

## TEST REPORT FOR GRAHAM ARCHITECTURAL PRODUCTS CORP.

Report No: K7668.03-116-45 R0

Date: 03/02/20

### SECTION 6

### SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W2700/W4500 Inswing Casement)												
Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft2-F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)		
1	NO FOAM: clr / arg97 / E180 (6mm/6mm) - 1" IG											
	0.224	0.500	0.223					ARG97	0.068(#3)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.36				VT (N) 0.41		CR 56		
2	NO FOAM: E272 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.042(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.23				VT (N) 0.38		CR 56		
3	NO FOAM: E340 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.028(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.12				VT (N) 0.20		CR 57		
4	NO FOAM: E366 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.020(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.16				VT (N) 0.34		CR 57		
5	NO FOAM: E366 / arg97 / i89 (6mm/6mm) - 1" IG											
	0.224	0.500	0.223					ARG97	0.020(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.38			SHGC (N) 0.16				VT (N) 0.33		CR 46		
6	NO FOAM: SunGuard SN68 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.22				VT (N) 0.37		CR 54		
7	NO FOAM: SunGuard SN68 / arg97 / clr (6mm/8mm) - 1-1/4" IG											
	0.221	0.700	0.294					ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.22				VT (N) 0.36		CR 54		
8	NO FOAM: SunGuard SN68 on Crystal Blue / arg97 / clr (6mm/8mm) - 1-1/4" IG											
	0.221	0.700	0.294					ARG97	0.039(#2)	BL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.17				VT (N) 0.24		CR 54		
9	NO FOAM: SunGuard AG43 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.067(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.18				VT (N) 0.23		CR 54		
10	NO FOAM: SunGuard AG50 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.059(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.20				VT (N) 0.27		CR 54		

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### SECTION 6 (Continued)

### SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W2700/W4500 Inswing Casement)												
Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft <sup>2</sup> -F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)		
11	NO FOAM: SunGuard SNX 51/23 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.021(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.14				VT (N) 0.28		CR 55		
12	NO FOAM: SunGuard SNX 62/27 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.020(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.16				VT (N) 0.33		CR 55		
13	NO FOAM: E272 / air / clr (6mm/6mm) - 1-1/4" IG											
	0.224	0.750	0.224					AIR	0.042(#2)	CL	SS-D	N
	U-Factor 0.43			SHGC (N) 0.23				VT (N) 0.38		CR 53		
14	NO FOAM: SB60 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.223	0.750	0.223					ARG97	0.035(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.23				VT (N) 0.38		CR 54		
15	NO FOAM: SB70 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.223	0.750	0.223					ARG97	0.018(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.16				VT (N) 0.35		CR 55		
16	NO FOAM: SunGuard SN68 / arg97 / IS-20 (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.039(#2) / 0.198(#4)	CL	TS-D	N
	U-Factor 0.37			SHGC (N) 0.21				VT (N) 0.36		CR 47		
17	NO FOAM: SunGuard SN68 / arg97 / clr / arg90 / clr (5mm/5mm/5mm) - 1-1/2" IG											
	0.182	0.469	0.182	0.469	0.182			ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.37			SHGC (N) 0.20				VT (N) 0.34		CR 62		
18	NO FOAM: SunGuard SN68 / arg97 / clr / arg90 / SunGuard SN68 (5mm/5mm/5mm) - 1-1/2" IG											
	0.182	0.469	0.182	0.469	0.182			ARG97	0.039(#2) / 0.039(#5)	CL	SS-D	N
	U-Factor 0.34			SHGC (N) 0.19				VT (N) 0.28		CR 62		
19	NO FOAM: E272 / air / E180 (#4) / air / clr (5mm/3mm/5mm) - 1-1/2" IG											
	0.187	0.500	0.118	0.500	0.185			AIR	0.042(#2) / 0.068(#4)	CL	SS-D	N
	U-Factor 0.34			SHGC (N) 0.21				VT (N) 0.34		CR 63		
20	NO FOAM: E272 / arg97 / E180 (#4) / arg90 / i89 (5mm/3mm/5mm) - 1-1/2" IG											
	0.187	0.500	0.118	0.500	0.187			ARG97	0.042(#2) / 0.068(#4) / 0.149(#6)	CL	SS-D	N
	U-Factor 0.31			SHGC (N) 0.21				VT (N) 0.33		CR 59		

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### SECTION 6 (Continued)

### SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (W2700/W4500 Inswing Casement)												
Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft <sup>2</sup> -F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)		
21	FOAM: clr / arg97 / E180 (6mm/6mm) - 1" IG											
	0.224	0.500	0.223					ARG97	0.068(#3)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.36				VT (N) 0.41		CR 56		
22	FOAM: E272 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.042(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.23				VT (N) 0.38		CR 56		
23	FOAM: E340 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.028(#2)	CL	SS-D	N
	U-Factor 0.39			SHGC (N) 0.12				VT (N) 0.20		CR 57		
24	FOAM: E366 / arg97 / clr (6mm/6mm) - 1" IG											
	0.224	0.500	0.224					ARG97	0.020(#2)	CL	SS-D	N
	U-Factor 0.39			SHGC (N) 0.16				VT (N) 0.34		CR 57		
25	FOAM: E366 / arg97 / i89 (6mm/6mm) - 1" IG											
	0.224	0.500	0.223					ARG97	0.020(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.37			SHGC (N) 0.16				VT (N) 0.33		CR 46		
26	FOAM: SunGuard SN68 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.22				VT (N) 0.37		CR 54		
27	FOAM: SunGuard SN68 / arg97 / clr (6mm/8mm) - 1-1/4" IG											
	0.221	0.700	0.294					ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.22				VT (N) 0.36		CR 54		
28	FOAM: SunGuard SN68 on Crystal Blue / arg97 / clr (6mm/8mm) - 1-1/4" IG											
	0.221	0.700	0.294					ARG97	0.039(#2)	BL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.17				VT (N) 0.24		CR 54		
29	FOAM: SunGuard AG43 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.067(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.18				VT (N) 0.23		CR 54		
30	FOAM: SunGuard AG50 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.059(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.20				VT (N) 0.27		CR 54		

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TOTAL PRODUCT CALCULATIONS (W2700/W4500 Inswing Casement)												
Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft2-F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)		
31	FOAM: SunGuard SNX 51/23 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.021(#2)	CL	SS-D	N
	U-Factor 0.39			SHGC (N) 0.14				VT (N) 0.28		CR 55		
32	FOAM: SunGuard SNX 62/27 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.020(#2)	CL	SS-D	N
	U-Factor 0.39			SHGC (N) 0.16				VT (N) 0.33		CR 55		
33	FOAM: E272 / air / clr (6mm/6mm) - 1-1/4" IG											
	0.224	0.750	0.224					AIR	0.042(#2)	CL	SS-D	N
	U-Factor 0.41			SHGC (N) 0.23				VT (N) 0.38		CR 53		
34	FOAM: SB60 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.223	0.750	0.223					ARG97	0.035(#2)	CL	SS-D	N
	U-Factor 0.40			SHGC (N) 0.23				VT (N) 0.38		CR 55		
35	FOAM: SB70 / arg97 / clr (6mm/6mm) - 1-1/4" IG											
	0.223	0.750	0.223					ARG97	0.018(#2)	CL	SS-D	N
	U-Factor 0.39			SHGC (N) 0.16				VT (N) 0.35		CR 55		
36	FOAM: SunGuard SN68 / arg97 / IS-20 (6mm/6mm) - 1-1/4" IG											
	0.221	0.750	0.221					ARG97	0.039(#2) / 0.198(#4)	CL	TS-D	N
	U-Factor 0.36			SHGC (N) 0.21				VT (N) 0.36		CR 48		
37	FOAM: SunGuard SN68 / arg97 / clr / arg90 / clr (5mm/5mm/5mm) - 1-1/2" IG											
	0.182	0.469	0.182	0.469	0.182			ARG97	0.039(#2)	CL	SS-D	N
	U-Factor 0.35			SHGC (N) 0.20				VT (N) 0.34		CR 62		
38	FOAM: SunGuard SN68 / arg97 / clr / arg90 / SunGuard SN68 (5mm/5mm/5mm) - 1-1/2" IG											
	0.182	0.469	0.182	0.469	0.182			ARG97	0.039(#2) / 0.039(#5)	CL	SS-D	N
	U-Factor 0.32			SHGC (N) 0.19				VT (N) 0.28		CR 64		
39	FOAM: E272 / air / E180 (#4) / air / clr (5mm/3mm/5mm) - 1-1/2" IG											
	0.187	0.500	0.118	0.500	0.185			AIR	0.042(#2) / 0.068(#4)	CL	SS-D	N
	U-Factor 0.33			SHGC (N) 0.21				VT (N) 0.34		CR 65		
40	FOAM: E272 / arg97 / E180 (#4) / arg90 / i89 (5mm/3mm/5mm) - 1-1/2" IG											
	0.187	0.500	0.118	0.500	0.187			ARG97	0.042(#2) / 0.068(#4) / 0.149(#6)	CL	SS-D	N
	U-Factor 0.30			SHGC (N) 0.21				VT (N) 0.33		CR 59		