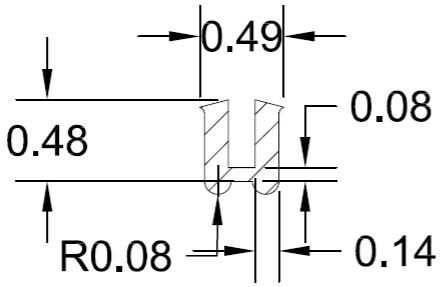
DESCRIPTION : 925RS SERIES WINDOW

DRAWING NO. : 003

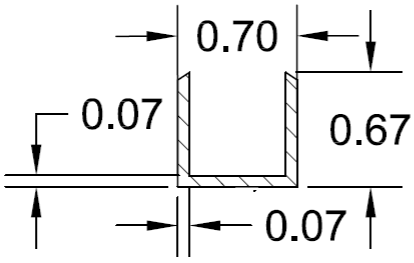
element

Drawing Dimensions Sourced from Provided Autocad Model by Element (S.H)

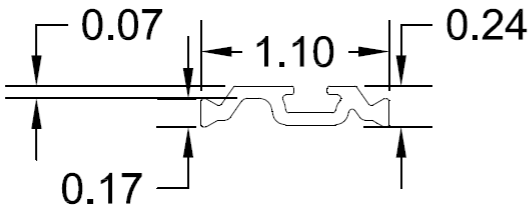
element APPROVED



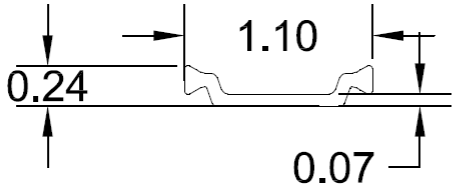
Single Glazed Spline (EPDM)



Dual Glazed Spline (EPDM)



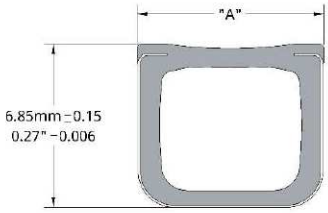
Frame Thermal Break (Polyamide)



Frame Thermal Break (Polyamide)

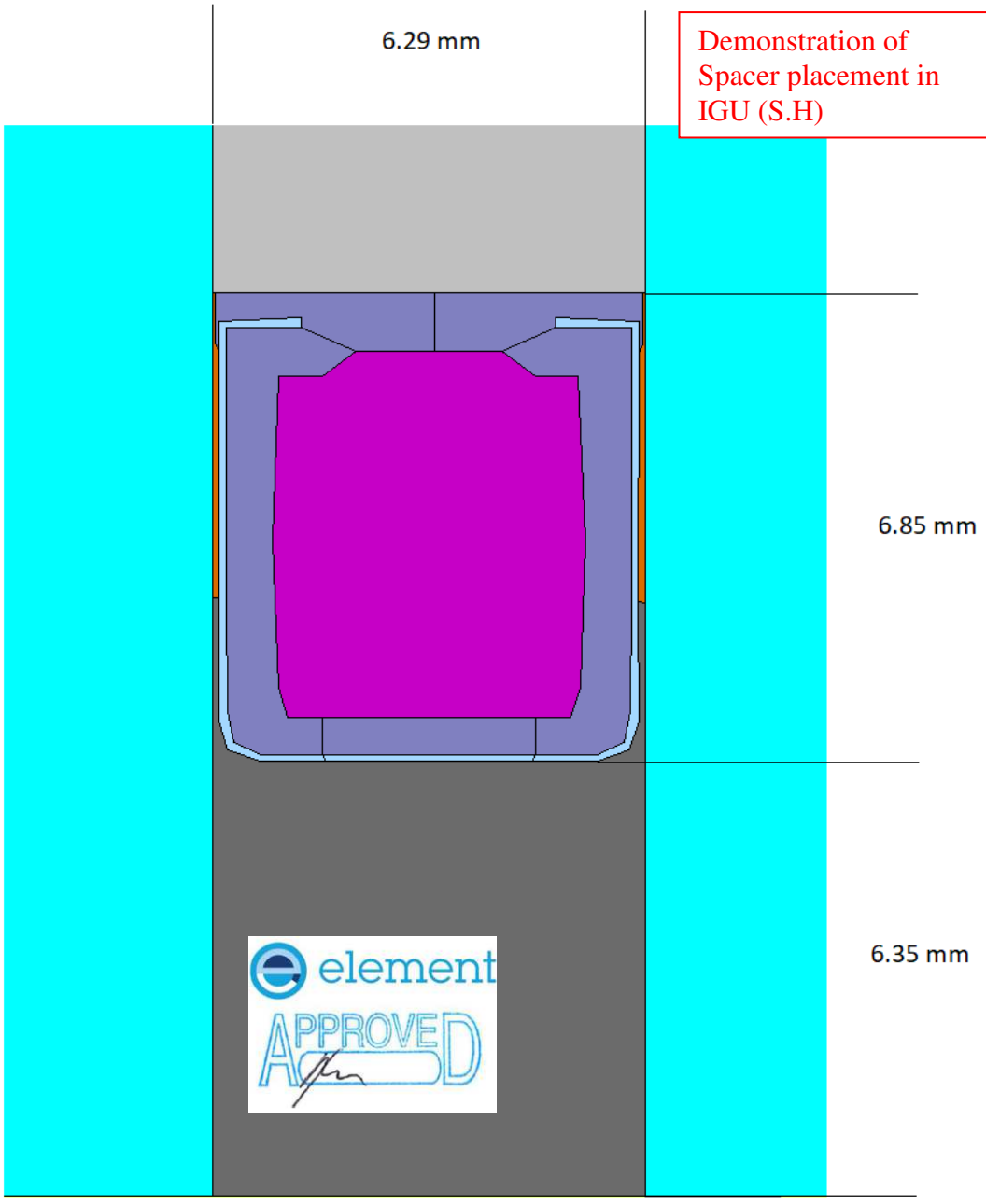
TECHNOFORM

TGI®-Spacer box width measurement



TGI-Spacer "box" widths, part numbers and packaging

Size (inches/MM)	Inches "A" width decimal tolerance: ±0.006"	Millimeters "A" width decimal tolerance: ±0.15mm	TGI Spacer part number	Spacer pieces/box	13' (156") feet/box	16.42' (197") feet/box	19' (228") feet/box
1/4"	0.2441	6.20	IS0104	323	4,199	5,303	6,137
5/16"	0.3067	7.79	IS0516	255	3,315	4,187	4,845
3/8"	0.3693	9.38	IS0308	204	2,652	3,349	3,876


6.29 mm
Demonstration of Spacer placement in IGU (S.H)
6.85 mm
6.35 mm
element
APPROVED