



NFRC SIMULATION REPORT

Project Name: Metro Glass Products - Thermal - Total

U-Factor Calculation

Project Number: 1256 – 18193

Simulation Date: 06 June 2025 Report Date: 06 June 2025

Revision #: R0

Name/Number	Туре
2020HP	GWCW
2025HP	GWCW

Fenestration Metro Glass Products

Product Supplier: 108, 1626 115 Ave NE, Calgary, AB T3K 2E4, Canada

Attn: Drew McLaughlin

	Layton Consulting Employee Name	Signature
Simulation by:	Jack Hardy, Thermal Analyst	SH
Reviewed by:	Taylor Wight, P.Eng., LEAFF NFRC Certified Simulator	The design of the second



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Product Model	^{s:} 2020HP an	Client: Metro Glass	s Products		
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GENERAL NOTES

Disclaimers

- This report shall not be reproduced, neither in part nor in full, without the approval of Layton Consulting Ltd.
- Thermal simulations were conducted following NFRC Thermal Simulation procedures as well as CSA-A440.2-19 *Fenestration Energy Performance*.
- Simulation was completed using NFRC approved software THERM 7.8 and WINDOW 7.8.
- This report relates only to the fenestration products simulated and are based on the CAD files and information provided by the client. Layton Consulting Ltd. does not verify that all the provided information is current and accurate to what is installed.
- Thermal simulation models may require some minor modifications made by the simulator, relative to the provided drawings, to account for software limitations.
- Rounding is per NFRC 601, NFRC Unit and Measurement Policy.
- Component values included in this report are not meant to be used directly for labelling purposes. Only those values approved and identified on a valid CMA Label Certificate are to be used for labelling purposes.

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GLAZING, CLADDING, & SPECIALTY STRUCTURAL ENGINEERING Suite 233 - 18525 53 rd Ave., Surrey, BC, Canada, V3S 7A4	Product Model	s: 2020HP and	P	Client: Metro Glass Products		
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PRODUCT LINE DESCRIPTION AND MATERIAL PROPERTIES

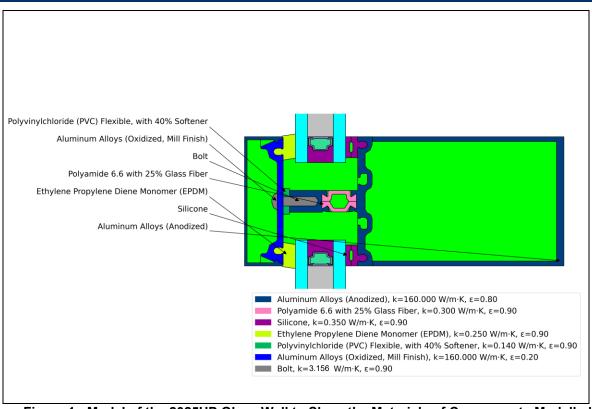


Figure 1: Model of the 2025HP Glass Wall to Show the Materials of Components Modelled

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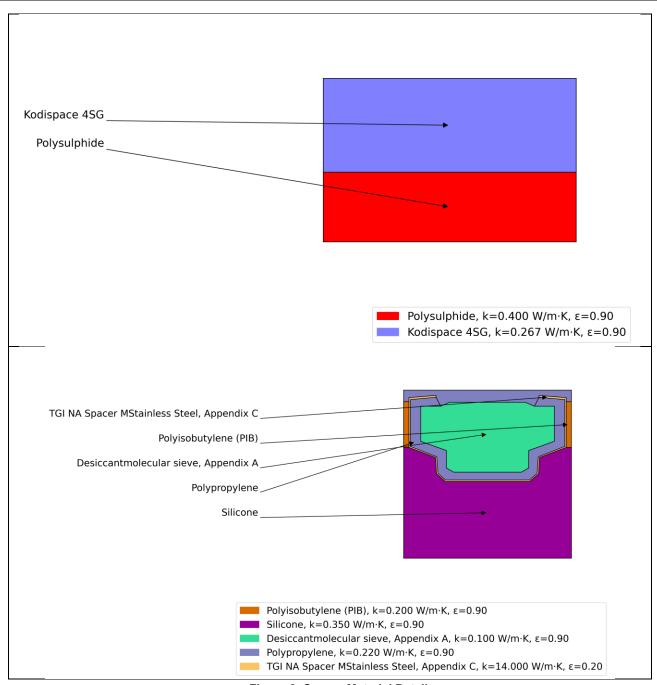


Figure 2: Spacer Material Details



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Insulated Glazing Unit (IGU) Details:

G1: J-CLR-PDE80A-6 (Surface #2, ε = 0.057) / 12.7mm Air (5%) - Argon (95%) Mix / Generic Clear Glass (Total Thickness = 24.3mm)

G2: Solarban® 60 on Clear 6mm (Surface #2, ε = 0.035) / 12.7mm Air (10%) - Argon (90%) Mix / Clear 6mm (Total Thickness = 24mm)

G3: J-CLR-PDE80A-6 (Surface #2, ε = 0.057) / 12.7mm Air (5%) - Argon (95%) Mix / J-CLR-PDE80A-6 (Surface #4, ε = 0.057) / 12.7mm Air (5%) - Argon (95%) Mix / Generic Clear Glass (Total Thickness = 42.8mm)

G4: LoE² 272 on 6 mm Clear (Surface #2, ε = 0.042) / 12.7mm Air (10%) - Argon (90%) Mix / Generic Clear Glass (Total Thickness = 24.1mm)

RATING FRAME SIZES

The standard NFRC sizes for curtainwall windows was used, the standard size is 2000 x 2000 mm (78.74 x 78.74 in). That standard size consists of half frames used around the perimeter, as well as a full vertical frame in the centre as shown in the figure below (taken from the NFRC 2024 Simulation manual Section 8.9.1).

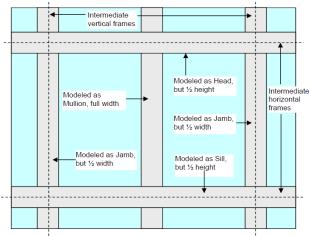


Figure 8-88. Curtain wall simulation model (represented by dotted lines) for rating, where the framing members are modeled at half their width.

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RESULTS

The windows are modelled following NFRC procedures and the results are summarized in Table 2:

<u>Table 1: Thermal Modelling Result – Overall Project Fenestration U-Factor</u>

	Product	Frame		Glazing	Width x Height	U-Value	U-Value		
Product Name	Type	Туре	Spacer Type	Туре	(mm)	(W/m²-K)	(Btu/h-ft²-°F)	SHGC	VT
HP2020 2.75in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.74	0.31	0.37	0.64
HP2020 2.75in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.77	0.31	0.36	0.65
HP2020 2.75in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.12	0.20	0.29	0.51
HP2020 2.75in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.78	0.31	0.38	0.64
HP2020 4in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.76	0.31	0.37	0.64
HP2020 4in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.79	0.32	0.36	0.65
HP2020 4in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.14	0.20	0.29	0.51
HP2020 4in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.81	0.32	0.38	0.64
HP2020 5.25in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.78	0.31	0.37	0.64
HP2020 5.25in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.81	0.32	0.36	0.65
HP2020 5.25in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.15	0.20	0.29	0.51
HP2020 5.25in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.83	0.32	0.38	0.64
HP2025 2.75in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.76	0.31	0.36	0.63
HP2025 2.75in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.78	0.31	0.36	0.64
HP2025 2.75in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.14	0.20	0.29	0.50
HP2025 2.75in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.79	0.32	0.37	0.63
HP2025 4in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.77	0.31	0.36	0.63
HP2025 4in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.80	0.32	0.36	0.64
HP2025 4in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.16	0.20	0.29	0.50
HP2025 4in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.81	0.32	0.37	0.63
HP2025 5.25in	GWCW	AT	Kodispace 2SG	G1	2000 x 2000	1.78	0.31	0.36	0.63
HP2025 5.25in	GWCW	AT	TGI Spacer M	G2	2000 x 2000	1.82	0.32	0.36	0.64
HP2025 5.25in	GWCW	AT	Kodispace 2SG	G3	2000 x 2000	1.18	0.21	0.29	0.50
HP2025 5.25in	GWCW	AT	TGI Spacer M	G4	2000 x 2000	1.83	0.32	0.37	0.63

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APPENDIX





Figure 3: NFRC Certification of Laboratory and Simulator - Taylor Wight



Product Models: GLAZING, CLADDING, & SPECIALTY STRUCTURAL ENGINEERING Suite 233 - 18525 53rd Ave., Surrey, BC, Canada, V3S 7A4

Project:

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Client:

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Metro Glass Products - Total U-Factor

Calculation

2020HP and 2025HP Metro Glass Products

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	IGU Name: G1								
	ID	Name	Thick	Surf	Tsol	Tvis	Е	Source	
Glass 1	6540	J-CLR-PDE80A-6.TGI	5.86	2	0.400666	0.784053	0.056667	IGDB v100.0	
Gap 1	6	Air (5%) - Argon (95%) Mix	12.7						
Glass 2	103	CLEAR_6.DAT	5.715		0.770675	0.883647		IGDB v11.4	
Overall Thickness (mm): 24.275									

IGU Name: G2								
	ID	Name	Thick	Surf	Tsol	Tvis	Е	Source
Glass 1	5284	SB60 Clear_6.VTA	5.6642	2	0.395717	0.791371	0.034606	IGDB v58.0
Gap 1	9	Air (10%) - Argon (90%) Mix	12.7					
Glass 2	5012	Clear_6.VTA	5.6642		0.770509	0.886115		IGDB v56.0
		Overall Thickness (mm):	24.028					

	IGU Name: G3							
	ID	Name	Thick	Surf	Tsol	Tvis	Е	Source
Glass 1	6540	J-CLR-PDE80A-6.TGI	5.86	2	0.400666	0.784053	0.056667	IGDB v100.0
Gap 1	6	Air (5%) - Argon (95%) Mix	12.7					
Glass 2	6540	J-CLR-PDE80A-6.TGI	5.86	4	0.400666	0.784053	0.056667	IGDB v100.0
Gap 2	6	Air (5%) - Argon (95%) Mix	12.7					
Glass 3	103	CLEAR_6.DAT	5.715		0.770675	0.883647		IGDB v11.4
Overall Thickness (mm):								

	IGU Name: G4								
	ID	Name	Thick	Surf	Tsol	Tvis	Е	Source	
Glass 1	2014	LoE272-6.CIG	5.7	2	0.411298	0.779911	0.04191	IGDB v97.0	
Gap 1	9	Air (10%) - Argon (90%) Mix	12.7						
Glass 2	103	CLEAR_6.DAT	5.715		0.770675	0.883647		IGDB v11.4	
		Overall Thickness (mm):	24.115						

Figure 4: IGU Composition Details



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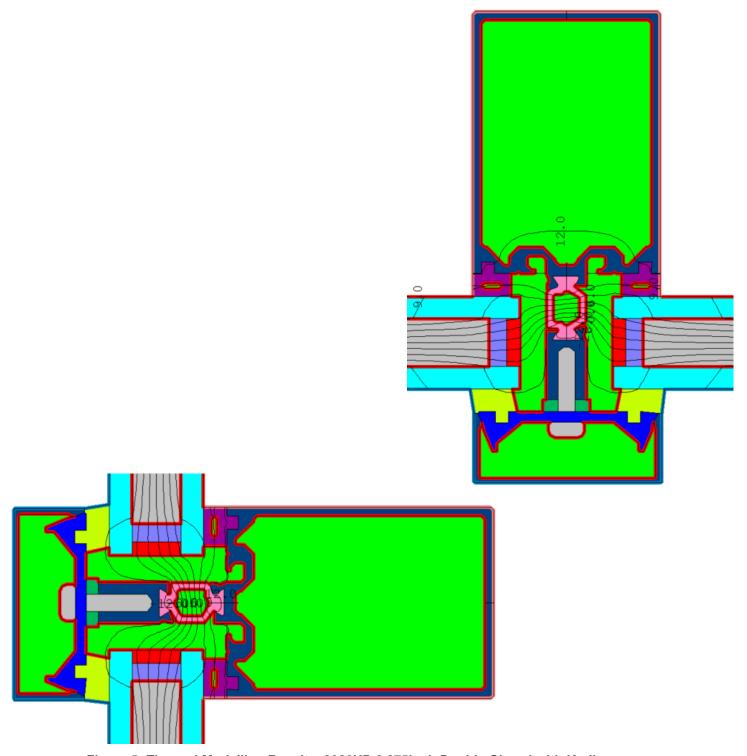


Figure 5: Thermal Modelling Result – 2020HP 2.875inch Double Glazed with Kodispacer



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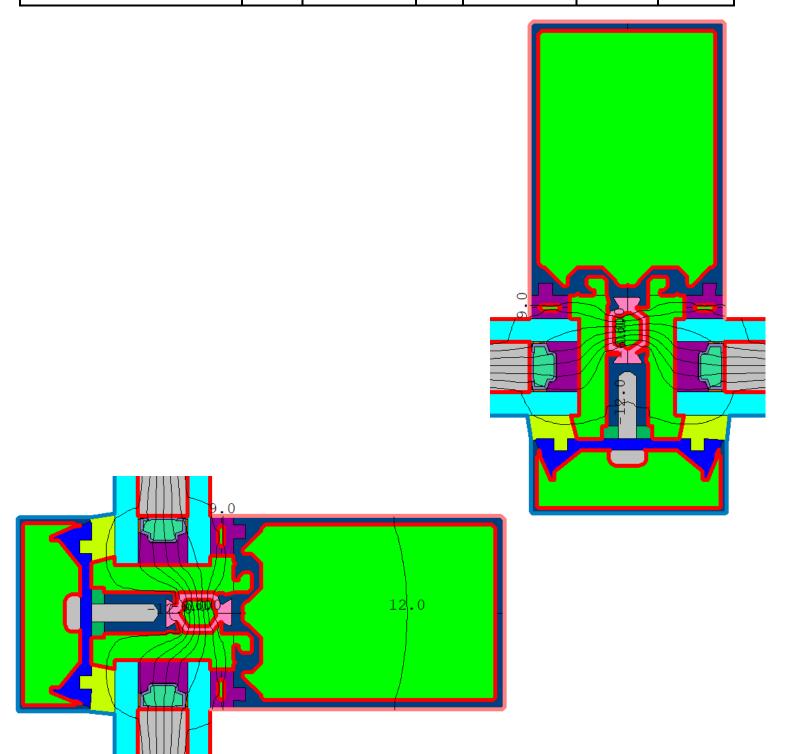


Figure 6: Thermal Modelling Result – 2020HP 2.875inch Double Glazed with TGI Spacer



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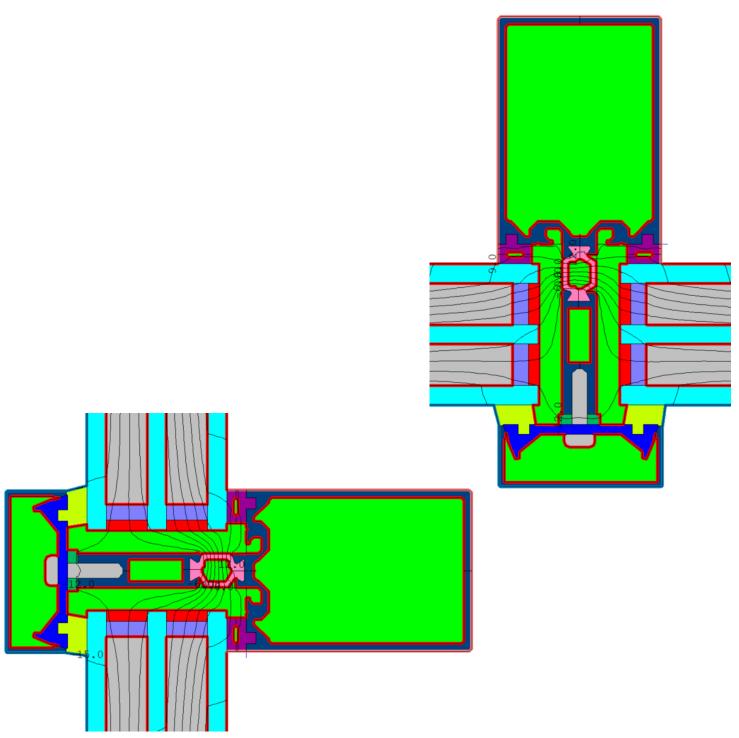
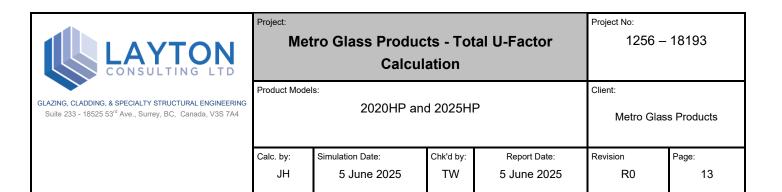


Figure 7: Thermal Modelling Result – 2020HP 2.875inch Triple Glazed



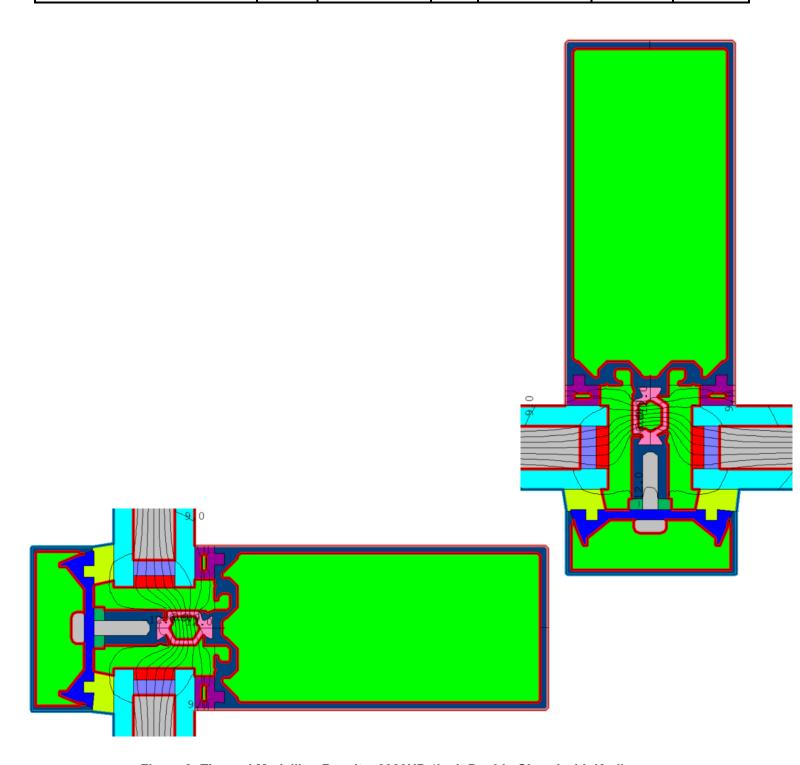
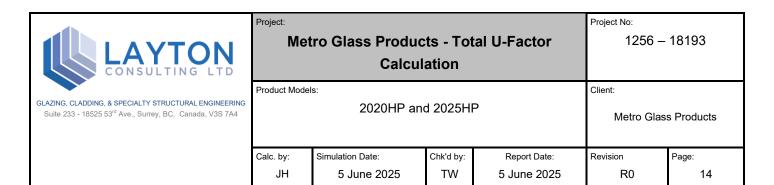


Figure 8: Thermal Modelling Result – 2020HP 4inch Double Glazed with Kodispacer



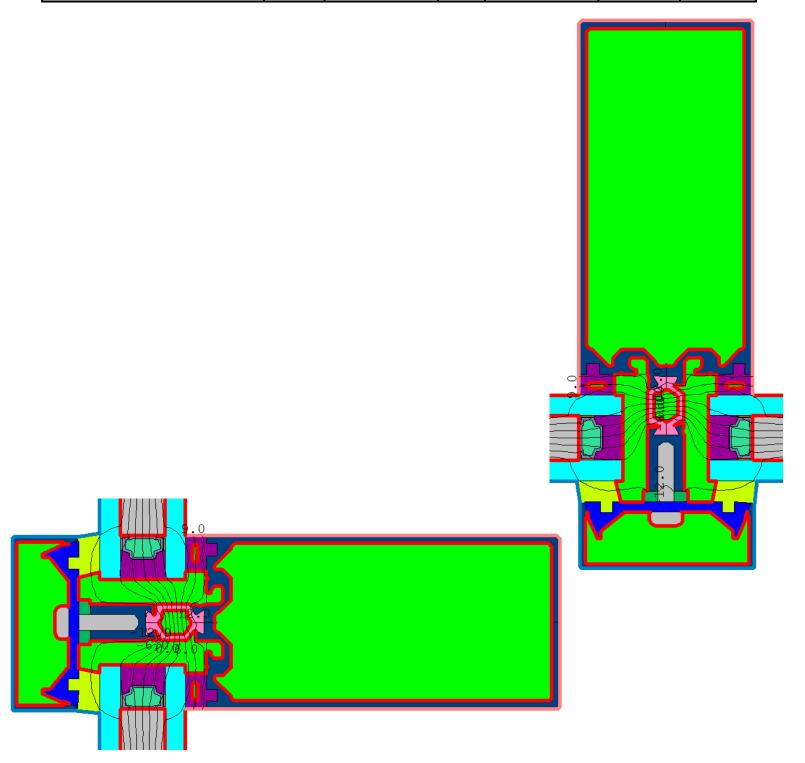
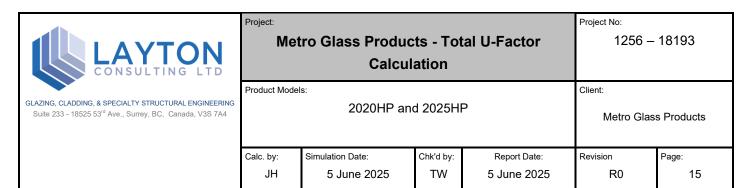


Figure 9: Thermal Modelling Result - 2020HP 4inch Double Glazed with TGI Spacer



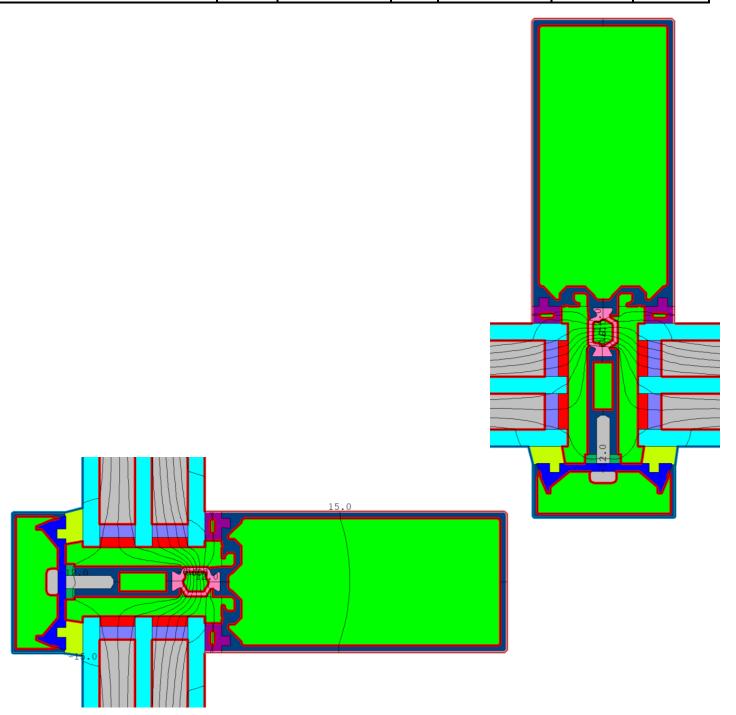


Figure 10: Thermal Modelling Result – 2020HP 4inch Triple Glazed



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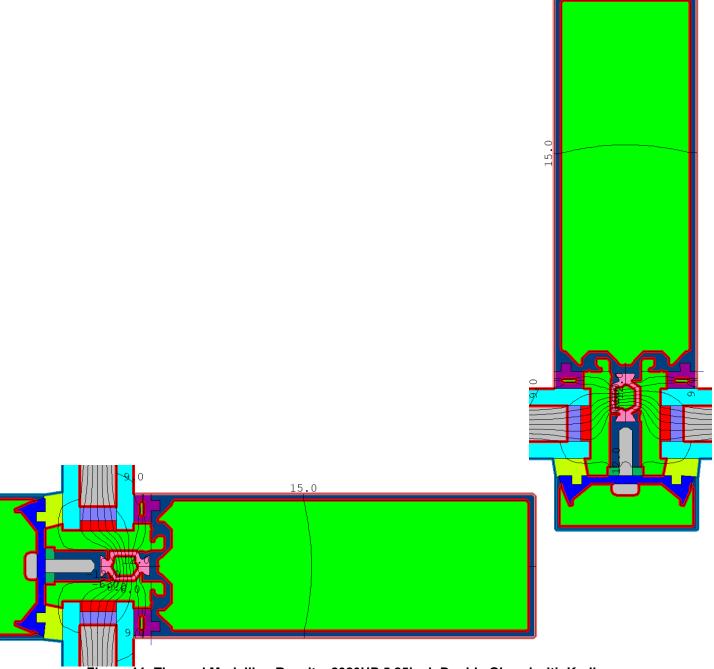
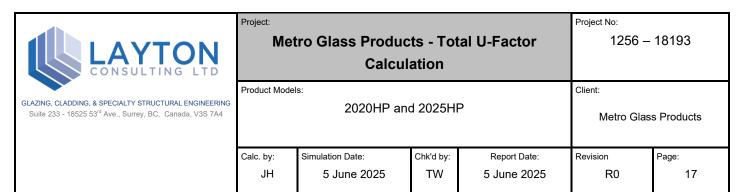


Figure 11: Thermal Modelling Result – 2020HP 5.25inch Double Glazed with Kodispacer



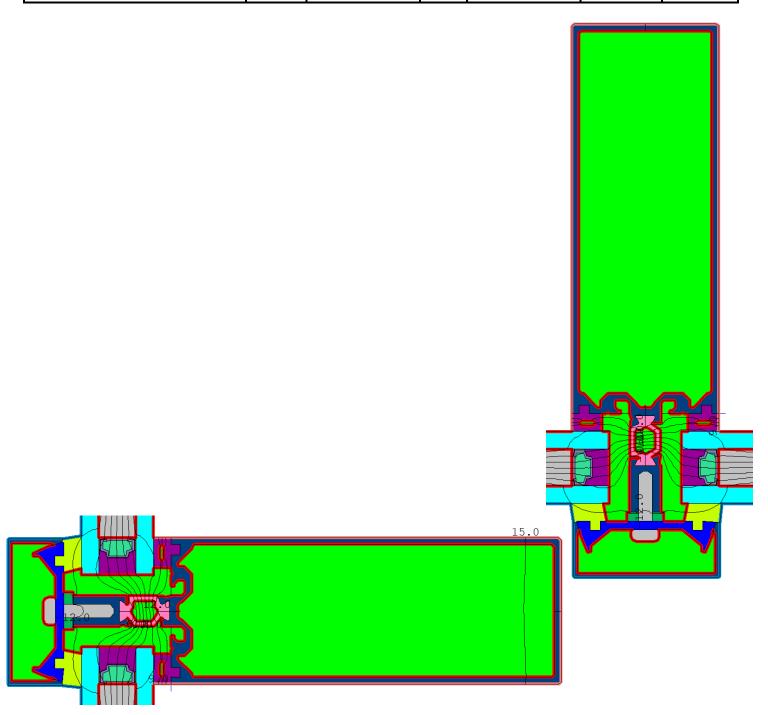


Figure 12: Thermal Modelling Result – 2020HP 5.25inch Double Glazed with TGI Spacer



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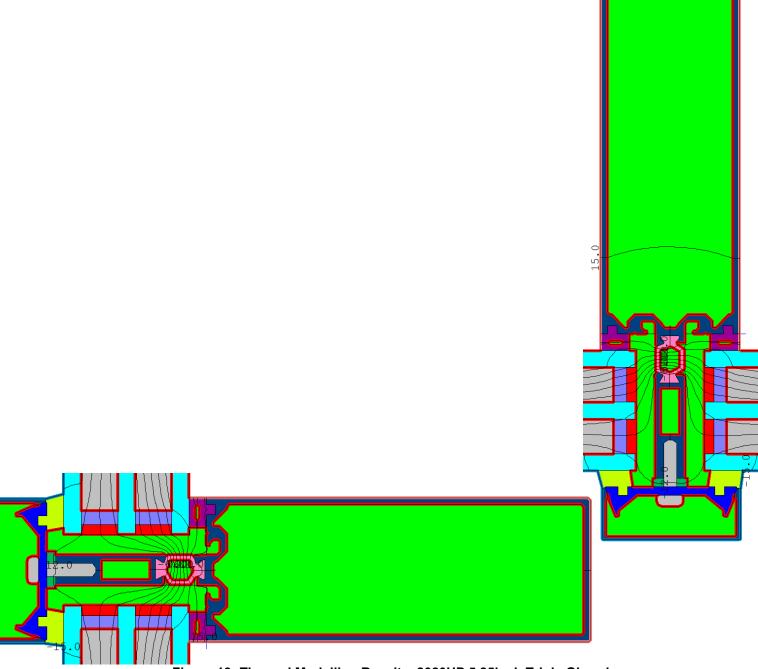
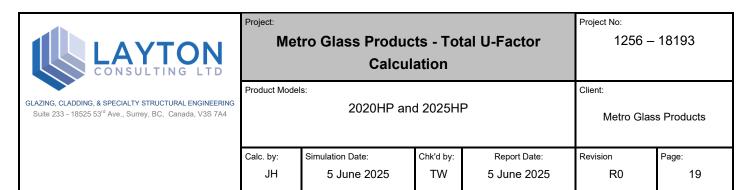


Figure 13: Thermal Modelling Result – 2020HP 5.25inch Triple Glazed



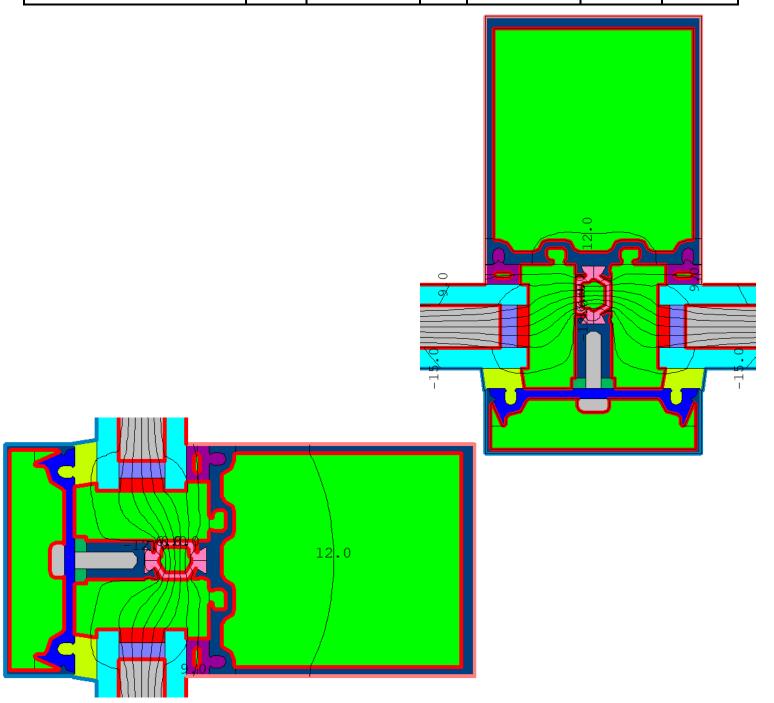


Figure 14: Thermal Modelling Result – 2025HP 2.875inch Double Glazed with Kodispacer



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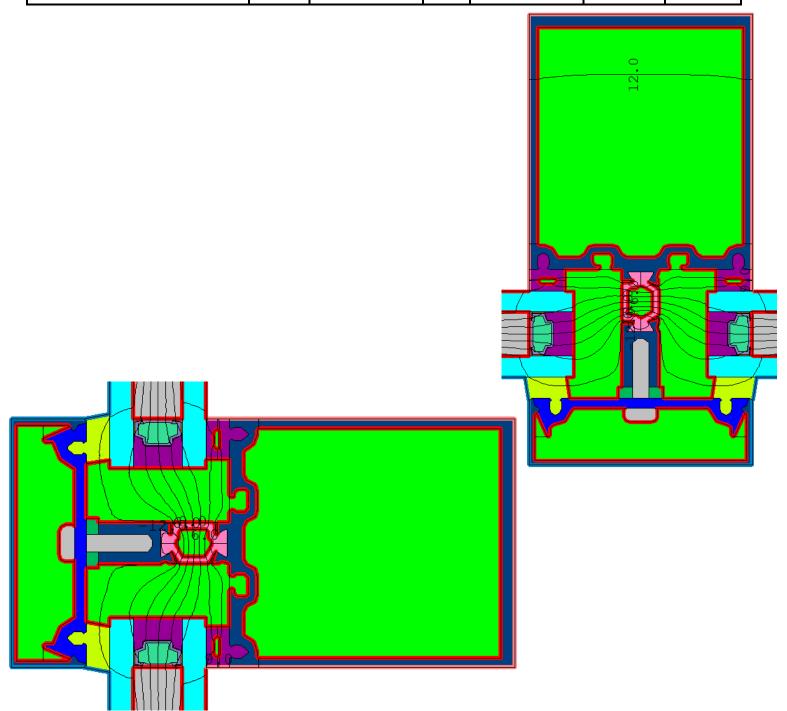


Figure 15: Thermal Modelling Result – 2025HP 2.875inch Double Glazed TGI Spacer



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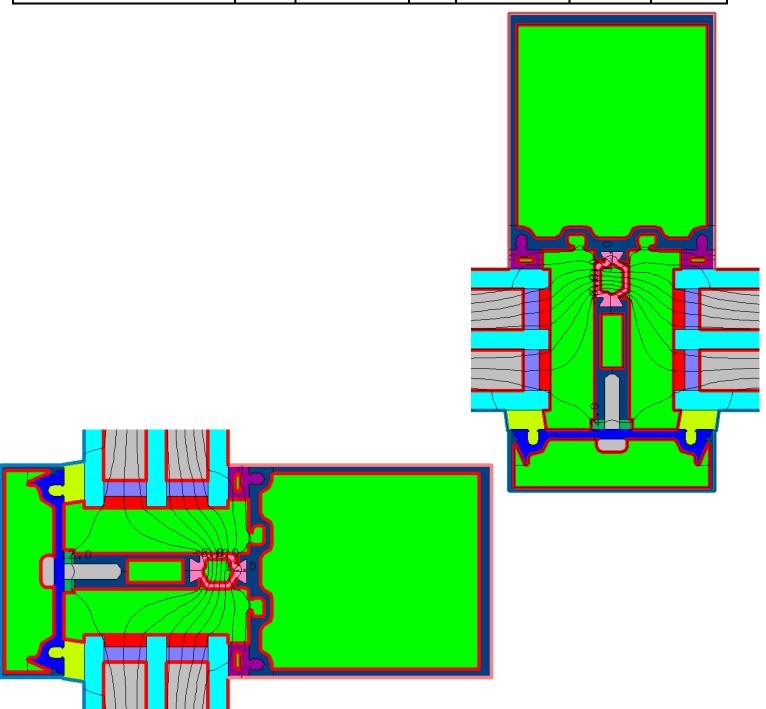


Figure 16: Thermal Modelling Result – 2020HP 2.875inch Triple Glazed



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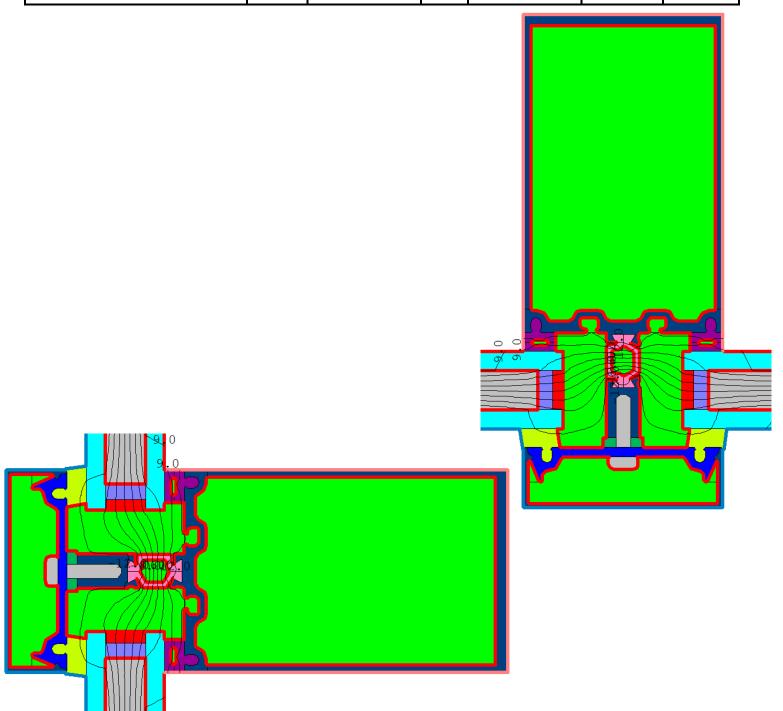


Figure 17: Thermal Modelling Result – 2025HP 4inch Double Glazed with Kodispacer



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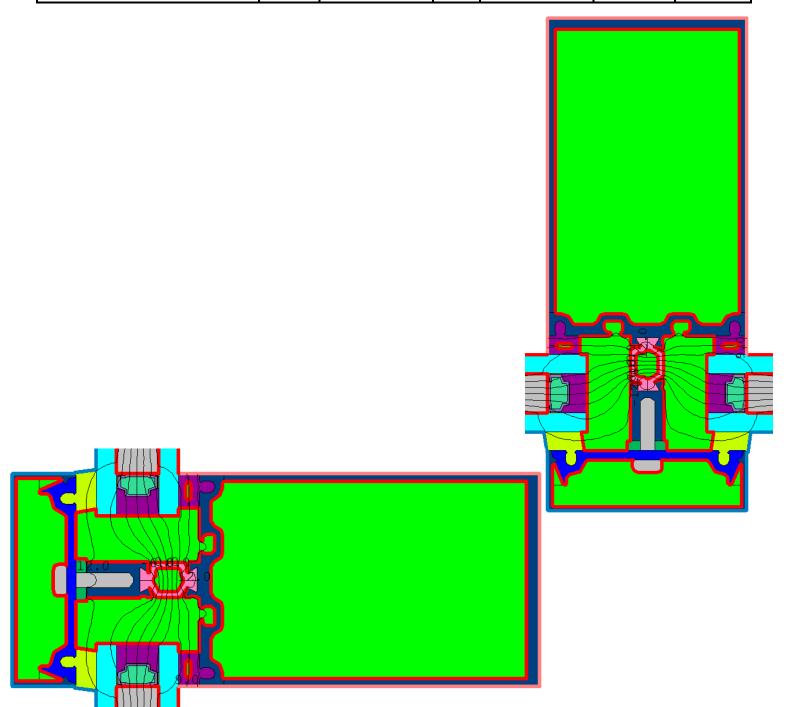


Figure 18: Thermal Modelling Result – 2025HP 4inch Double Glazed with TGI Spacer



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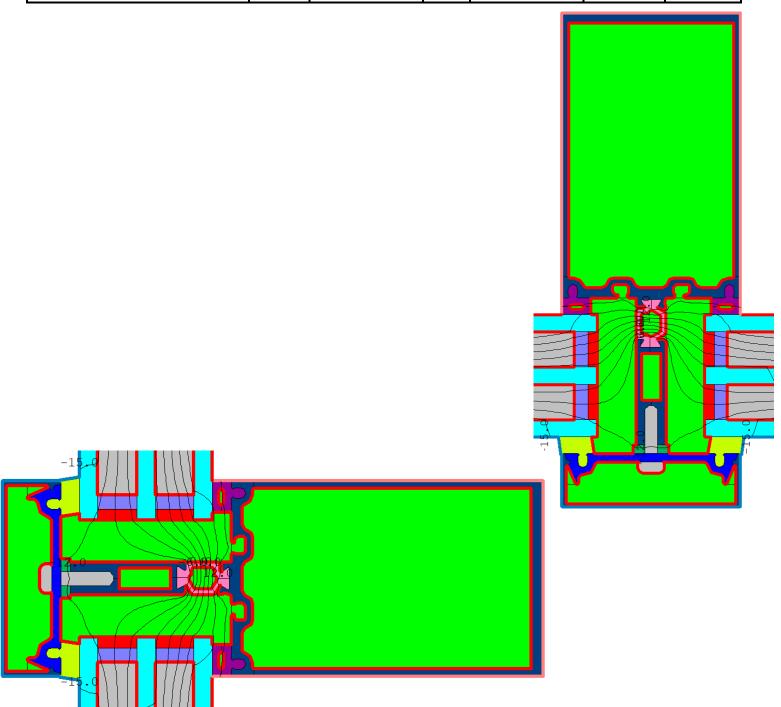
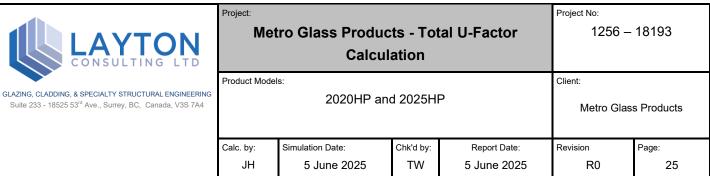


Figure 19: Thermal Modelling Result – 2025HP 4inch Triple Glazed



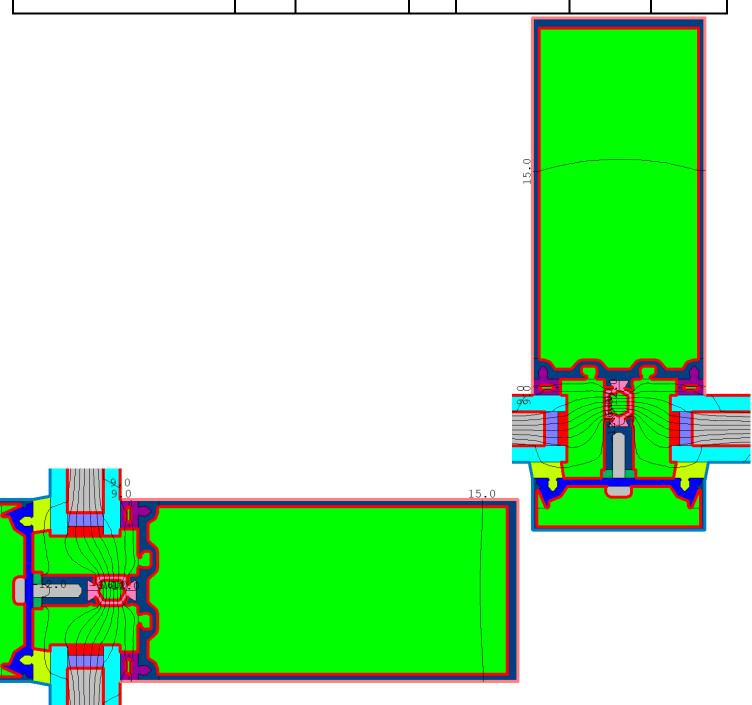
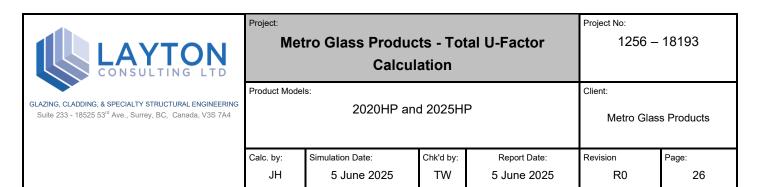


Figure 20: Thermal Modelling Result – 2025HP 5.25inch Double Glazed with Kodispacer



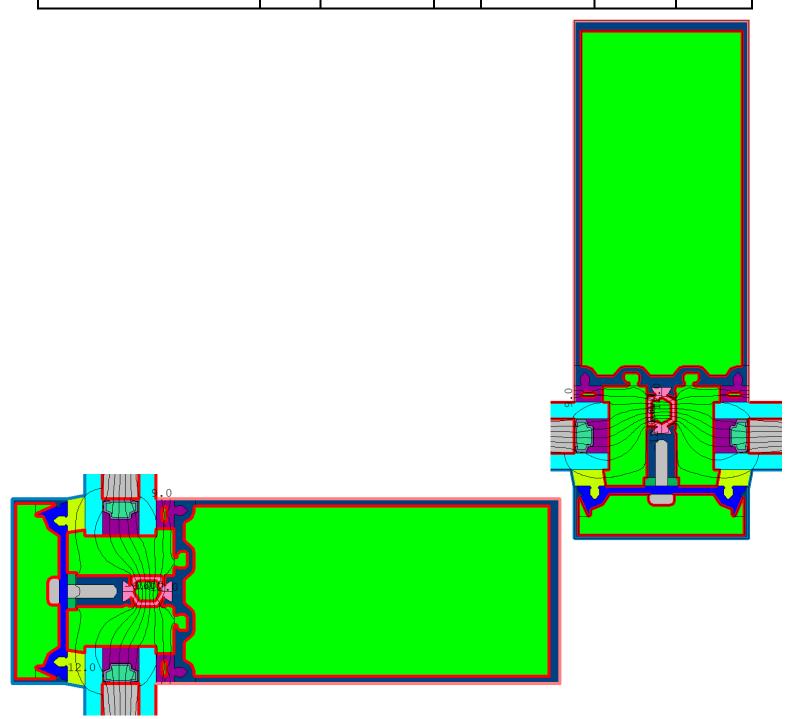
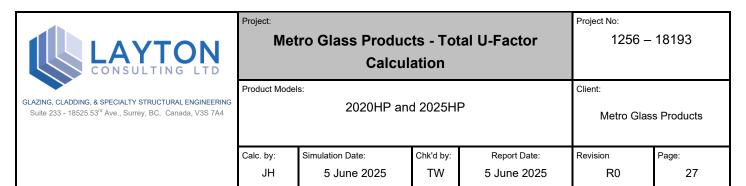


Figure 21: Thermal Modelling Result - 2025HP 5.25inch Double Glazed with TGI Spacer



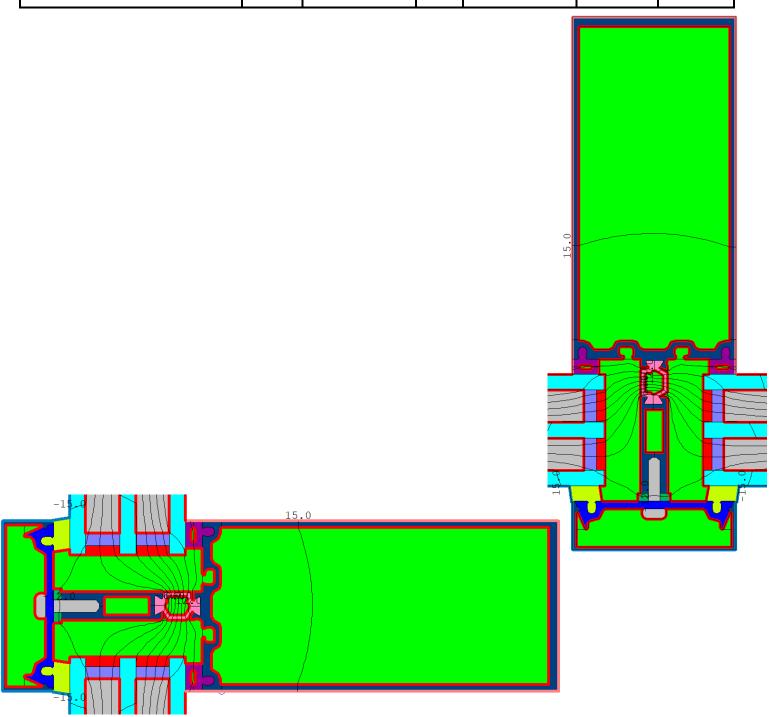


Figure 22: Thermal Modelling Result – 2025HP 5.25inch Triple Glazed