LAYTON CONSULTING LTD
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NFRC National Fenestration Rating Council® ACCREDITED

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	Type
2020HP	GWCW
2025HP	GWCW

Fenestration Product Supplier: **Metro Glass Products**
108, 1626 115 Ave NE, Calgary, AB T3K 2E4, Canada

Attn: Drew McLaughlin

	Layton Consulting Employee Name	Signature
Simulation by:	Jack Hardy, Thermal Analyst	
Reviewed by:	Taylor Wight, P.Eng., LEAFF NFRC Certified Simulator	

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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.

PRODUCT LINE DESCRIPTION AND MATERIAL PROPERTIES

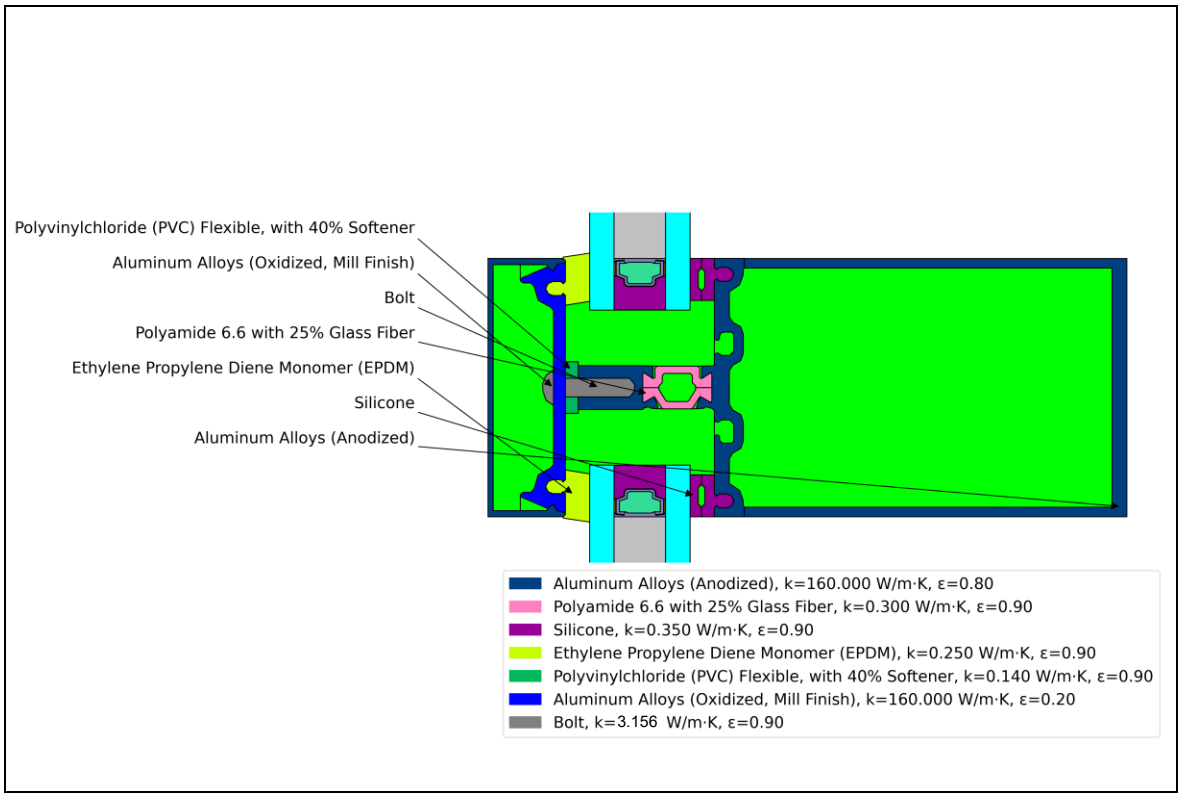


Figure 1: Model of the 2025HP Glass Wall to Show the Materials of Components Modelled

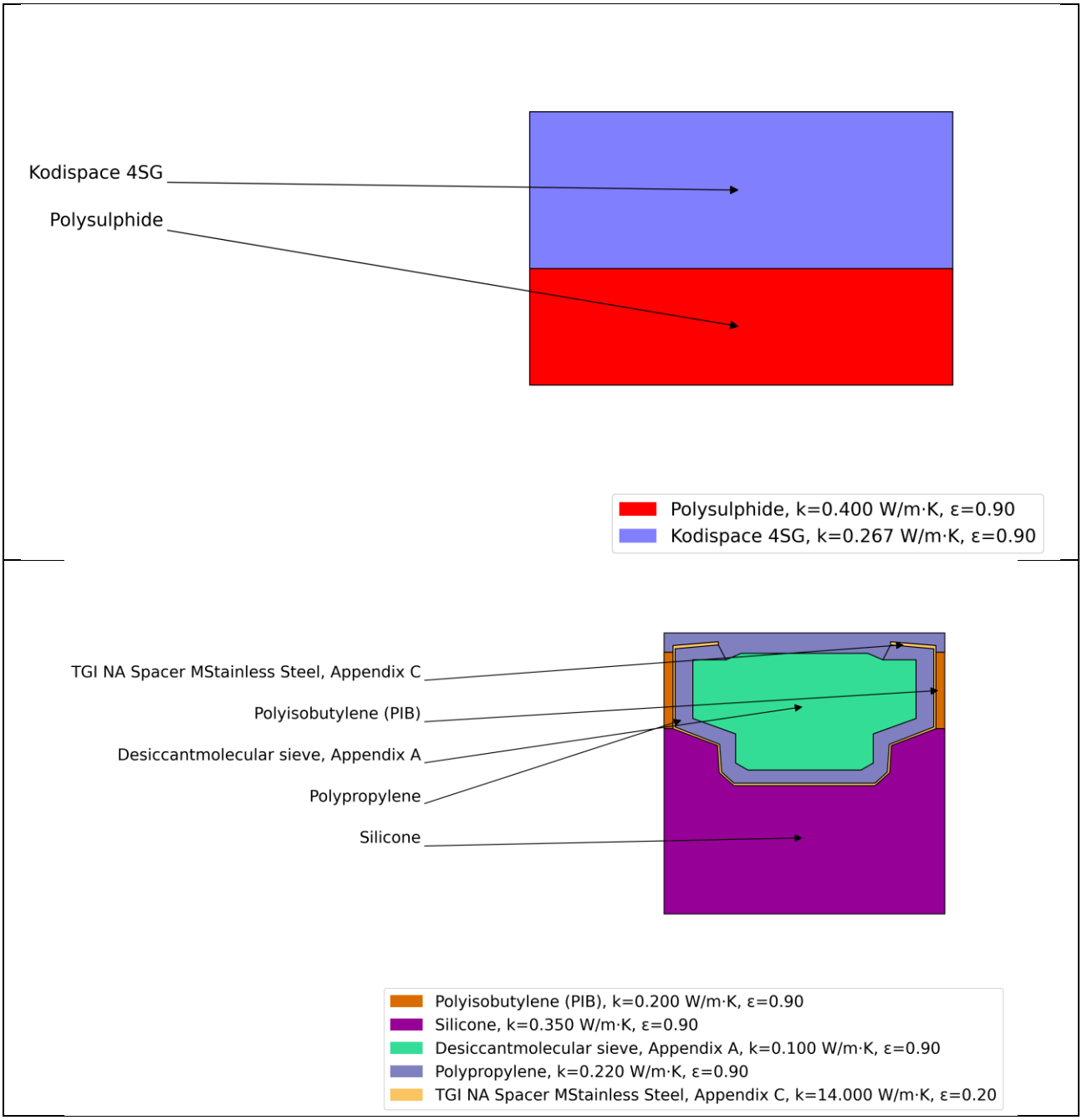


Figure 2: Spacer Material Details

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).

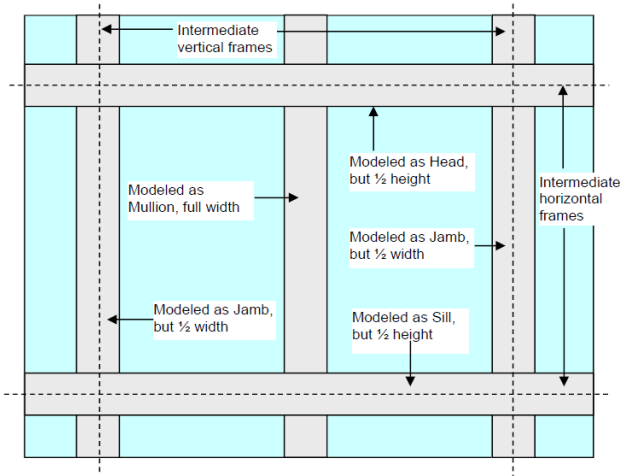


Figure 8-88. Curtain wall simulation model (represented by dotted lines) for rating, where the framing members are modeled at half their width.

RESULTS

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

Table 1: Thermal Modelling Result – Overall Project Fenestration U-Factor

Product Name	Product Type	Frame Type	Spacer Type	Glazing Type	Width x Height (mm)	U-Value (W/m²-K)	U-Value (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

APPENDIX

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

IGU Name: G1

	ID	Name	Thick	Surf	Tsol	Tvis	E	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	E	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	E	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):	42.835					

IGU Name: G4

	ID	Name	Thick	Surf	Tsol	Tvis	E	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

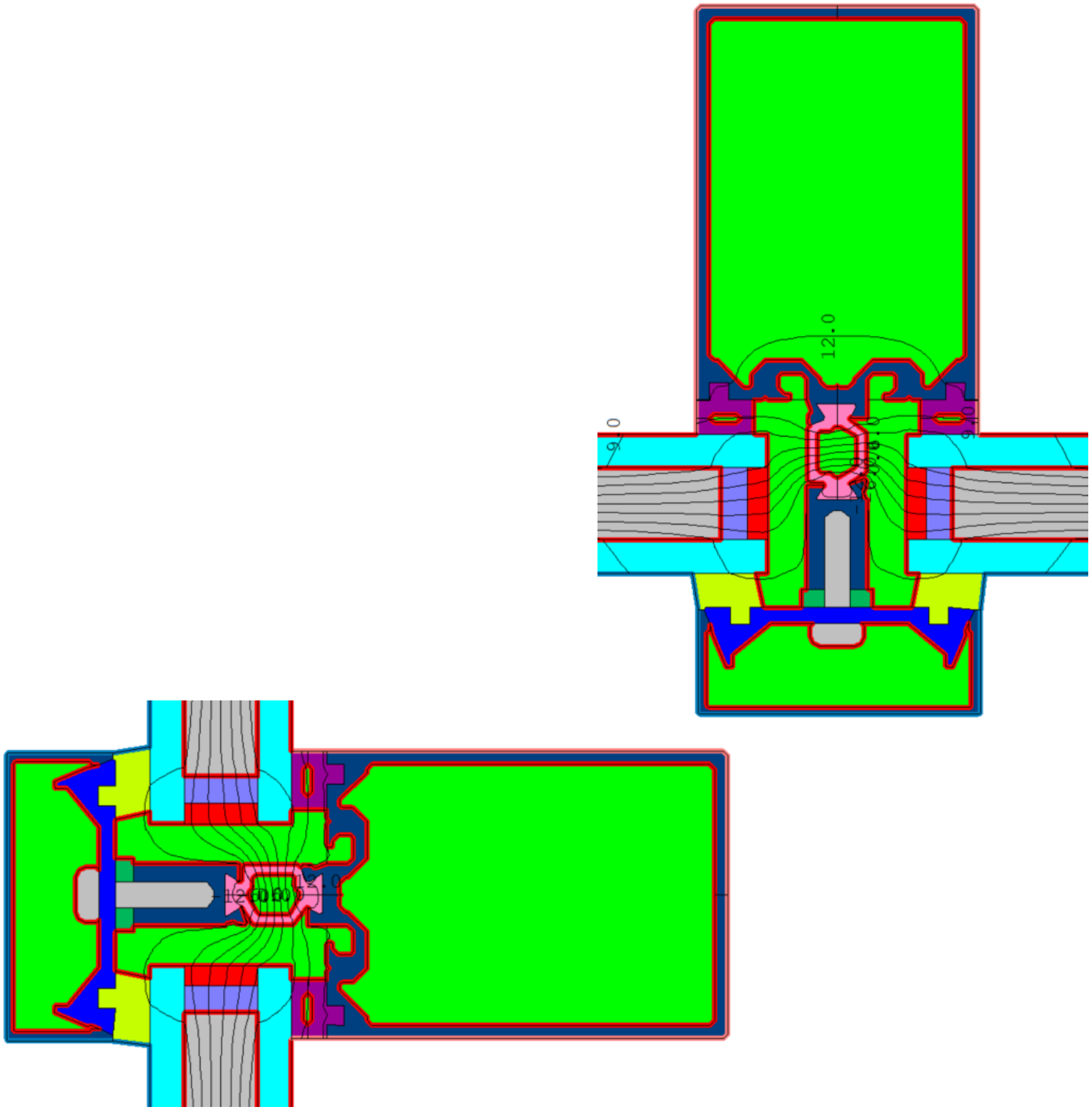
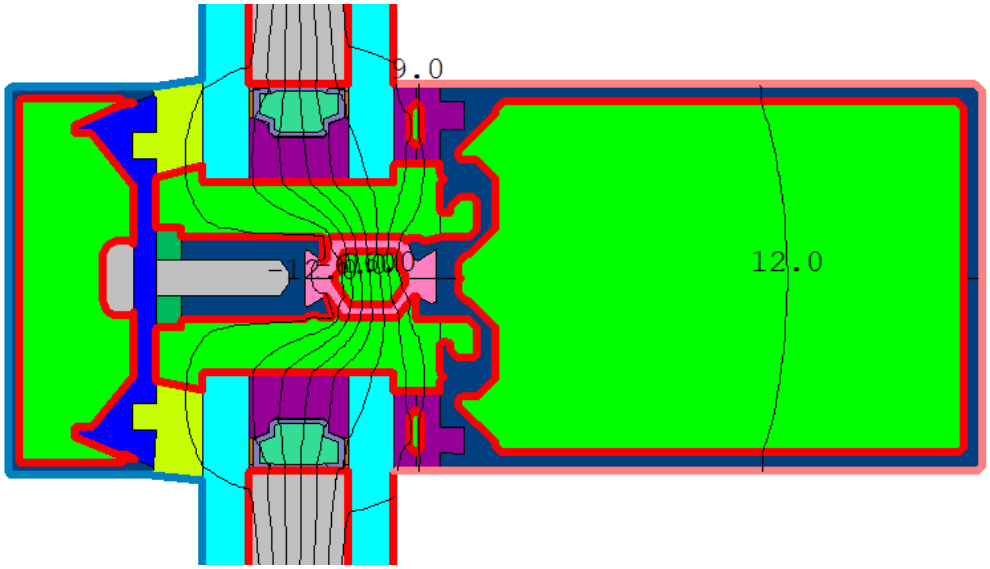


Figure 5: Thermal Modelling Result – 2020HP 2.875inch Double Glazed with Kodispacer



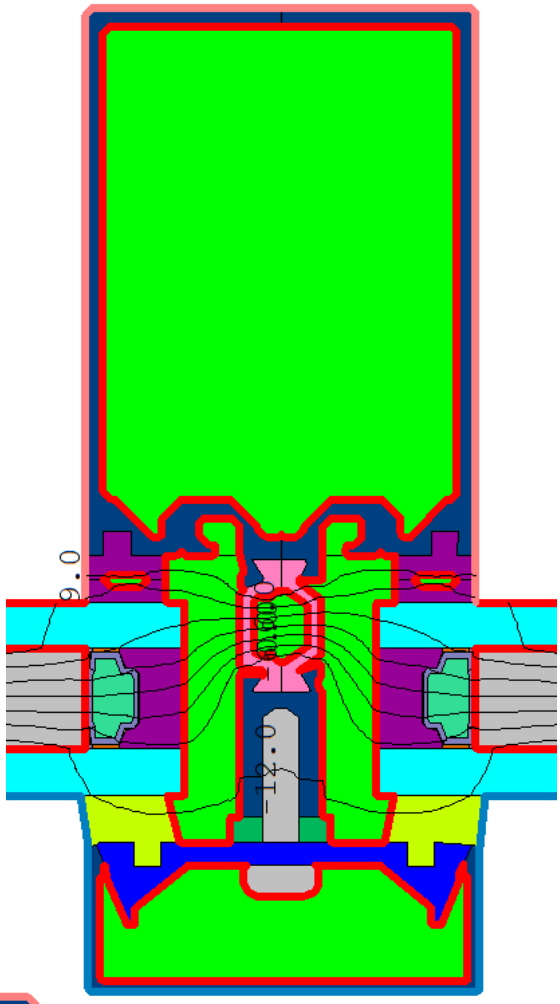


Figure 6: Thermal Modelling Result – 2020HP 2.875inch Double Glazed with TGI Spacer

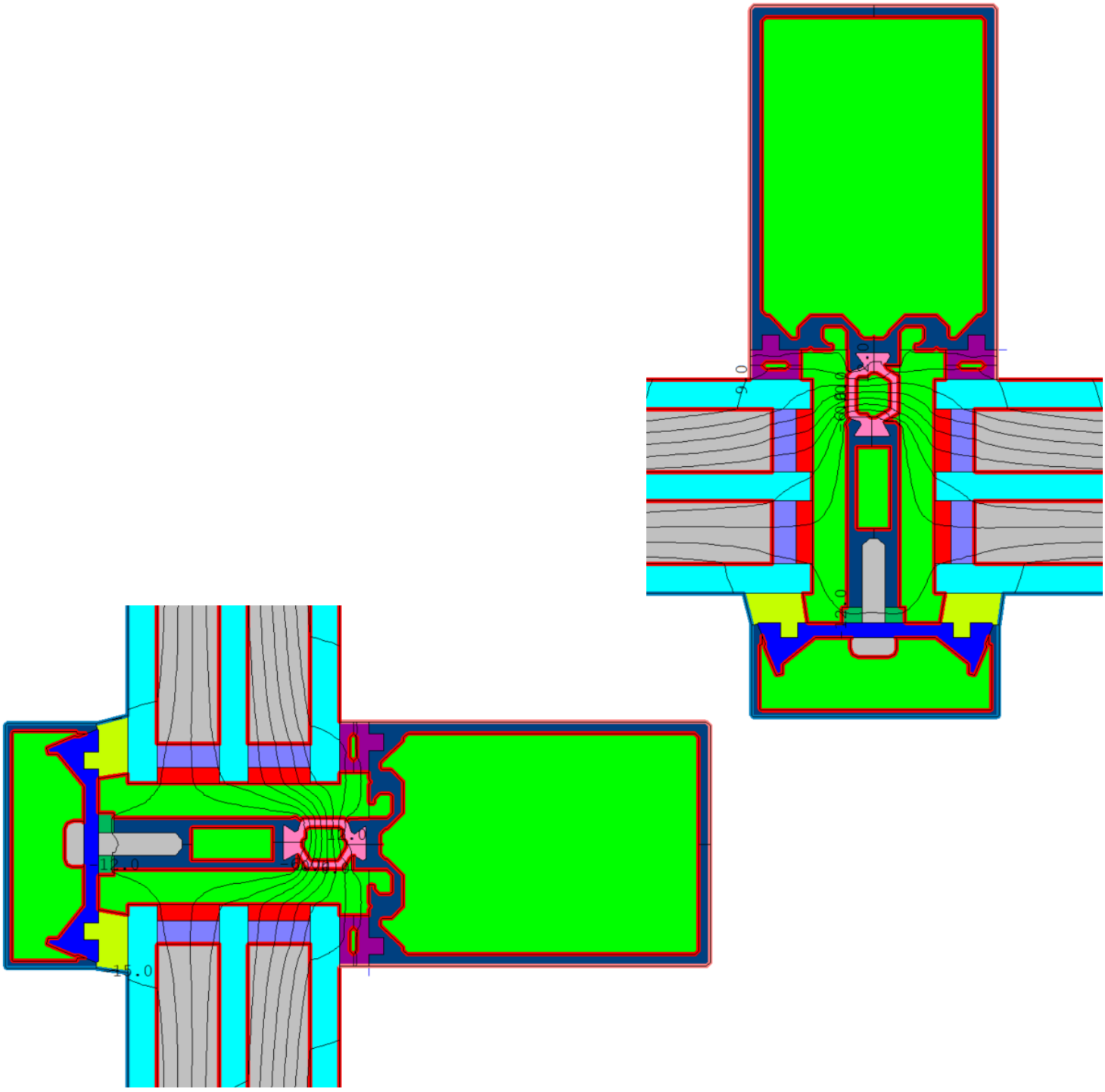


Figure 7: Thermal Modelling Result – 2020HP 2.875inch Triple Glazed

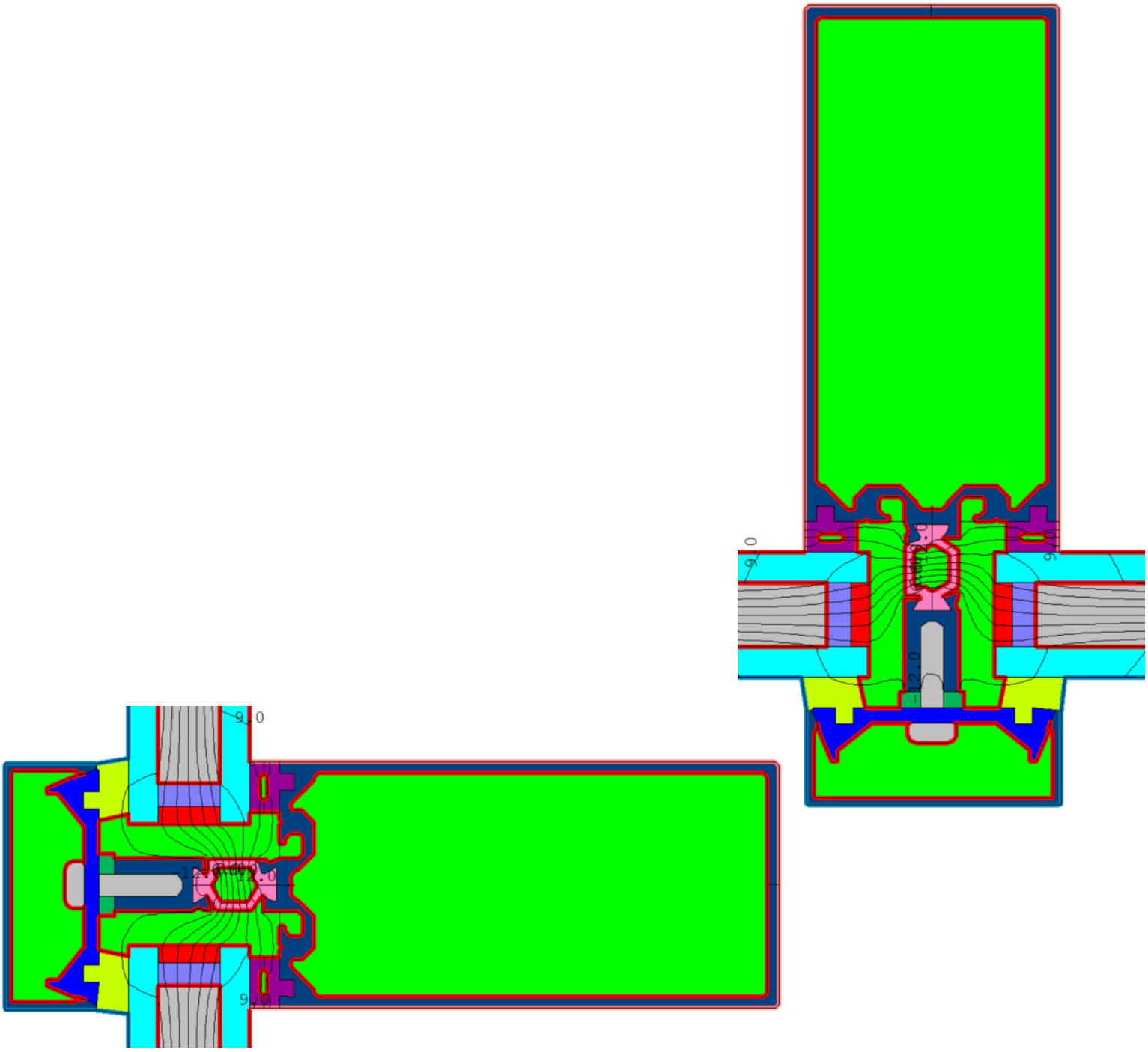


Figure 8: Thermal Modelling Result – 2020HP 4inch Double Glazed with Kodispacer

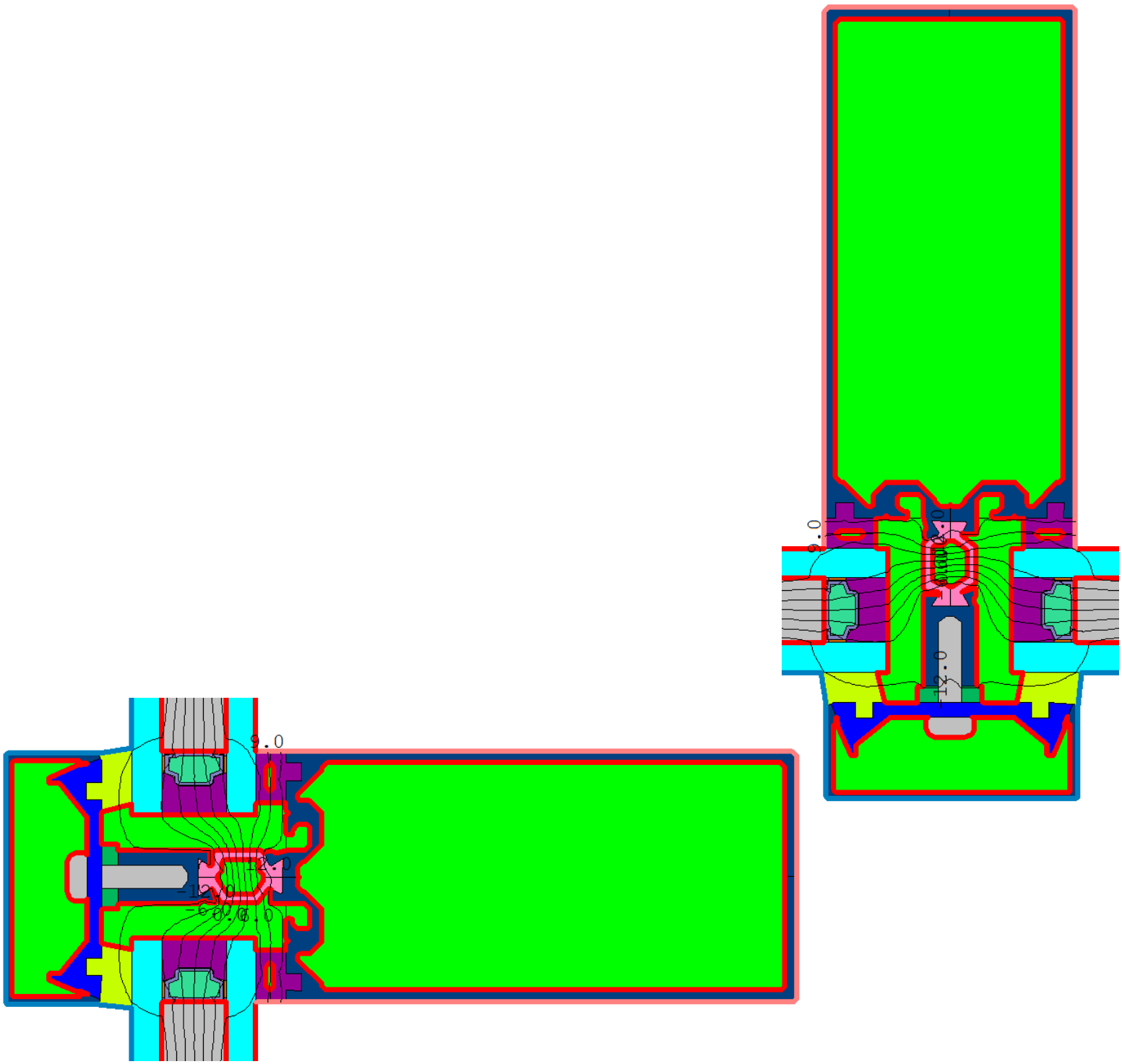


Figure 9: Thermal Modelling Result – 2020HP 4inch Double Glazed with TGI Spacer

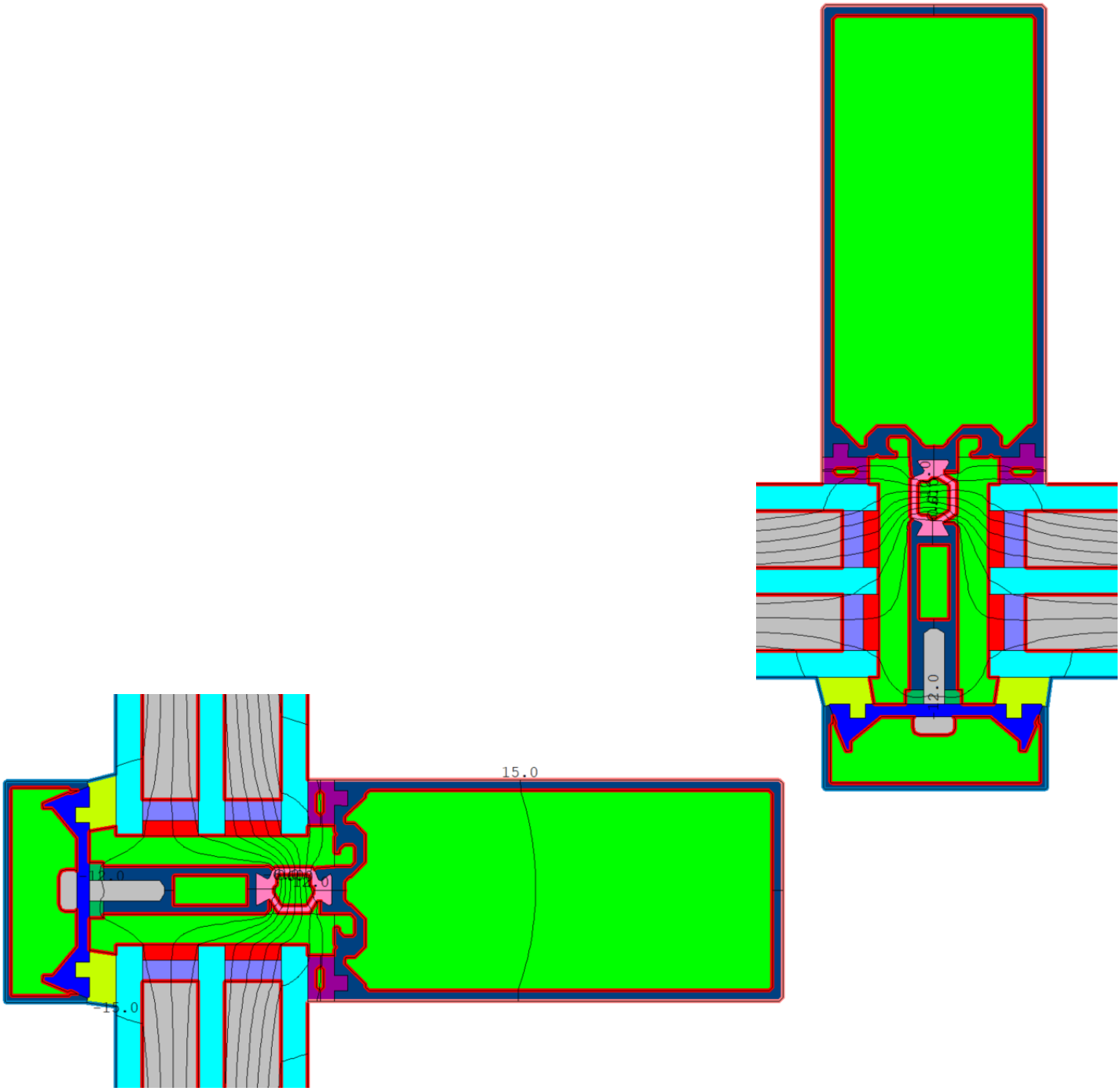


Figure 10: Thermal Modelling Result – 2020HP 4inch Triple Glazed

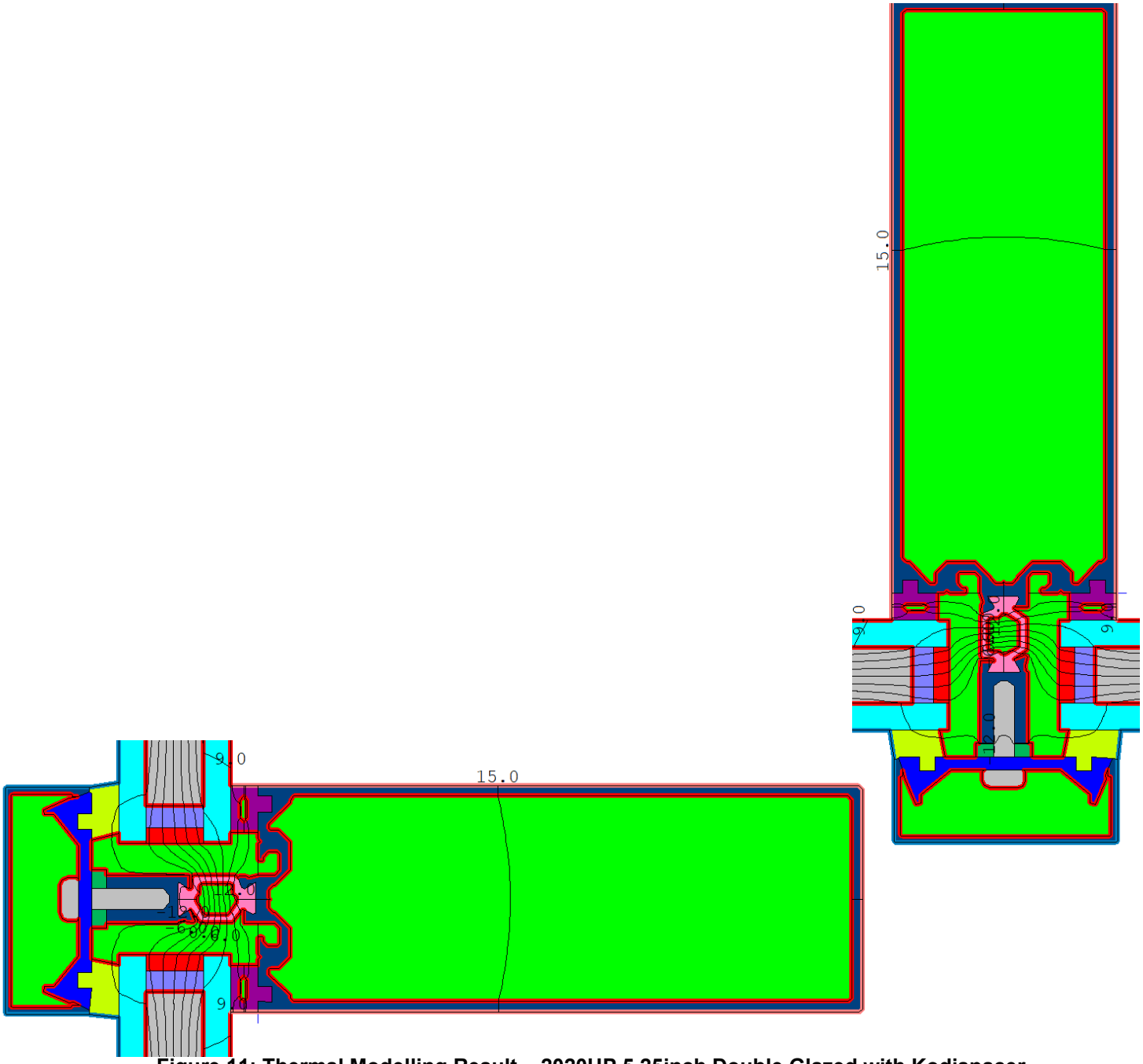


Figure 11: Thermal Modelling Result – 2020HP 5.25inch Double Glazed with Kodispacer

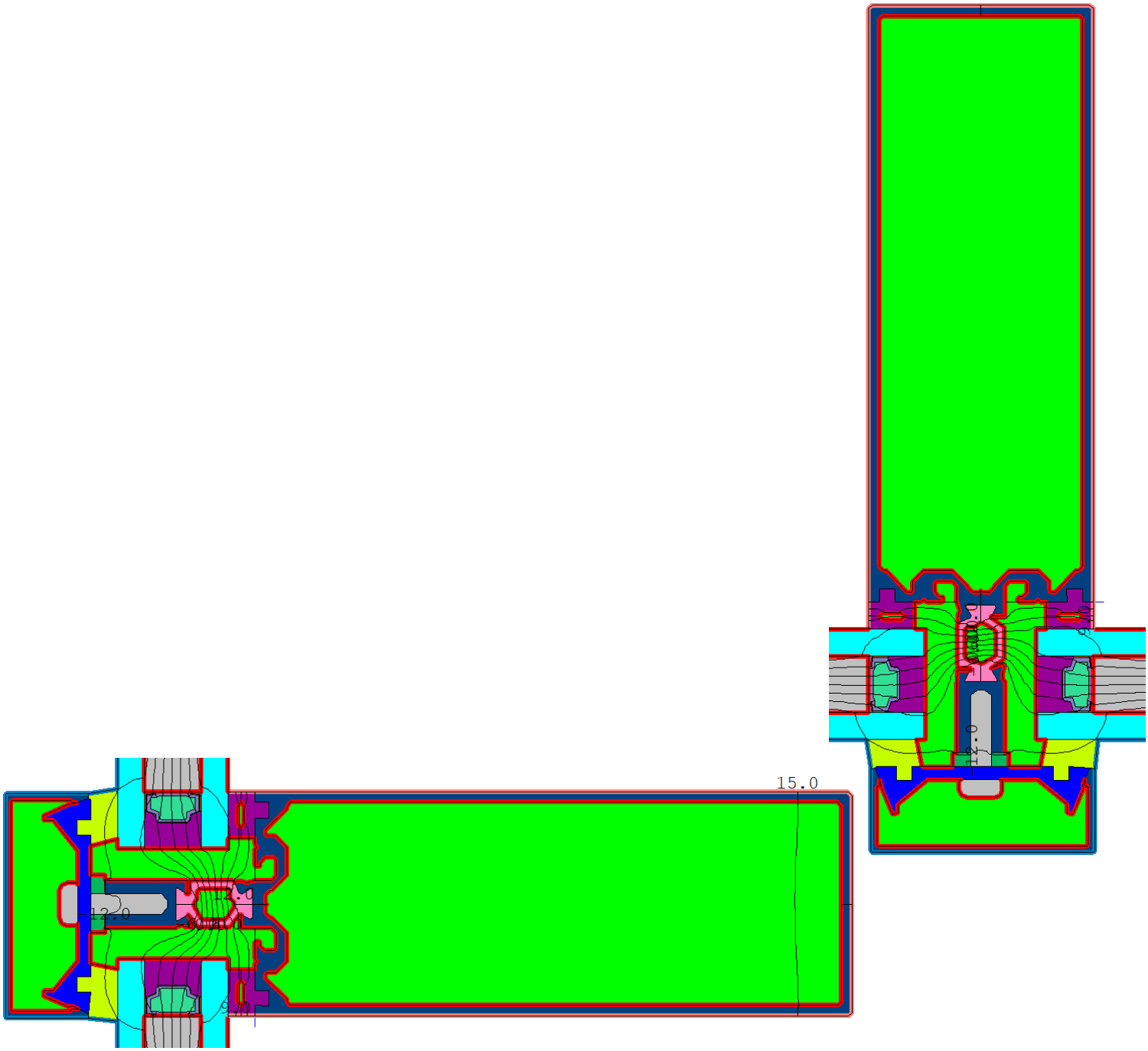


Figure 12: Thermal Modelling Result – 2020HP 5.25inch Double Glazed with TGI Spacer

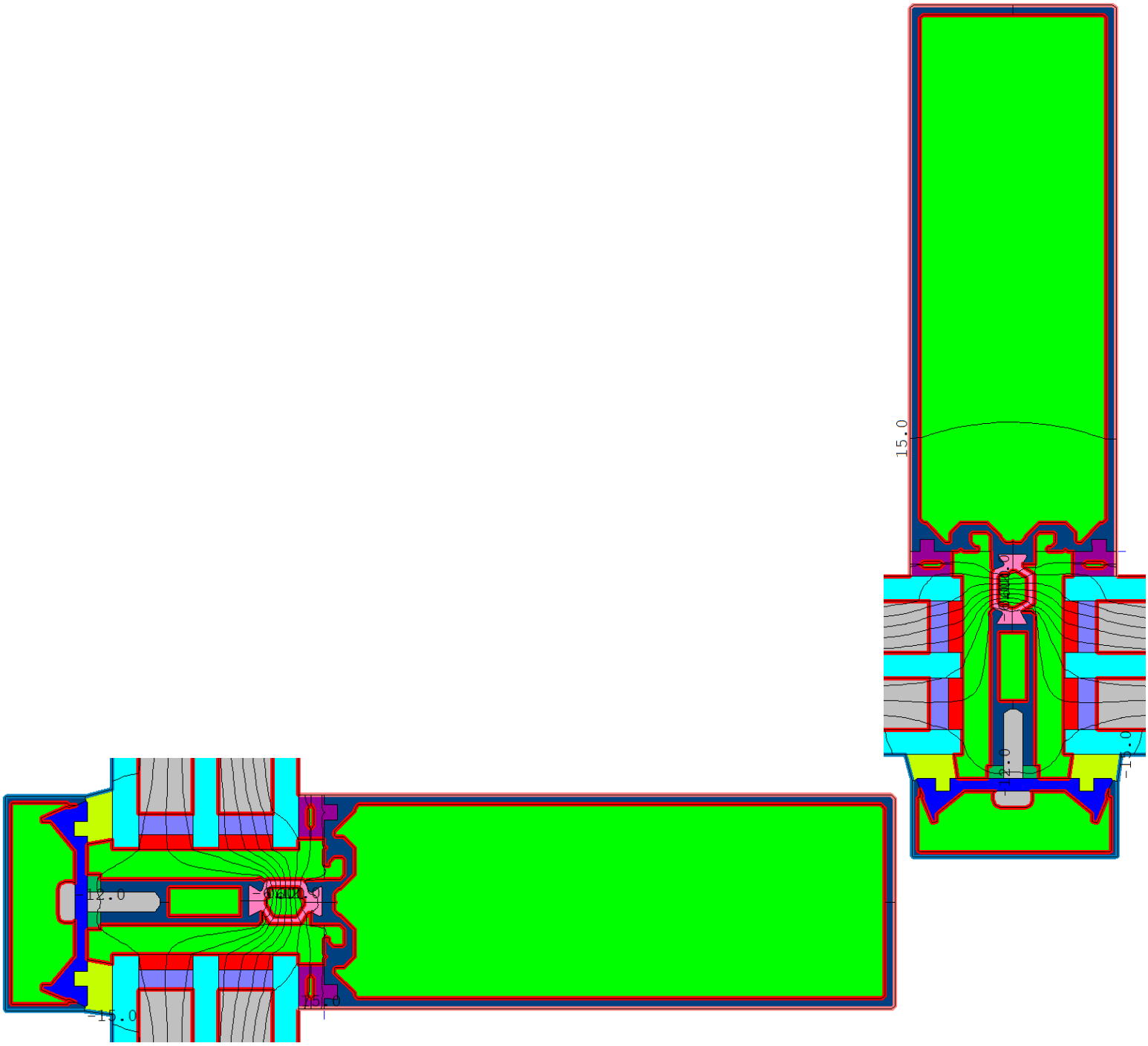


Figure 13: Thermal Modelling Result – 2020HP 5.25inch Triple Glazed

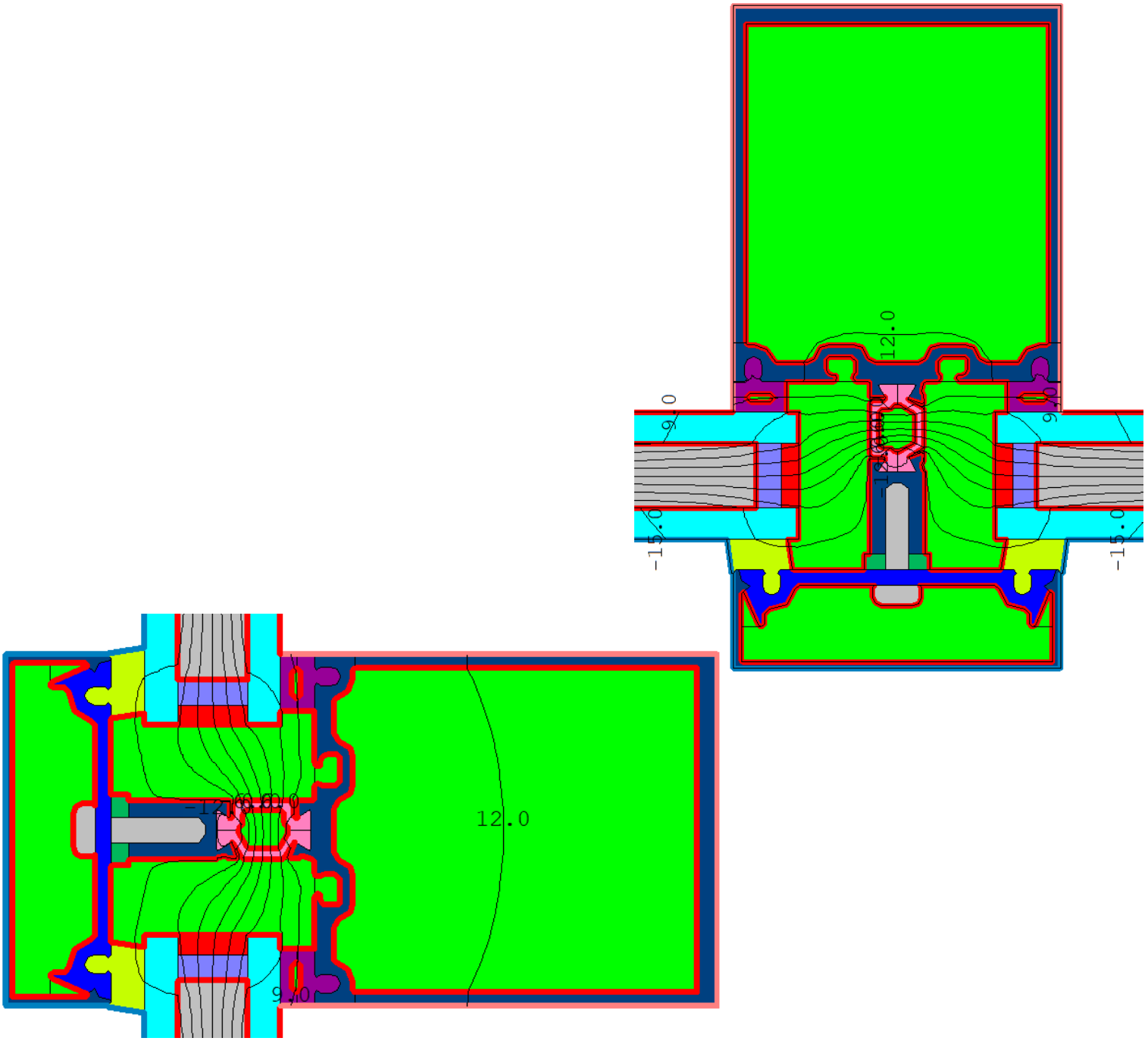


Figure 14: Thermal Modelling Result – 2025HP 2.875inch Double Glazed with Kodispacer

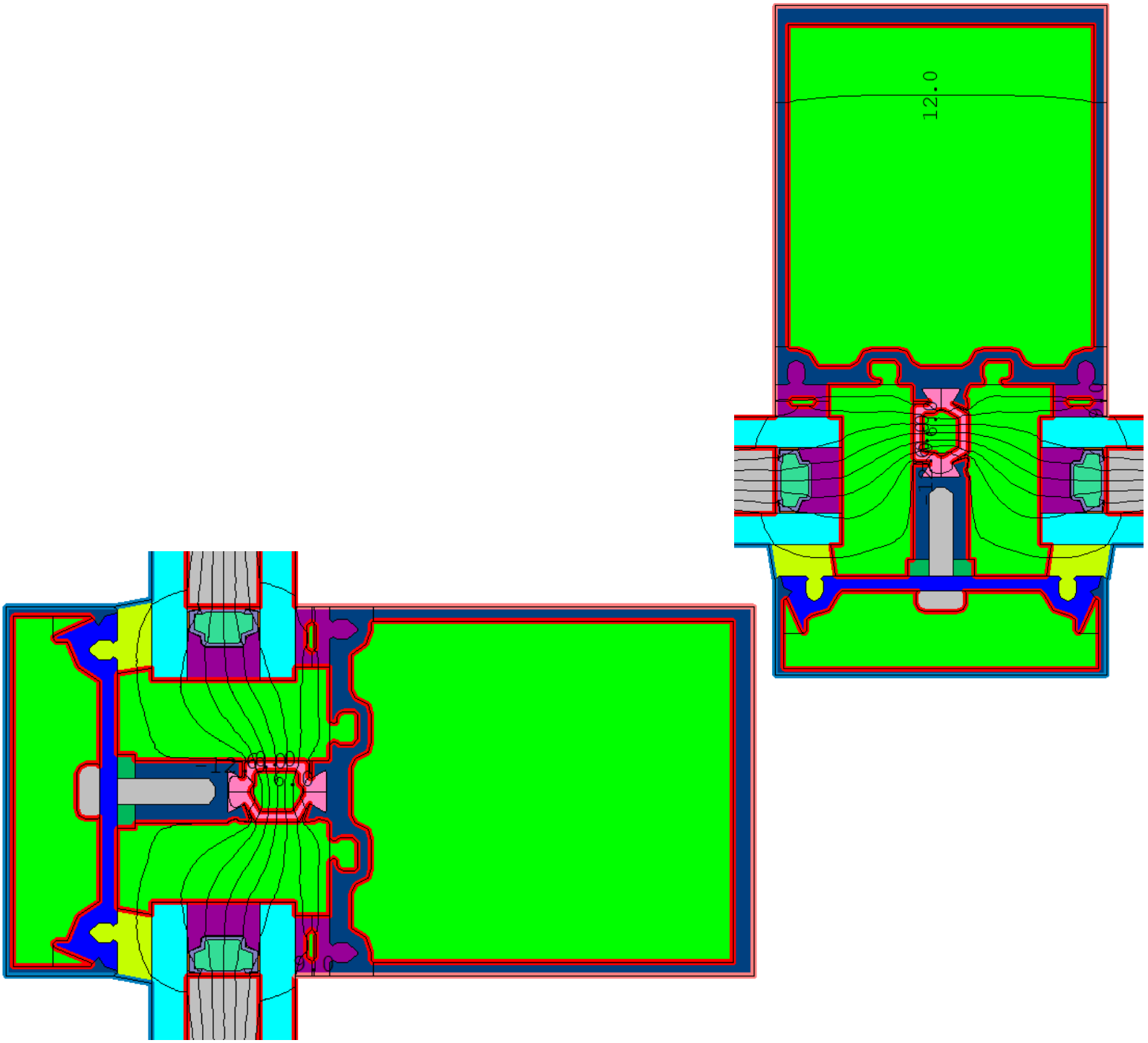


Figure 15: Thermal Modelling Result – 2025HP 2.875inch Double Glazed TGI Spacer

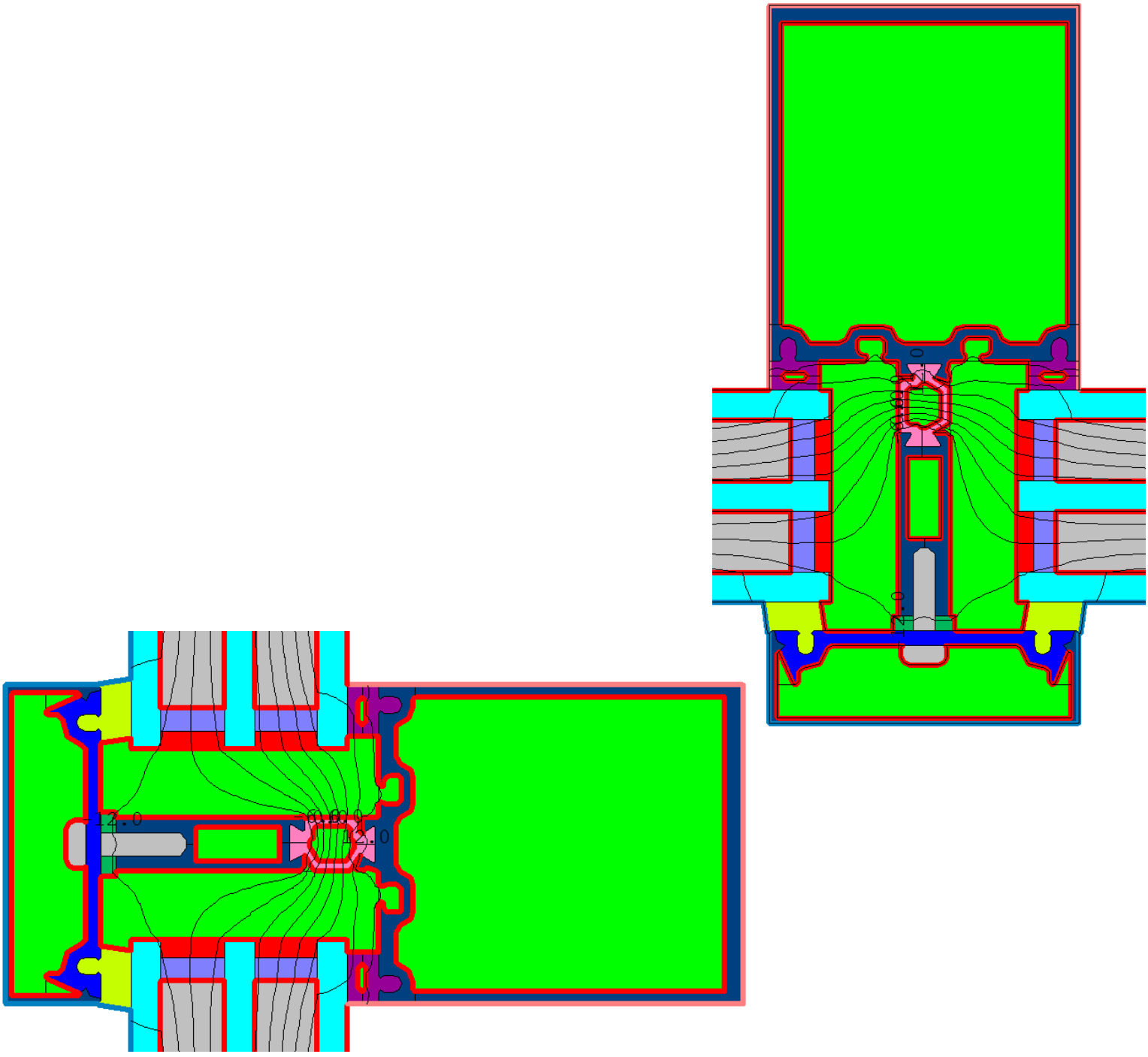


Figure 16: Thermal Modelling Result – 2020HP 2.875inch Triple Glazed

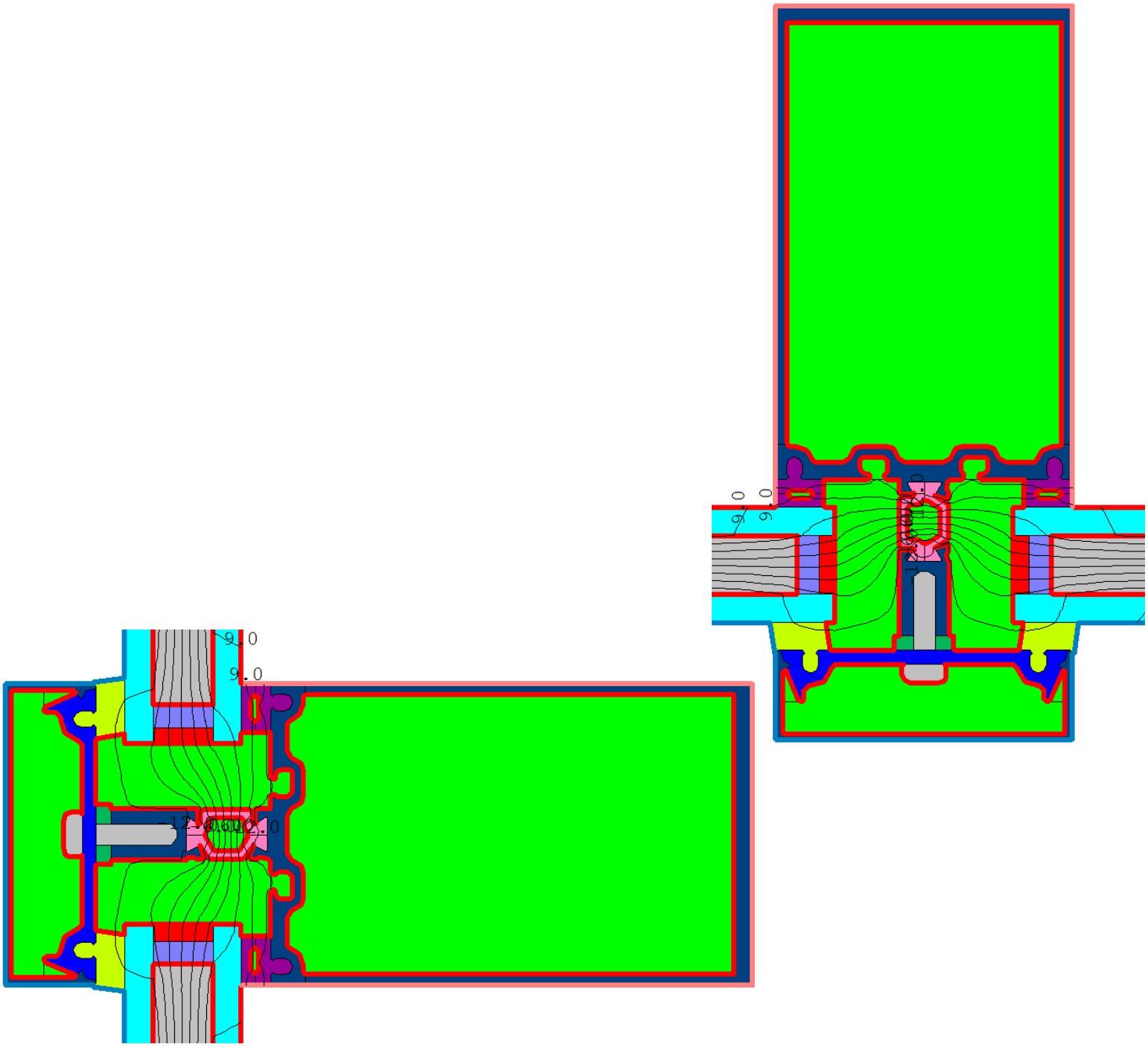


Figure 17: Thermal Modelling Result – 2025HP 4inch Double Glazed with Kodispacer

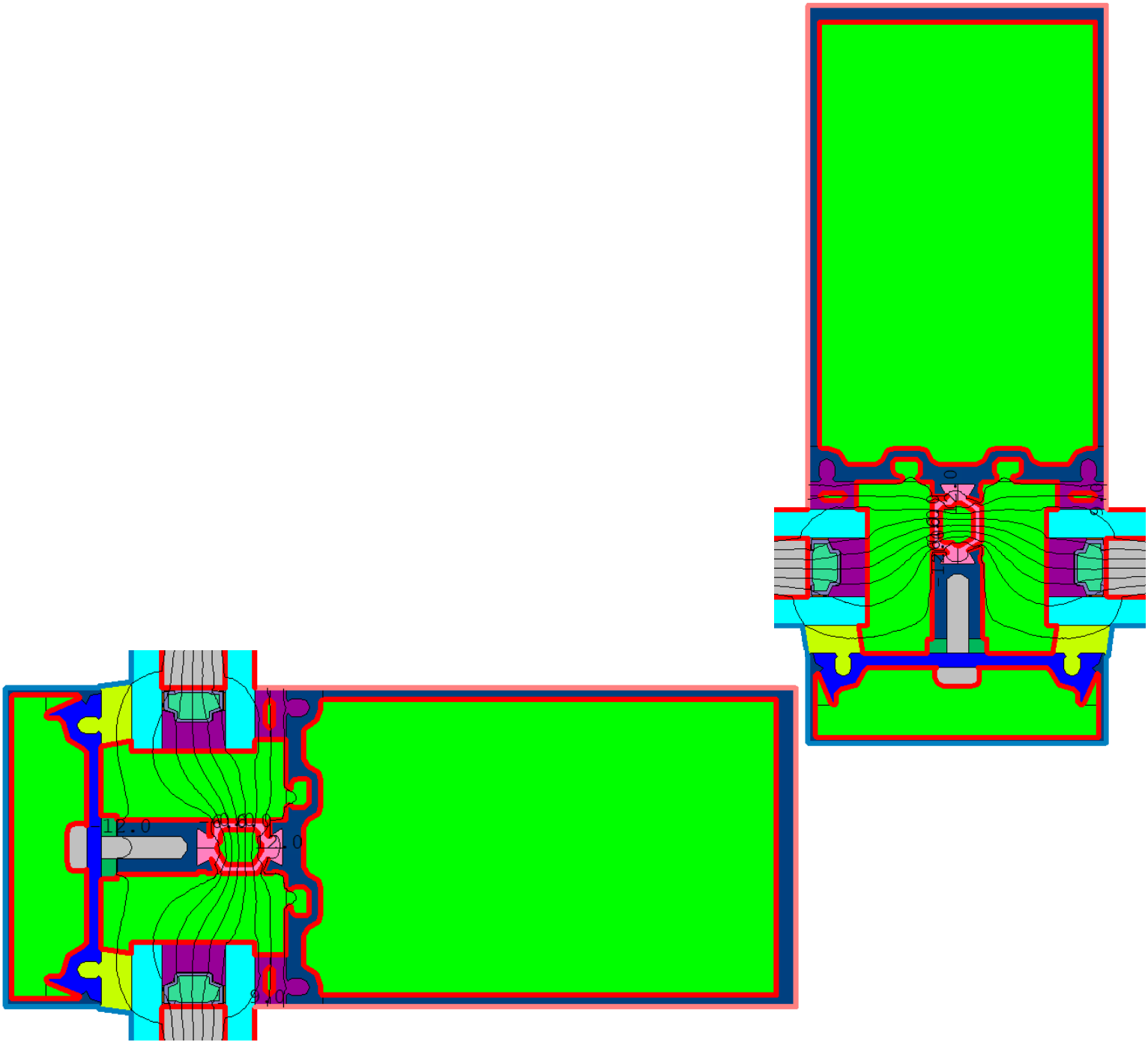


Figure 18: Thermal Modelling Result – 2025HP 4inch Double Glazed with TGI Spacer

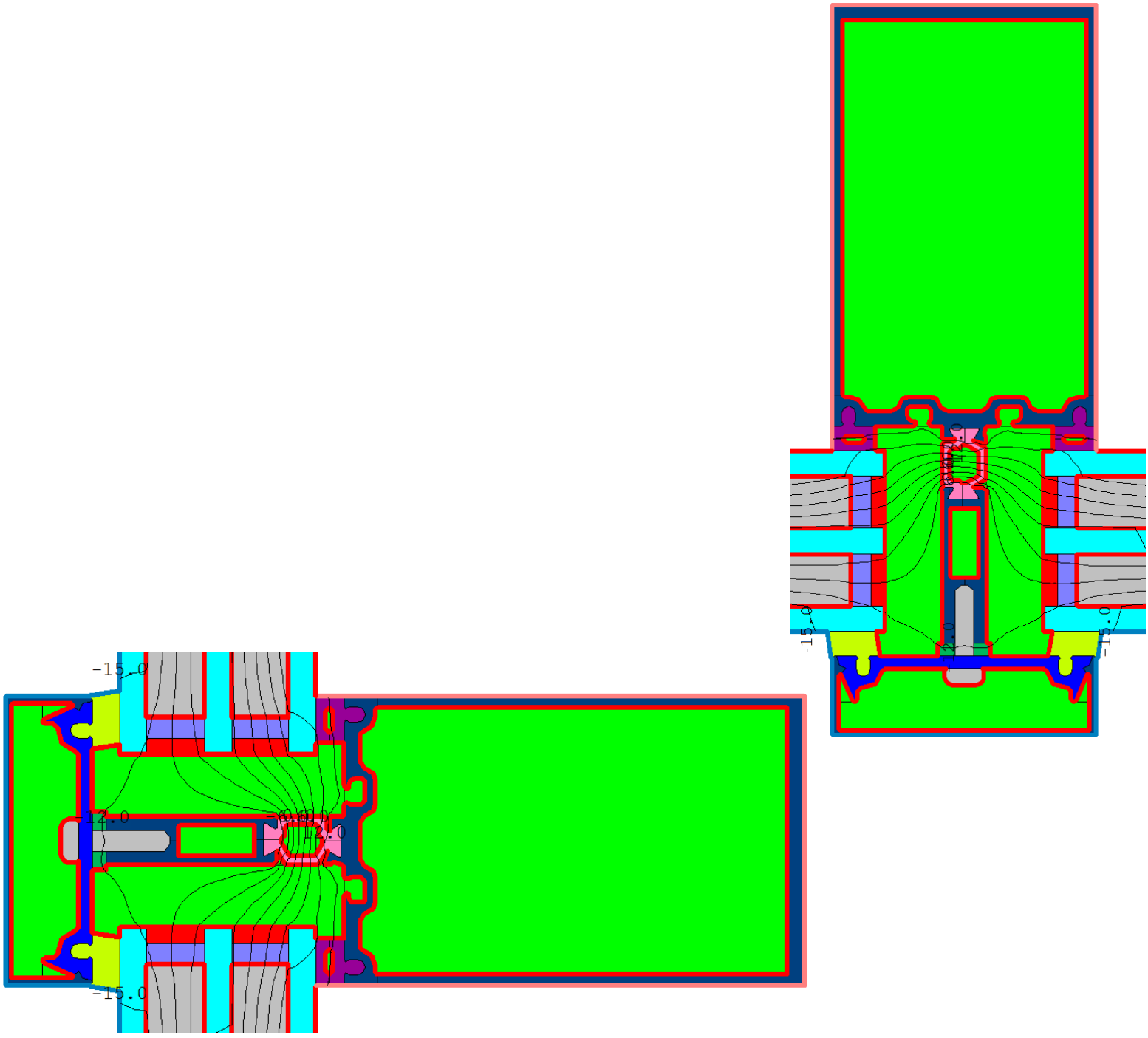


Figure 19: Thermal Modelling Result – 2025HP 4inch Triple Glazed

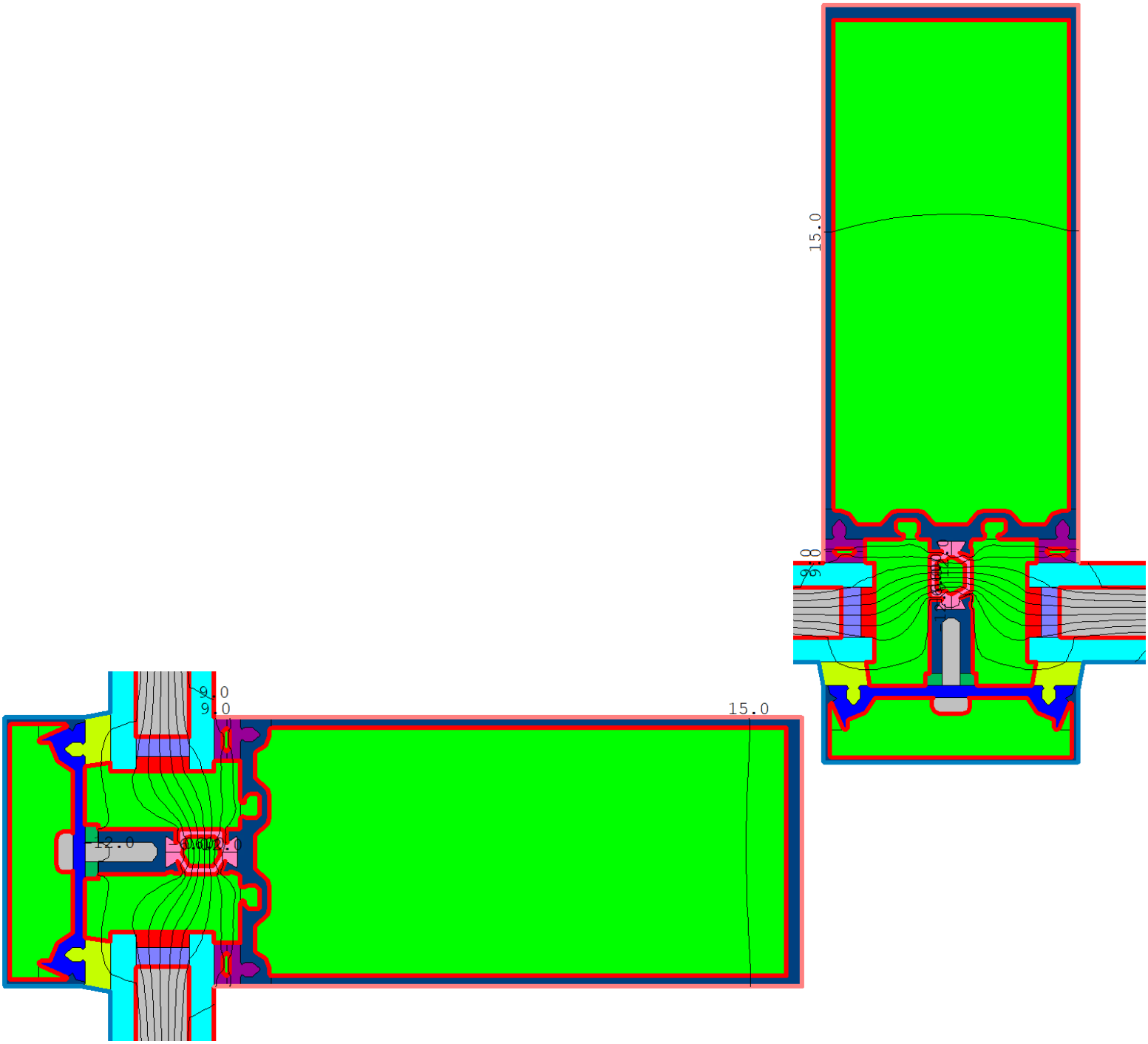


Figure 20: Thermal Modelling Result – 2025HP 5.25inch Double Glazed with Kodispacer

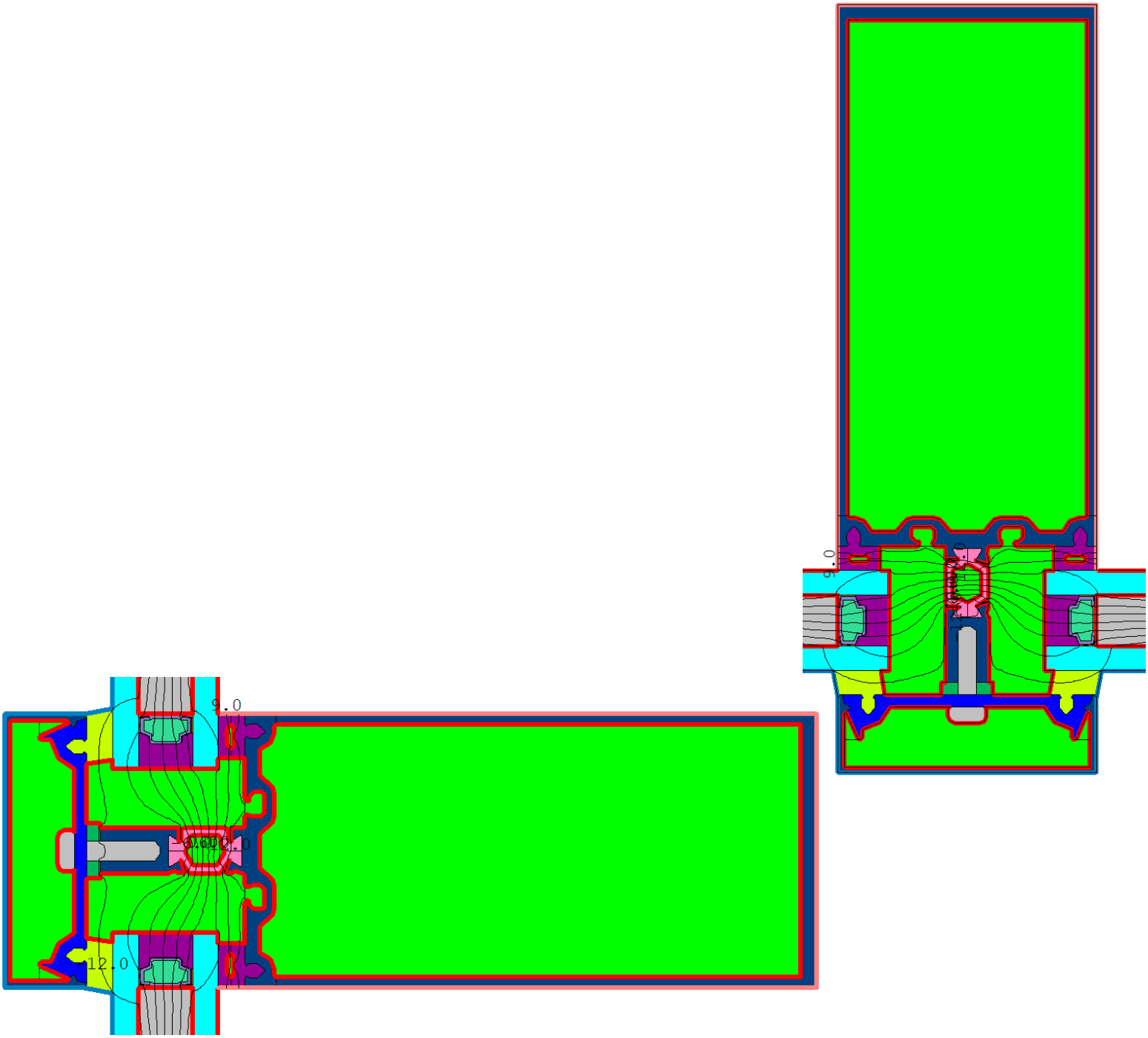


Figure 21: Thermal Modelling Result – 2025HP 5.25inch Double Glazed with TGI Spacer

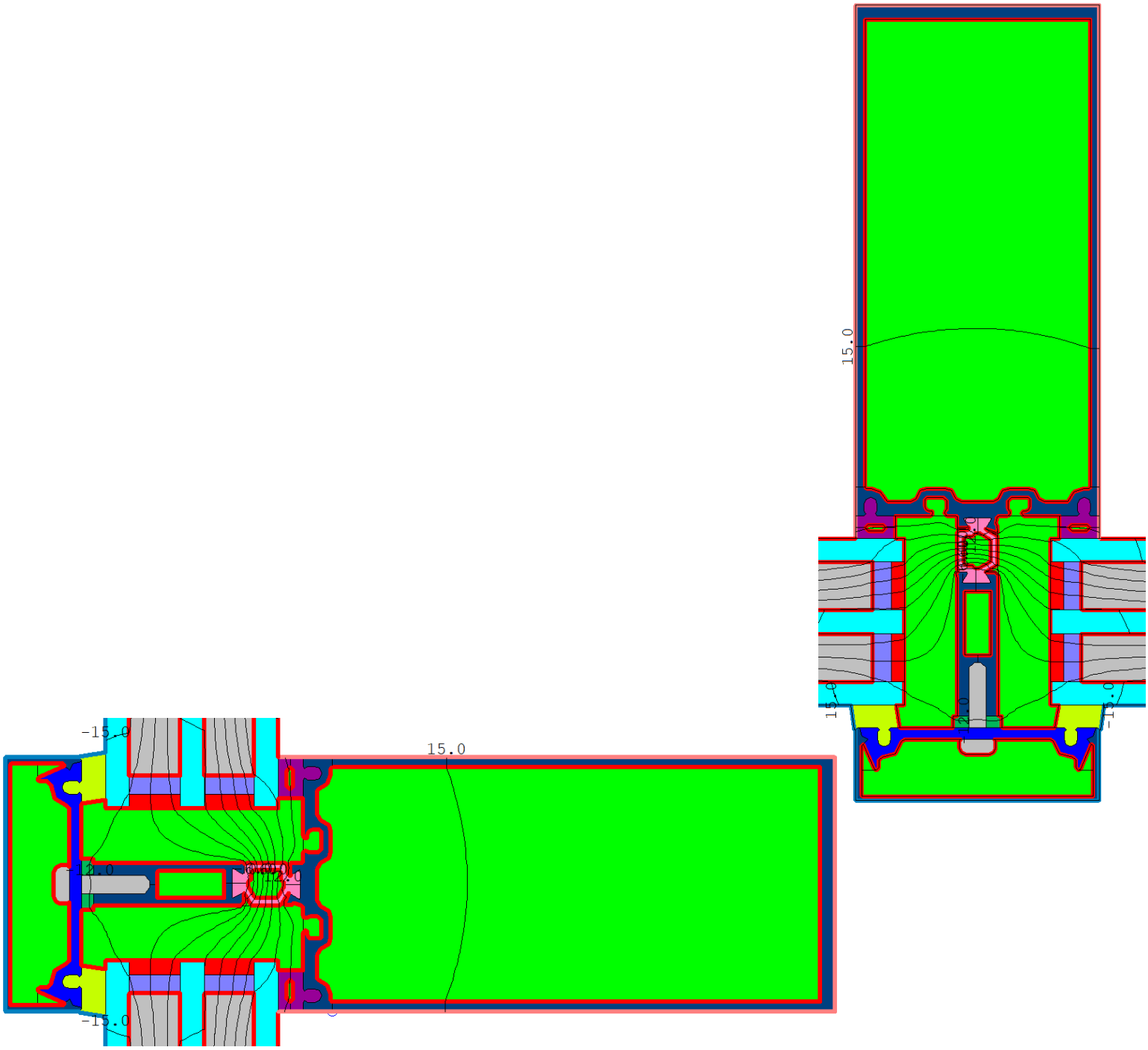


Figure 22: Thermal Modelling Result – 2025HP 5.25inch Triple Glazed