THERMAL SIMULATION REPORT

Report Number:	**TCL2012-SWA-004**
Prepared For:	**Steel Window Association 42 Heath Street Tamworth Staffordshire B79 7HJ**
Window System Identifier:	**W20**
Fixed Outer Frame Identifier:	**W7**
Transom Frame Identifier:	**W8/W2**
Vent Frame Identifier:	**W8/W5**
Glazing System:	**4 mm Diamant – 8 mm 90% Krypton – 4 mm Total Plus**
Spacer Bar:	**8mm Edgetech Super Spacer 360 with butyl secondary sealant**
Notes:	**This report contains a provisional air leakage figure, and MUST NOT be used for ratings purposes.**

Results

Thermal Transmittance (U_{window})	**2.4**	$W/(m^2K)$
Solar Factor (g_{window})	**0.55**	
Air Leakage Factor (L_{factor})	**0**	$W/(m^2K)$
BFRC Energy Rating Index	**-45**	
BFRC Energy rating Band	**E**	

(Window Configuration as per GGF Document 2.2)
(1230mm wide x 1480mm high –vent next to fixed light)

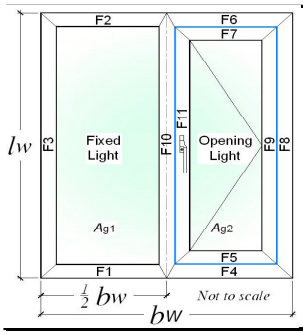
Report Prepared By *Dr Gary Morgan*
Therm Consulting

Signed: *G Morgan*

Date: *14th September 2012*

British Fenestration Rating Council
BFRC Certified Simulator 016

The simulations in this report were performed using Therm 5.2.14 according to EN ISO 10077 – 2:2012
The Therm files generated are attached to this report as appendices



Sample Style:

Casement

Fixed Light / Side Hung

Blue line illustrates opening light length (air leakage)

Report Number: TCL2012-SWA-004 Issue No.21: 04/03/2009

Report Date: Friday, September 14, 2012

Project Details: W20 Steel Frame 4mm Diamant 8mm 90% Krypton 4mm Planitherm Total Plus Edgetech Super Spacer 360

Input Values:

Yellow input, green intermediary, blue finals X' DP is no.of decimal places to enter

Parameter	*Symbol*		*Units*
Total window height ***0DP***	l_w	1480	mm
Total window width ***0DP***	b_w	1230	mm

Nominal 4mm etc to ***0DP***, others ***1DP***

Glazing dimensions and properties:

Thickness of pane 1	4	mm
Pane 1/2 distance	8	mm
Gas fill (1/2)	Krypton 90%	
Thickness of pane 2	4	mm
Complete next 3 cells for TG IGU		
Pane 2/3 distance		mm
Gas fill (2/3)		
Thickness of pane 3		mm
Glazing Trans. - ***3DP*** U_g	1.260	W/(m²·K)
g-value - ***2DP*** $g_?$	0.74	

Thermal transmittance of window from hot box test

U_w - *2DP* W/(m²·K)

Frame dimensions:

	(b_f)	Without gasket (mm)	Gasket protrusion (mm)	With gasket (mm)	
All frame values to nearest 0.5mm, gaskets to ***1DP***	F1 fixed sill	22.5	0.7	23.2	
	F2 fixed head	22.5	0.7	23.2	
	F3 fixed jamb	22.5	0.7	23.2	Total
F4 + F5 sash sill	F4 fixed sash sill	42.5	n/a	42.5	56.2
	F5 moving sash sill	13	0.7	13.7	
F6 + F7 sash head	F6 fixed sash head	42.5	n/a	42.5	56.2
	F7 moving sash head	13	0.7	13.7	
F8 + F9 sash jamb	F8 Fixed sash jamb	42.5	n/a	42.5	56.2
	F9 moving sash jamb	13	0.7	13.7	
F10 + F11 mullion	F10 fixed mullion	61	0.7	61.7	75.4
	F11 moving mullion	13	0.7	13.7	
	Total gasket area		0.0054309	m^2	

Window Dimensions:

	Length	Width	Area No gasket	Area With gasket
Section	(m)	(m)	(m^2)	(m^2)
Fixed Light	1.4350	0.5620	0.8065	0.8037
Opening light	1.3690	0.5160	0.7064	0.7038
Total glazing, A_g			1.5129	1.5074
Frame	(m)	(m)	(m^2)	(m^2)
F1	0.6150	0.0225	0.0132	0.0136
F2	0.6150	0.0225	0.0132	0.0136
F3	1.4800	0.0225	0.0328	0.0338
F4	0.6150	0.0425	0.0246	0.0246
F5	0.5420	0.0130	0.0069	0.0072
F6	0.6150	0.0425	0.0246	0.0246
F7	0.5420	0.0130	0.0069	0.0072
F8	1.4800	0.0425	0.0611	0.0611
F9	1.3950	0.0130	0.0180	0.0189
F10	1.4800	0.0610	0.0883	0.0893
F11	1.3950	0.0130	0.0180	0.0189
Total Frame			0.3075	0.3130
Total Window, A_w			1.8204	1.8204
Percentage fixed light glass area			44.30%	44.15%
Percentage opening light glass area			38.80%	38.66%
Percentage glass area (total)			83.11%	82.81%

Where a U_d value from hot box testing is available, no L_f^{2D} or L_ψ^{2D} values need to be entered

Frame conductance:

All *L* values to ***4DP***. All b values to ***0DP***

	L_f^{2D} W/(m·K)	b_p (mm)	L_ψ^{2D} W/(m·K)	b_g (mm)
F1 fixed sill	0.4679	190	0.4505	190
F2 fixed head	0.4679	190	0.4505	190
F3 fixed jamb	0.4679	190	0.4505	190
F4 + F5 sash sill	0.6748	190	0.6589	190
F6 + F7 sash head	0.6748	190	0.6589	190
F8 + F9 sash jamb	0.6748	190	0.6589	190
F10 + F11 mullion	1.1082	380	1.0758	380

Frame:

Section	b_f *(no gaskets)* (m)	U_f (W/(m²·K))	Frame areas (no gaskets) (m^2)	Heat flow (W/K)	Ψ (W/(m·K))	l_g (m)	Heat flow (W/K)
F1 fixed sill	0.0225	7.3306	0.0132	0.0971	0.0462	0.5620	0.0259
F2 fixed head	0.0225	7.3306	0.0132	0.0971	0.0462	0.5620	0.0259
F3 fixed jamb	0.0225	7.3306	0.0328	0.2404	0.0462	1.4350	0.0662
F4 + F5 sash sill	0.0555	6.6998	0.0315	0.2108	0.0477	0.5160	0.0246
F6 + F7 sash head	0.0555	6.6998	0.0315	0.2108	0.0477	0.5160	0.0246
F8 + F9 sash jamb	0.0555	6.6998	0.0791	0.5297	0.0477	1.3690	0.0652
F10 + F11 mullion	0.0740	6.7875	0.1063	0.7213	0.0947	1.4020	0.1328
Totals			0.3075	2.1071	Total		0.3654

Solar Factor, *g*-value:

F_w	0.9
g_w	0.55

Air Leakage loss:

Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - ***2DP*** 0.00 m³/(m·h)

Opening light length	3.8740	m	Total air leakage	0.000	m^3/h
L_{50}	0.00	$m^3/(m^2?h)$	Heat loss = 0.0165 L_{50}	0.00	W/(m²·K)

U_{window} U_w 2.41 W/(m²·K)

Other parameters needed for calculation, taken from simulations:

Panel thickness, $d_p = d_g$ = 0.016 m

λ_p = 0.035 W/(m·K) R_{se} = 0.04 m²·K/W R_{se} = 0.13 m²·K/W

R_p = 0.4571 m²·K/W R_{tot} = 0.6271 m²·K/W U_p = 1.5945 W/(m²·K)

BFRC Rating kWh/(m²·yr)	Label index	EWER Rating Scale	Window Rating
? 0	-45	A	E
-10 to <0		B	
-20 to <-10		C	
-30 to <-20		D	
-50 to <-30 ⇦		⇨ E ⇦	
-70 to <-50		F	
<-70		G	

BFRC Rating =

218.6g_{window} - 68.5 x (U_{window} + Effective L_{50}) = -44.86

Climate zone is: UK

Thermal transmittance, W/(m²·K)	U_{window}	2.4
Solar factor	g_{window}	0.55
Window air leakage heat loss, W/(m²·K)	L_{factor}	0.00

British Fenestration Rating Council

BFRC Certified Simulator 016

Simulator Name: Dr Gary Morgan

Version 10 22/07/2011. Calculations according to BS EN 673:2011

Number of spaces
1

Spaces 1

Glazing orientation	
	Vertical
Resistivity panes	1 m·K/W

Outside

	Pane 1		Pane 2
		90%	
		Gas	
		Krypton	
Thickness (mm)	4.0	8	4.0
Normal emissivity		0.89	0.05
$\Sigma d_j/\lambda_j$ =	0.008	Uncoated	

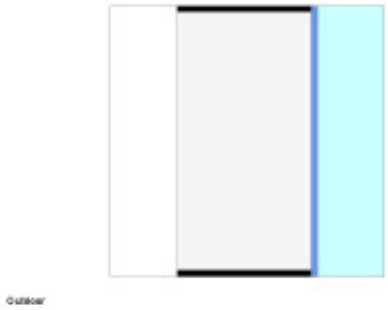
For uncoated surfaces input 0.89 for normal emissivity, which corresponds to a corrected emissivity of 0.837

Iteration number	U value	$\Sigma 1/h_s$	Space 1 λeff	Space 1 ΔT
	W/(m²K)	(m²K)/W	W/(mK)	
1	1.260	0.61563	0.0130	15
2	1.260	0.61563	0.0130	15

SAINT-GOBAIN
GLASS

Calumen® II 1.2.3
14 September 2012

Glazing design



	First glazing	Second glazing
Gas		Krypton 92% 8mm
Coating		PLANITHERM TOTAL+
First glass	DIAMANT 4mm	PLANILUX 4mm
Coating		
Layer		
Coating		
Second glass		
Coating		

Manufacturing sizes

Nominal thickness :	16.0	mm
Weight :	20.0	kg/m²

Luminous factors

Transmittance :	81	%
Outdoor reflectance :	12	%
Indoor reflectance :	12	%

Energy factors

Transmittance :	63	%
Outdoor reflectance :	21	%
Indoor reflectance :	19	%
Absorptance A1 :	3	%
Absorptance A2 :	13	%
Solar factor g :	0.74	
Shading coefficient :	0.85	

Thermal transmission - 0° related to vertical position

Ug :	1.2	W/(m².K)

Calumen II

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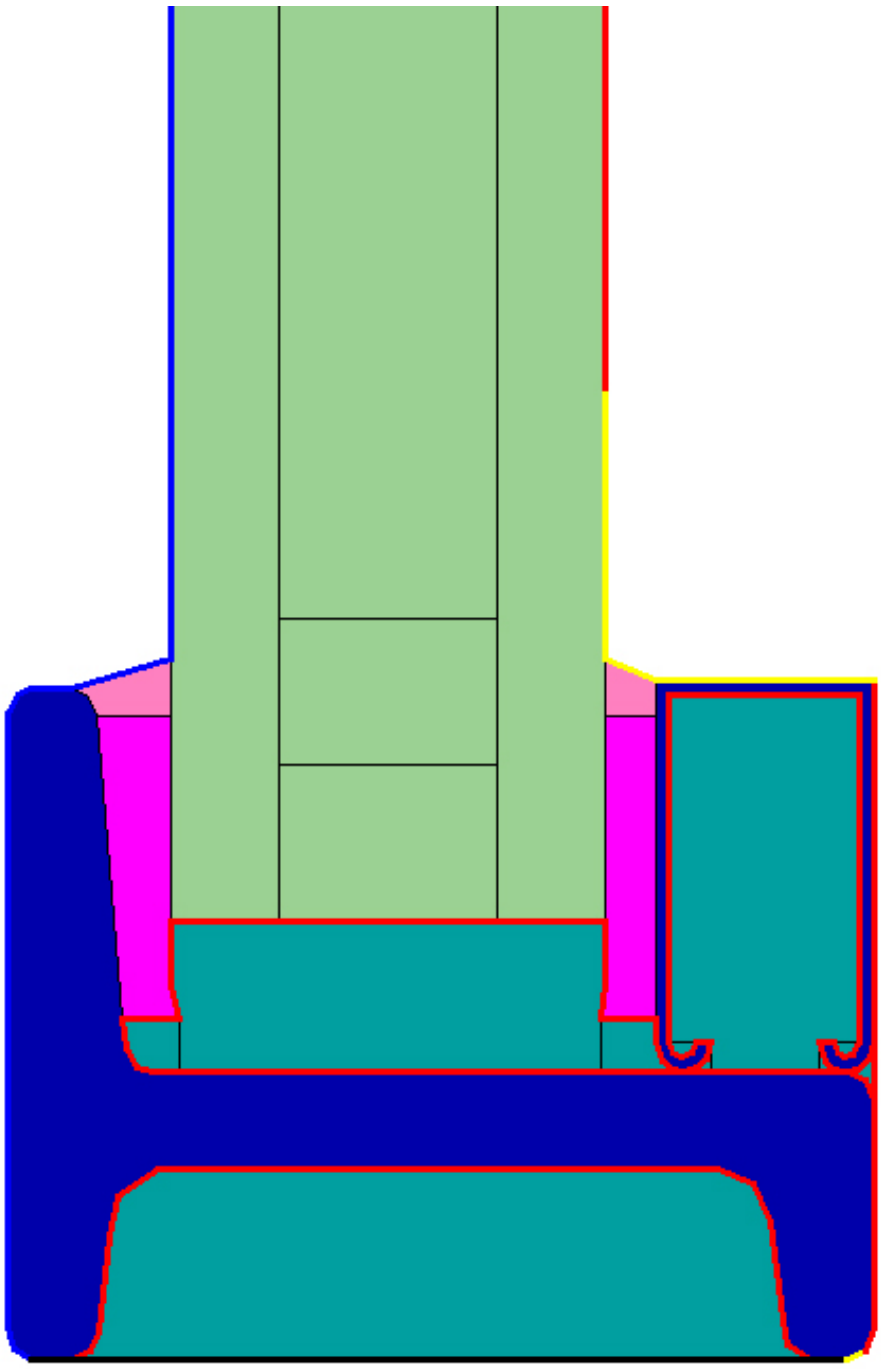


Therm Version 5.2 (5.2.14)
Date: Fri Sep 14 15:00:39 2012

Created by:
Created for:

Therm Filename: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Outer Panel.THM
Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Outer.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K
LINEAR TRANSMITTANCE	1000.00	Custom	0.4679

Solid Materials

Name	Conductivity W/m-K	Emissivity
CEN Insulation Panel	0.04	0.90
CEN Steel	50.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90

Cavities

Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff W/m-K	Cavity Height mm
17	Horizontal	15.00	0.90	5.00	0.90	25.72	5.97	N/A	0.0405	N/A
20	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
22	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
8	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
11	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
13	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
18	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
21	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
24	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
26	Horizontal	15.00	0.90	5.00	0.90	0.52	1.05	N/A	0.0250	N/A

Glazing Systems

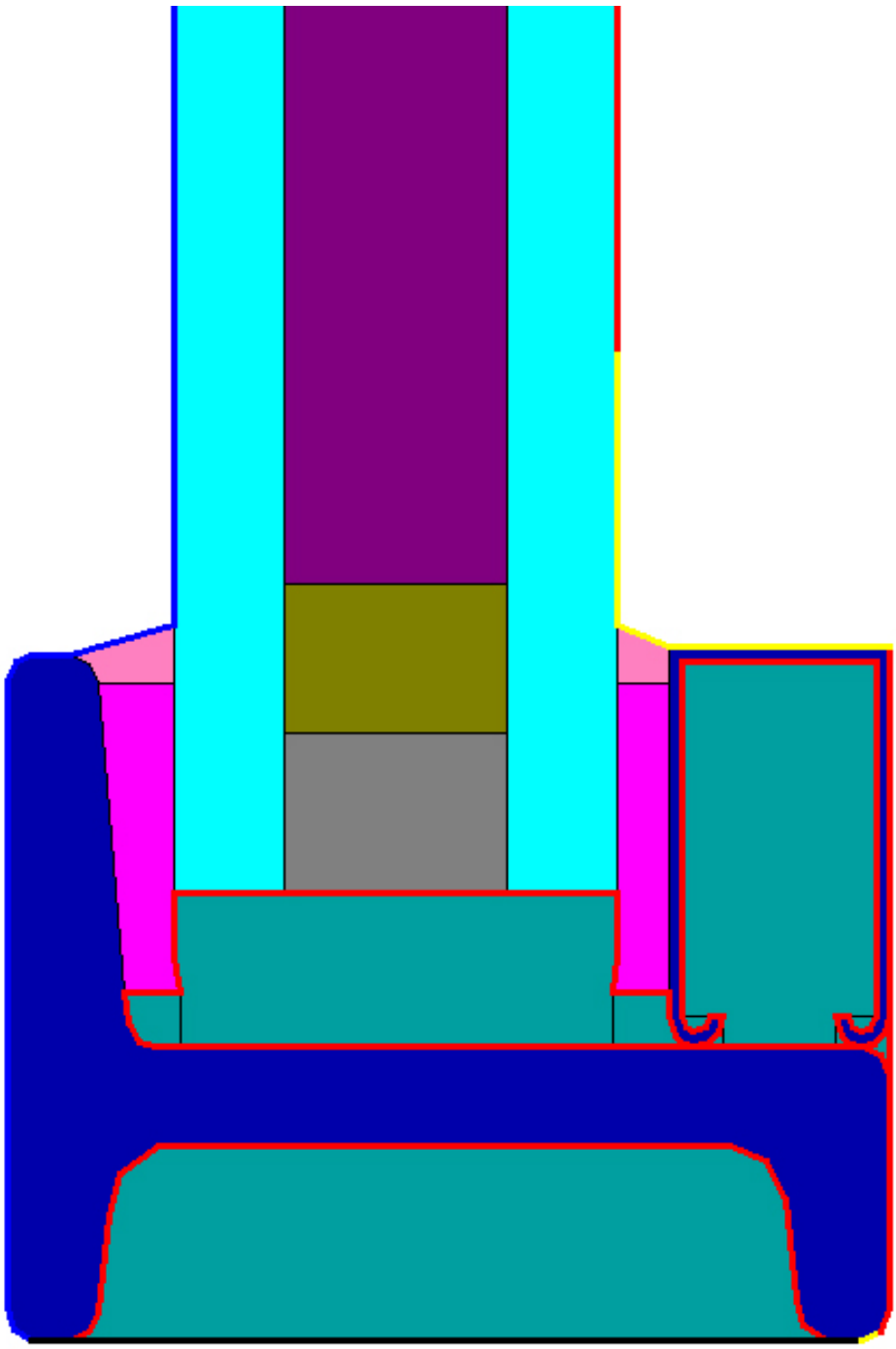
None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Red Rad	20.00	5.000
CEN Interior	20.00	7.692

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 4%
Calculations done in Version 5.2 (5.2.14)



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Date: Fri Sep 14 15:01:42 2012

Created by:
Created for:

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Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Outer.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K
LINEAR TRANSMITTANCE	1000.00	Custom	0.4505

Solid Materials

Name	Conductivity W/m-K	Emissivity
CEN Edgetech Super Spacer Standard	0.12	0.90
CEN Butyl Solid / Hot Melt	0.24	0.90
CEN Steel	50.00	0.90
CEN Glass	1.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90
4 8 4 Total Plus and Krypton	0.01	0.90

Cavities

Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff W/m-K	Cavity Height mm
17	Horizontal	15.00	0.90	5.00	0.90	25.72	5.97	N/A	0.0405	N/A
20	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
22	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
8	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
11	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
13	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
18	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
21	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
24	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
26	Horizontal	15.00	0.90	5.00	0.90	0.52	1.05	N/A	0.0250	N/A

Glazing Systems

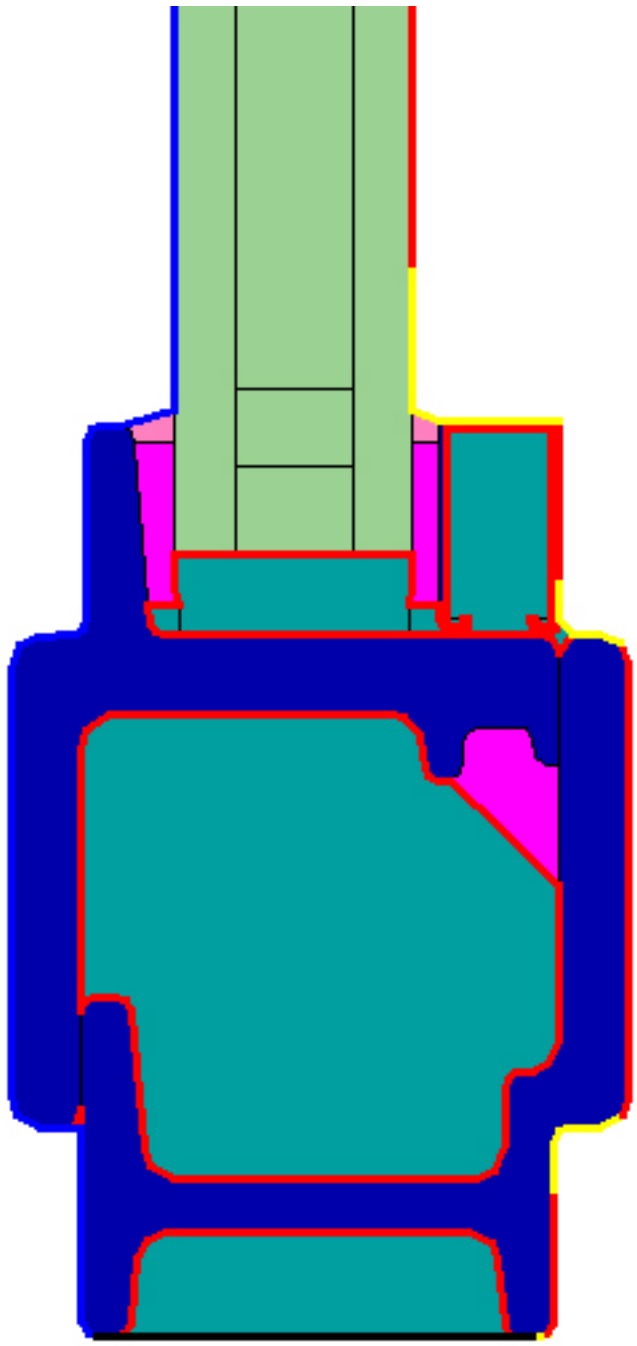
None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Red Rad	20.00	5.000
CEN Interior	20.00	7.692

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 3.7%
Calculations done in Version 5.2 (5.2.14)



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Date: Fri Sep 14 15:03:09 2012

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Created for:

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Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Sash.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K
Linear Transmittance	1000.00	Custom	0.6748

Solid Materials

Name	Conductivity	Emissivity

	W/m-K	
CEN Insulation Panel	0.04	0.90
CEN Steel	50.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90

Cavities

Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff Cavity Height W/m-K	mm
11	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
10	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
9	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
8	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
7	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
6	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
5	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
4	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
34	Horizontal	15.00	0.90	5.00	0.90	0.55	0.48	N/A	0.0250	N/A
36	Horizontal	15.00	0.90	5.00	0.90	0.56	0.56	N/A	0.0250	N/A
37	Horizontal	15.00	0.90	5.00	0.90	29.73	26.02	N/A	0.0468	N/A
39	Horizontal	15.00	0.90	5.00	0.90	25.74	6.06	N/A	0.0405	N/A
43	Horizontal	15.00	0.90	5.00	0.90	1.24	1.24	N/A	0.0250	N/A

Glazing Systems

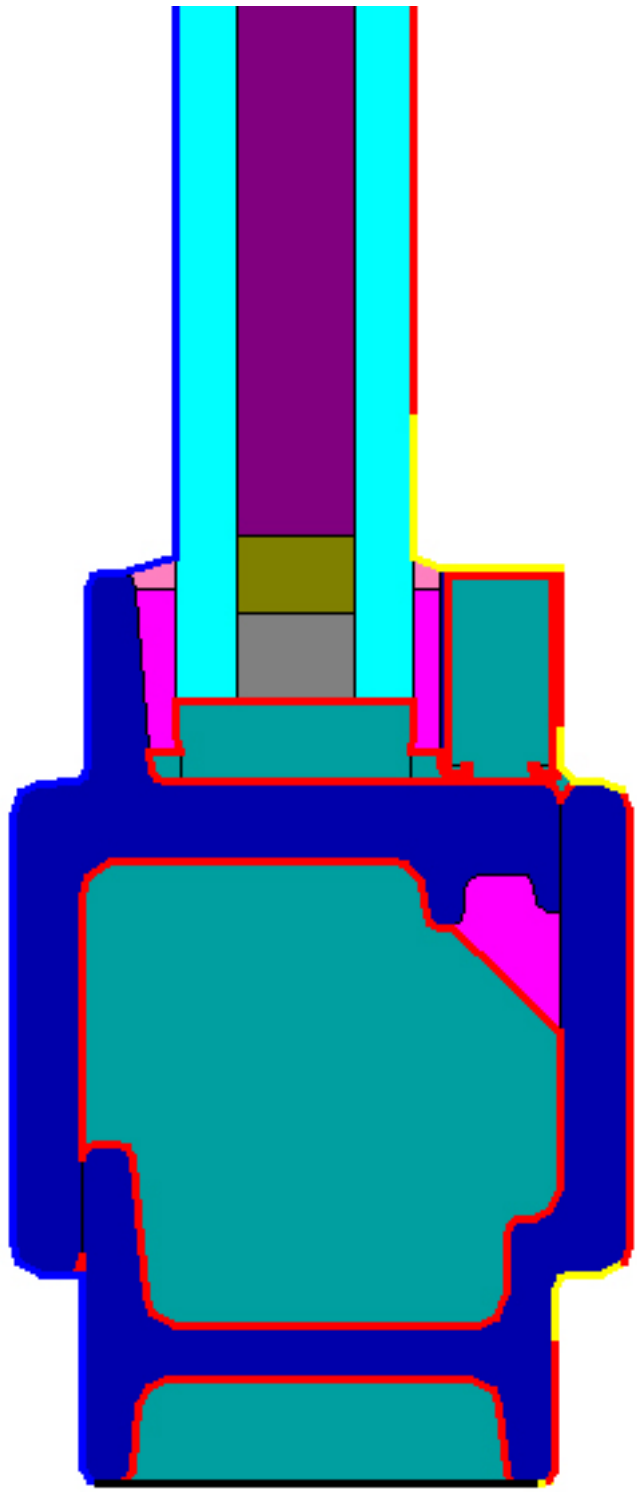
None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Red Rad	20.00	5.000
CEN Interior	20.00	7.692

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 4.3%
Calculations done in Version 5.2 (5.2.14)



Therm Version 5.2 (5.2.14)
Date: Fri Sep 14 15:04:21 2012

Created by:
Created for:

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Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Sash.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K

Linear Transmittance1000.00 Custom 0.6589

Solid Materials

Name	Conductivity W/m-K	Emissivity
CEN Edgetech Super Spacer Stan dard	0.12	0.90
CEN Butyl Solid / Hot Melt	0.24	0.90
CEN Steel	50.00	0.90
CEN Glass	1.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90
4 8 4 Total Plus and Krypton	0.01	0.90

Cavities
Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff W/m-K	Cavity Height mm
11	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
10	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
9	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
8	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
7	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
6	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
5	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
4	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
34	Horizontal	15.00	0.90	5.00	0.90	0.55	0.48	N/A	0.0250	N/A
36	Horizontal	15.00	0.90	5.00	0.90	0.56	0.56	N/A	0.0250	N/A
37	Horizontal	15.00	0.90	5.00	0.90	29.73	26.02	N/A	0.0468	N/A
39	Horizontal	15.00	0.90	5.00	0.90	25.74	6.06	N/A	0.0405	N/A
43	Horizontal	15.00	0.90	5.00	0.90	1.24	1.24	N/A	0.0250	N/A

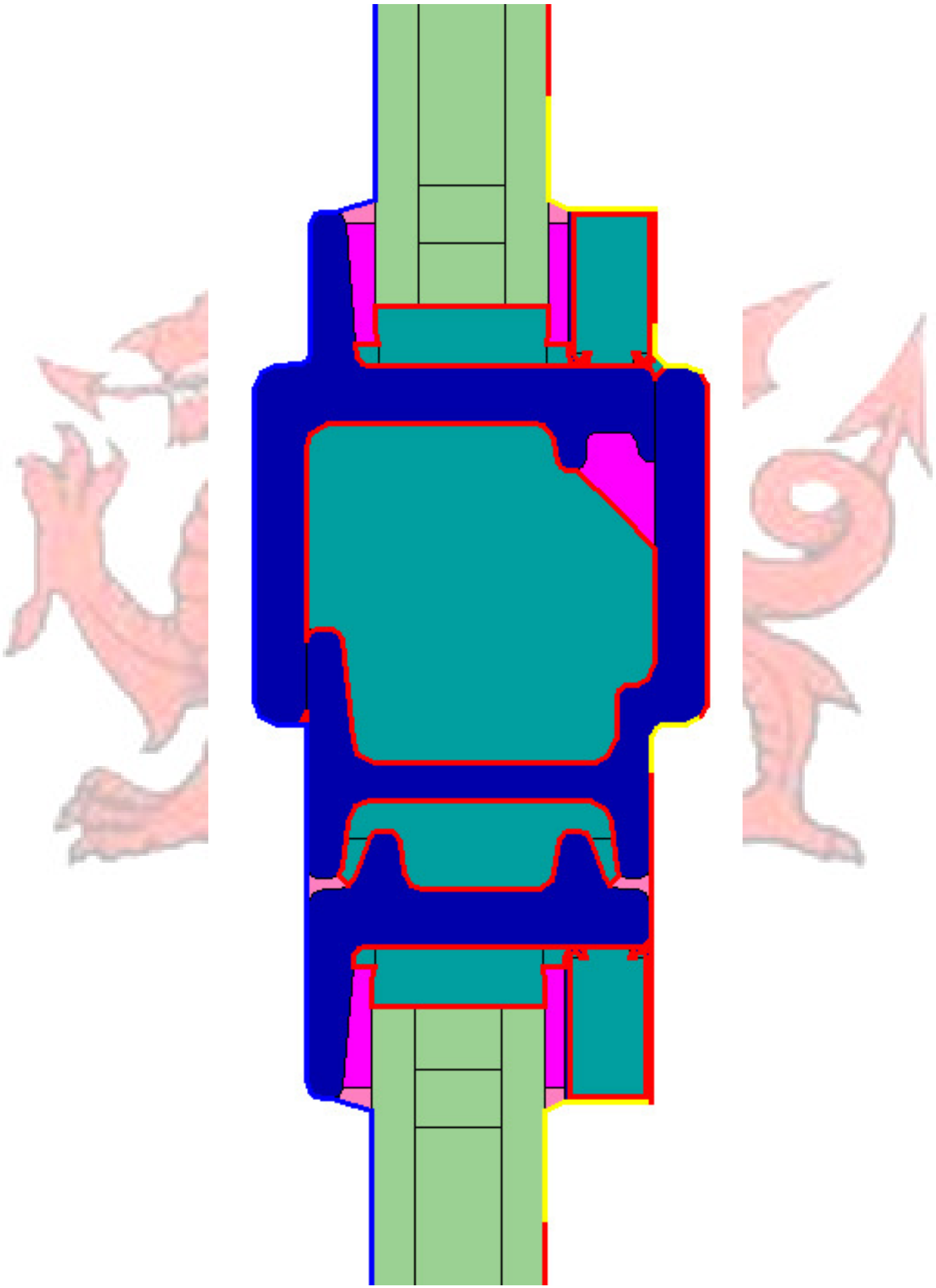
Glazing Systems
None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Red Rad	20.00	5.000
CEN Interior	20.00	7.692

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 4.2%
Calculations done in Version 5.2 (5.2.14)



Therm Version 5.2 (5.2.14)
Date: Fri Sep 14 15:06:32 2012

Created by:
Created for:

Therm Filename: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Mullion Panels.THM
Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Mullion.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K
LINEAR TRANSMITTANCE	1000.00	Custom	1.1082

Solid Materials

Name	Conductivity W/m-K	Emissivity
CEN Insulation Panel	0.04	0.90
CEN Steel	50.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90

Cavities

Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff W/m-K	Cavity Height mm
188	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
187	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
186	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
185	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
184	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
183	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
182	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
181	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
158	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
157	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
156	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
155	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
154	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
153	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
152	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
151	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
146	Horizontal	15.00	0.90	5.00	0.90	0.55	0.48	N/A	0.0250	N/A
145	Horizontal	15.00	0.90	5.00	0.90	0.56	0.56	N/A	0.0250	N/A
144	Horizontal	15.00	0.90	5.00	0.90	29.73	26.02	N/A	0.0468	N/A

142	Horizontal	15.00	0.90	5.00	0.90	1.24	1.24	N/A
0.0250	N/A							
202	Horizontal	15.00	0.90	5.00	0.90	2.04	2.86	N/A
0.0250	N/A							
173	Horizontal	15.00	0.90	5.00	0.90	2.04	2.86	N/A
0.0250	N/A							
176	Horizontal	15.00	0.90	5.00	0.90	20.88	6.20	N/A
0.0328	N/A							
1	Horizontal	15.00	0.90	5.00	0.90	0.50	1.03	N/A
0.0250	N/A							

Glazing Systems

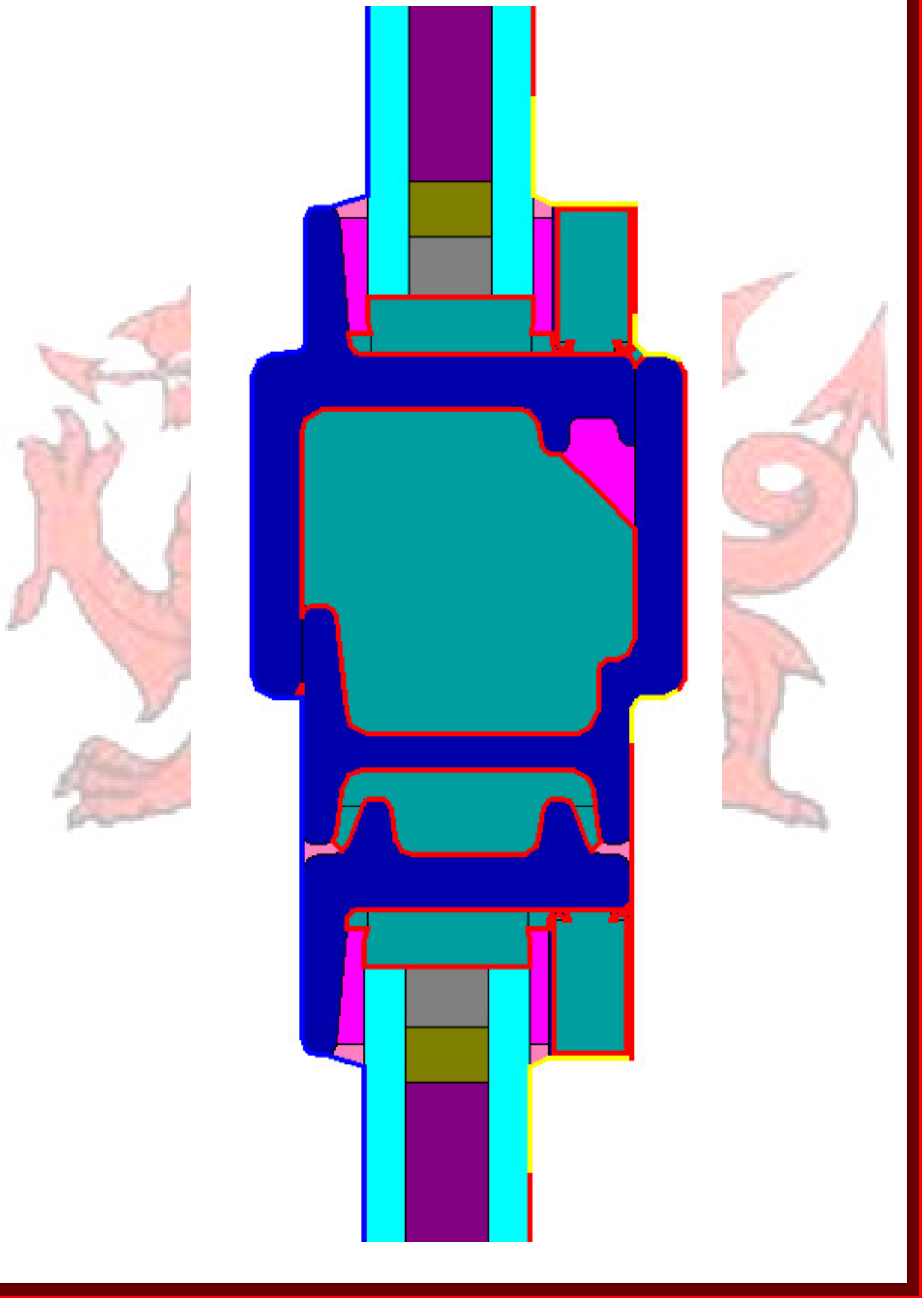
None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Interior	20.00	7.692
CEN Red Rad	20.00	5.000

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 5.2%
Calculations done in Version 5.2 (5.2.14)



Therm Version 5.2 (5.2.14)
Date: Fri Sep 14 15:08:25 2012

Created by:
Created for:

Therm Filename: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Mullion Glazed.THM
Cross Section Type: Sill
Underlay Name: D:\MyDocs from Thermbridge\Therm Output Files\Steel Window Association\September 2012\NSB-THERM- Simulations\W20 Domestic\Mullion.dxf

U-factors

Name	Length mm	Basis	U-factor W/m2-K
LINEAR TRANSMITTANCE	1000.00	Custom	1.0758

Solid Materials

Name	Conductivity W/m-K	Emissivity
CEN Edgetech Super Spacer Standard	0.12	0.90
CEN Butyl Solid / Hot Melt	0.24	0.90
CEN Steel	50.00	0.90
CEN Glass	1.00	0.90
CEN PVC Flexible	0.14	0.90
CEN Silicone	0.35	0.90
4 8 4 Total Plus and Krypton	0.01	0.90

Cavities

Name: CEN Cavity (Unventilated) - Detailed
Gas Fill: Air
Convection Model: CEN
Radiation Model: Advanced

Poly ID	Heat Flow Dir	Side 1 Temp C	Side 1 Emis	Side 2 Temp C	Side 2 Emis	Dimension Horz. mm	Dimension Vert. mm	Nu #	Keff W/m-K	Cavity Height mm
188	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
187	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
186	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
185	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
184	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
183	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
182	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
181	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
158	Horizontal	15.00	0.90	5.00	0.90	1.95	1.70	N/A	0.0250	N/A
157	Horizontal	15.00	0.90	5.00	0.90	2.54	1.52	N/A	0.0250	N/A
156	Horizontal	15.00	0.90	5.00	0.90	15.89	4.96	N/A	0.0250	N/A
155	Horizontal	15.00	0.90	5.00	0.90	0.50	0.50	N/A	0.0250	N/A
154	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
153	Horizontal	15.00	0.90	5.00	0.90	0.51	0.51	N/A	0.0250	N/A
152	Horizontal	15.00	0.90	5.00	0.90	0.84	0.42	N/A	0.0250	N/A
151	Horizontal	15.00	0.90	5.00	0.90	6.88	12.28	N/A	0.0250	N/A
146	Horizontal	15.00	0.90	5.00	0.90	0.55	0.48	N/A	0.0250	N/A

145	Horizontal	15.00	0.90	5.00	0.90	0.56	0.56	N/A
0.0250	N/A							
144	Horizontal	15.00	0.90	5.00	0.90	29.73	26.02	N/A
0.0468	N/A							
142	Horizontal	15.00	0.90	5.00	0.90	1.24	1.24	N/A
0.0250	N/A							
202	Horizontal	15.00	0.90	5.00	0.90	2.04	2.86	N/A
0.0250	N/A							
173	Horizontal	15.00	0.90	5.00	0.90	2.04	2.86	N/A
0.0250	N/A							
176	Horizontal	15.00	0.90	5.00	0.90	20.88	6.20	N/A
0.0328	N/A							
1	Horizontal	15.00	0.90	5.00	0.90	0.50	1.03	N/A
0.0250	N/A							

Glazing Systems

None

Standard Boundary Conditions

Name	Temperature C	Film Coefficient W/m2-K
CEN Exterior	0.00	25.000
CEN Interior	20.00	7.692
CEN Red Rad	20.00	5.000

Calculation Specifications

Mesh Parameter : 9
Estimated Error: 5%
Calculations done in Version 5.2 (5.2.14)