

**NFRC U-FACTOR, SHGC, VT, &
CONDENSATION RESISTANCE
COMPUTER SIMULATION REPORT**

**Rendered to:
REMODELERS SUPPLY CENTER / CLIMATE GUARD MANUFACTURING**

**SERIES/MODEL:
CG Thermaforce (Casement)**

**Report Number: D4782.04-116-45
Report Date: 08/18/15**



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REMODELERS SUPPLY CENTER / CLIMATE GUARD MANUFACTURING
2622 N. Pulaski Road
Chicago, Illinois 60639

Report Number: D4782.04-116-45
Simulation Date: 01/23/14
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Project Summary:

Architectural Testing, Inc., an Intertek Company (Intertek-ATI) was contracted to perform U-Factor, Solar Heat Gain Coefficient, Visible Transmittance, and Condensation Resistance* computer simulations in accordance with the National Fenestration Rating Council (NFRC). The products were evaluated in full compliance with NFRC requirements to the standards listed below.

**NFRC's Condensation Resistance rating is NOT equivalent to a Condensation Resistance Factor (CRF) determined in accordance with AAMA 1503.*

Standards:

ANSI/NFRC 100-2014: Procedure for Determining Fenestration Product U-Factors

ANSI/NFRC 200-2014: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

NFRC 500-2014: Procedure for Determining Fenestration Product Condensation Resistance Values

Software:

Frame and Edge Modeling: THERM 6.3.46
Center-of-Glass Modeling: WINDOW 6.3.74
Total Product Calculations: WINDOW 6.3.74
Spectral Data Library: IGDB 41.0

Simulations Specimen Description:

Series/Model: CG Thermaforce (Casement)
Type: Casement, Single Vent
Frame Material: VY Vinyl
Sash Material: VY Vinyl
Standard Size: 600mm x 1500mm

Modeling Assumptions/Technical Interpretations:

- 1) To prevent air infiltration, tape was applied to all interior sash crack locations.
- 2) The nailing flange was not modeled because it has been deemed removable by the manufacturer.

Specialty Products Table:

The specialty products method allow the manufacturer to determine the overall product SHGC and VT for any glazing option. The center of glass SHGC and/or VT must be determined using WINDOW 6.3.74. The method gives overall product SHGC and VT indexed on center of glass properties. All values used in the calculations are truncated to six decimal place precision.

	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.004731	0.006976	0.009115
SHGC1	0.752569	0.685972	0.622496
VT0	0.000000	0.000000	0.000000
VT1	0.747838	0.678997	0.613381

$$SHGC = SHGC0 + SHGCc (SHGC1 - SHGC0)$$

$$VT = VT0 + VTc (VT1 - VT0)$$

Validation Matrix:

The following products are part of a validation matrix. Only one is required for validation testing.

<i>Product Line</i>	<i>Report Number</i>
None	-

Spacer Option Description

<i>Spacer Type</i>	<i>Sealant</i>		<i>Code</i>
	<i>Primary</i>	<i>Secondary</i>	
GED Standard Intercept Spacer	Butyl Rubber	-	CU-D
GED Ultra Intercept Spacer	Butyl Rubber	-	SU-D

Grid Option Description

<i>Grid Size</i>	<i>Grid Type</i>	<i>Grid Pattern</i>
3/16" x 5/8"	Aluminum Rectangular Grid (Painted)	NFRC Standard

Reinforcement Option Description

<i>Location</i>	<i>Material</i>
All vertical sash members	Composite

Gas Filling Technique Description

<i>Fill Type</i>	<i>Method</i>
95% Argon	Two-probe with concentration sensor

Edge-of-Glass Construction

<i>Interior Condition</i>	Foam weatherstripping between rigid PVC sash and glass
<i>Exterior Condition</i>	Rigid PVC glazing bead with flexible vinyl fin against glass

Weatherstripping

<i>Type</i>	<i>Quantity</i>	<i>Location</i>
PVC bulb gasket	2 rows	Sash Perimeter
PVC foam-filled bulb gasket	1 row	Sash Perimeter

Frame/Sash Materials Finish

<i>Interior</i>	Vinyl
<i>Exterior</i>	Vinyl

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
1	CLR/AIR/CLR (SS/SS) 3/4"											
	0.086	0.563	0.086					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.61 / 0.55				VT (N / <1) 0.62 / 0.56			CR 43	
	CLR/AIR/CLR (DS/DS) 3/4"											
	0.123	0.500	0.123					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.59 / 0.54				VT (N / <1) 0.61 / 0.56			CR 43	
2	CS73/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.086					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.29			SHGC (N / <1) 0.51 / 0.47				VT (N / <1) 0.58 / 0.53			CR 56	
	CS73/ARG95/CLR (DS/DS) 3/4"											
	0.123	0.500	0.123					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.29			SHGC (N / <1) 0.49 / 0.45				VT (N / <1) 0.56 / 0.50			CR 56	
3	E366/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 59	
	E366/ARG95/CLR (DS/DS) 3/4"											
	0.117	0.500	0.118					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 59	
4	E270/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 58	
	E270/ARG95/CLR (DS/DS) 3/4"											
	0.118	0.500	0.118					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 58	
5	E270/ARG95/CS73 (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 46	
	E270/ARG95/CS73 (DS/DS) 3/4"											
	0.118	0.500	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 46	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
6	E272/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 58	
	E272/ARG95/CLR (DS/DS) 3/4"											
	0.117	0.500	0.118					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 58	
7	CLR/AIR/CLR (SS/SS) 7/8"											
	0.086	0.688	0.086					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.61 / 0.55				VT (N / <1) 0.62 / 0.56			CR 43	
	CLR/AIR/CLR (DS/DS) 7/8"											
	0.123	0.625	0.123					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.59 / 0.54				VT (N / <1) 0.61 / 0.56			CR 43	
8	CLR/AIR/CLR/AIR/CLR (SS/SS/SS) 7/8"											
	0.086	0.297	0.086	0.297	0.086			AIR		CL	CU-D	N
	U-Factor 0.34			SHGC (N) 0.55				VT (N) 0.57			CR 52	
9	CLR/AIR/CLR/AIR/CLR (SS/SS/SS) 7/8"											
	0.086	0.297	0.086	0.297	0.086			AIR		CL	CU-D	G
	U-Factor 0.34			SHGC (<1) 0.50				VT (<1) 0.52			CR 52	
10	CS73/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.086					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.30			SHGC (N / <1) 0.51 / 0.47				VT (N / <1) 0.58 / 0.53			CR 55	
	CS73/ARG95/CLR (DS/DS) 7/8"											
	0.123	0.625	0.123					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.30			SHGC (N / <1) 0.49 / 0.45				VT (N / <1) 0.56 / 0.50			CR 55	
11	CS73/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.086	0.297	0.086			ARG95	0.148(#2)	CL	CU-D	N
	U-Factor 0.26			SHGC (N) 0.47				VT (N) 0.53			CR 59	
12	CS73/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.086	0.297	0.086			ARG95	0.148(#2)	CL	CU-D	G
	U-Factor 0.27			SHGC (<1) 0.43				VT (<1) 0.48			CR 59	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
13	E366/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 58	
	E366/ARG95/CLR (DS/DS) 7/8"											
	0.117	0.625	0.118					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 58	
14	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.022(#2)	CL	CU-D	N
	U-Factor 0.24			SHGC (N) 0.20				VT (N) 0.45			CR 61	
15	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.022(#2)	CL	CU-D	G
	U-Factor 0.25			SHGC (<1) 0.18				VT (<1) 0.41			CR 61	
16	E270/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 58	
	E270/ARG95/CLR (DS/DS) 7/8"											
	0.118	0.625	0.118					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 58	
17	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2)	CL	CU-D	N
	U-Factor 0.25			SHGC (N) 0.26				VT (N) 0.49			CR 61	
18	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2)	CL	CU-D	G
	U-Factor 0.25			SHGC (<1) 0.24				VT (<1) 0.44			CR 61	
19	E270/ARG95/CS73 (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 46	
	E270/ARG95/CS73 (DS/DS) 7/8"											
	0.118	0.625	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 46	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
20	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	N
	U-Factor 0.21			SHGC (N) 0.24				VT (N) 0.41			CR 65	
21	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	G
	U-Factor 0.21			SHGC (<1) 0.22				VT (<1) 0.38			CR 65	
22	E272/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.086					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 58	
	E272/ARG95/CLR (DS/DS) 7/8"											
	0.117	0.625	0.118					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 58	
23	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2)	CL	CU-D	N
	U-Factor 0.25			SHGC (N) 0.30				VT (N) 0.50			CR 61	
24	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2)	CL	CU-D	G
	U-Factor 0.26			SHGC (<1) 0.27				VT (<1) 0.45			CR 61	
25	E272/ARG95/CS73 (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.042(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.30 / 0.28				VT (N / <1) 0.51 / 0.46			CR 46	
	E272/ARG95/CS73 (DS/DS) 7/8"											
	0.117	0.625	0.123					ARG95	0.042(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.30 / 0.27				VT (N / <1) 0.49 / 0.44			CR 46	
26	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	N
	U-Factor 0.21			SHGC (N) 0.27				VT (N) 0.44			CR 65	
27	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	G
	U-Factor 0.21			SHGC (<1) 0.25				VT (<1) 0.40			CR 65	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
28	CLR/AIR/CLR (SS/SS) 1"											
	0.086	0.813	0.086					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.61 / 0.55				VT (N / <1) 0.62 / 0.56			CR 43	
	CLR/AIR/CLR (DS/DS) 1"											
	0.123	0.750	0.123					AIR		CL	CU-D	N,G
	U-Factor 0.43			SHGC (N / <1) 0.59 / 0.54				VT (N / <1) 0.61 / 0.56			CR 43	
29	CLR/AIR/CLR/AIR/CLR (SS/SS/SS) 1"											
	0.086	0.359	0.086	0.359	0.086			AIR		CL	CU-D	N
	U-Factor 0.33			SHGC (N) 0.55				VT (N) 0.57			CR 53	
30	CLR/AIR/CLR/AIR/CLR (SS/SS/SS) 1"											
	0.086	0.359	0.086	0.359	0.086			AIR		CL	CU-D	G
	U-Factor 0.33			SHGC (<1) 0.50				VT (<1) 0.52			CR 53	
31	CS73/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.086					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.30			SHGC (N / <1) 0.51 / 0.47				VT (N / <1) 0.58 / 0.53			CR 54	
	CS73/ARG95/CLR (SS/SS) 1"											
	0.123	0.750	0.123					ARG95	0.148(#2)	CL	CU-D	N,G
	U-Factor 0.30			SHGC (N / <1) 0.49 / 0.45				VT (N / <1) 0.56 / 0.50			CR 54	
32	CS73/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.086	0.359	0.086			ARG95	0.148(#2)	CL	CU-D	N
	U-Factor 0.25			SHGC (N) 0.47				VT (N) 0.53			CR 60	
33	CS73/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.086	0.359	0.086			ARG95	0.148(#2)	CL	CU-D	G
	U-Factor 0.25			SHGC (<1) 0.43				VT (<1) 0.48			CR 60	
34	E366/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 56	
	E366/ARG95/CLR (SS/SS) 1"											
	0.117	0.750	0.118					ARG95	0.022(#2)	CL	CU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 56	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
35	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.022(#2)	CL	CU-D	N
	U-Factor 0.23			SHGC (N) 0.20				VT (N) 0.45			CR 62	
36	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.022(#2)	CL	CU-D	G
	U-Factor 0.24			SHGC (<1) 0.18				VT (<1) 0.41			CR 62	
37	E270/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.28			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 56	
	E270/ARG95/CLR (SS/SS) 1"											
	0.118	0.750	0.118					ARG95	0.037(#2)	CL	CU-D	N,G
	U-Factor 0.28			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 56	
38	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2)	CL	CU-D	N
	U-Factor 0.23			SHGC (N) 0.26				VT (N) 0.49			CR 62	
39	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2)	CL	CU-D	G
	U-Factor 0.24			SHGC (<1) 0.24				VT (<1) 0.44			CR 62	
40	E270/ARG95/CS73 (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 45	
	E270/ARG95/CS73 (SS/SS) 1"											
	0.118	0.750	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 45	
41	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	N
	U-Factor 0.19			SHGC (N) 0.24				VT (N) 0.41			CR 66	
42	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	G
	U-Factor 0.19			SHGC (<1) 0.22				VT (<1) 0.38			CR 66	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
43	E272/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.28			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 56	
	E272/ARG95/CLR (SS/SS) 1"											
	0.117	0.750	0.118					ARG95	0.042(#2)	CL	CU-D	N,G
	U-Factor 0.28			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 56	
44	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2)	CL	CU-D	N
	U-Factor 0.23			SHGC (N) 0.29				VT (N) 0.50			CR 62	
45	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2)	CL	CU-D	G
	U-Factor 0.24			SHGC (<1) 0.27				VT (<1) 0.45			CR 62	
46	E272/ARG95/CS73 (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.042(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.24			SHGC (N / <1) 0.30 / 0.28				VT (N / <1) 0.51 / 0.46			CR 44	
	E272/ARG95/CS73 (SS/SS) 1"											
	0.117	0.750	0.123					ARG95	0.042(#2) / 0.148(#4)	CL	CU-D	N,G
	U-Factor 0.24			SHGC (N / <1) 0.30 / 0.27				VT (N / <1) 0.49 / 0.44			CR 44	
47	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	N
	U-Factor 0.19			SHGC (N) 0.27				VT (N) 0.44			CR 66	
48	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	G
	U-Factor 0.20			SHGC (<1) 0.25				VT (<1) 0.40			CR 66	
49	E366/ARG95/CLR/ARG95/E366 (SS/SS/SS) 1-1/4"											
	0.087	0.484	0.087	0.484	0.087			ARG95	0.022(#2) / 0.022(#5)	CL	CU-D	N,G
	U-Factor 0.17			SHGC (N / <1) 0.18 / 0.17				VT (N / <1) 0.35 / 0.32			CR 66	
50	E366/ARG95/CLR/ARG95/E366 (DS/DS/DS) 1-1/4"											
	0.117	0.438	0.118	0.438	0.117			ARG95	0.022(#2) / 0.022(#5)	CL	CU-D	N,G
	U-Factor 0.18			SHGC (N / <1) 0.18 / 0.17				VT (N / <1) 0.35 / 0.32			CR 66	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
51	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 1-1/4"											
	0.087	0.484	0.087	0.484	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	N,G
	U-Factor 0.18			SHGC (N / <1) 0.24 / 0.22				VT (N / <1) 0.41 / 0.38			CR 67	
52	E270/ARG95/CLR/ARG95/E270 (DS/DS/DS) 1-1/4"											
	0.118	0.438	0.118	0.438	0.118			ARG95	0.037(#2) / 0.037(#5)	CL	CU-D	N,G
	U-Factor 0.18			SHGC (N / <1) 0.24 / 0.22				VT (N / <1) 0.41 / 0.37			CR 66	
53	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 1-1/4"											
	0.087	0.484	0.087	0.484	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	N,G
	U-Factor 0.18			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.44 / 0.40			CR 67	
54	E272/ARG95/CLR/ARG95/E272 (DS/DS/DS) 1-1/4"											
	0.117	0.438	0.118	0.438	0.117			ARG95	0.042(#2) / 0.042(#5)	CL	CU-D	N,G
	U-Factor 0.18			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.43 / 0.39			CR 66	
55	E366/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.25			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 56	
	E366/ARG95/CLR (DS/DS) 3/4"											
	0.117	0.500	0.118					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.25			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 56	
56	E270/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 60	
	E270/ARG95/CLR (DS/DS) 3/4"											
	0.118	0.500	0.118					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 60	
57	E270/ARG95/CS73 (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 48	
	E270/ARG95/CS73 (DS/DS) 3/4"											
	0.118	0.500	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 48	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
58	E272/ARG95/CLR (SS/SS) 3/4"											
	0.087	0.563	0.087					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 60	
	E272/ARG95/CLR (DS/DS) 3/4"											
	0.117	0.500	0.118					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 60	
59	E366/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 56	
	E366/ARG95/CLR (DS/DS) 7/8"											
	0.117	0.625	0.118					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 56	
60	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.022(#2)	CL	SU-D	N
	U-Factor 0.24			SHGC (N) 0.20				VT (N) 0.45			CR 62	
61	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.022(#2)	CL	SU-D	G
	U-Factor 0.25			SHGC (<1) 0.18				VT (<1) 0.41			CR 62	
62	E270/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 60	
	E270/ARG95/CLR (DS/DS) 7/8"											
	0.118	0.625	0.118					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 60	
63	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2)	CL	SU-D	N
	U-Factor 0.24			SHGC (N) 0.26				VT (N) 0.49			CR 63	
64	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2)	CL	SU-D	G
	U-Factor 0.25			SHGC (<1) 0.24				VT (<1) 0.44			CR 63	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
65	E270/ARG95/CS73 (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 48	
	E270/ARG95/CS73 (DS/DS) 7/8"											
	0.118	0.625	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 48	
66	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	SU-D	N
	U-Factor 0.20			SHGC (N) 0.24				VT (N) 0.41			CR 68	
67	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	SU-D	G
	U-Factor 0.20			SHGC (<1) 0.22				VT (<1) 0.38			CR 68	
68	E272/ARG95/CLR (SS/SS) 7/8"											
	0.087	0.688	0.086					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 60	
	E272/ARG95/CLR (DS/DS) 7/8"											
	0.117	0.625	0.118					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 60	
69	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2)	CL	SU-D	N
	U-Factor 0.24			SHGC (N) 0.30				VT (N) 0.50			CR 63	
70	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2)	CL	SU-D	G
	U-Factor 0.25			SHGC (<1) 0.27				VT (<1) 0.45			CR 63	
71	E272/ARG95/CS73 (SS/SS) 7/8"											
	0.087	0.688	0.087					ARG95	0.042(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.30 / 0.28				VT (N / <1) 0.51 / 0.46			CR 48	
	E272/ARG95/CS73 (DS/DS) 7/8"											
	0.117	0.625	0.123					ARG95	0.042(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.22			SHGC (N / <1) 0.30 / 0.27				VT (N / <1) 0.49 / 0.44			CR 48	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) <small>Grids (None / <1 / >=1)</small>				Visible Transmittance (VT) <small>Grids (None / <1 / >=1)</small>			Condensation Resistance	
72	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	SU-D	N
	U-Factor 0.20			SHGC (N) 0.27				VT (N) 0.44			CR 68	
73	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 7/8"											
	0.087	0.297	0.087	0.297	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	SU-D	G
	U-Factor 0.21			SHGC (<1) 0.25				VT (<1) 0.40			CR 68	
74	E366/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.49 / 0.44			CR 55	
	E366/ARG95/CLR (SS/SS) 1"											
	0.117	0.750	0.118					ARG95	0.022(#2)	CL	SU-D	N,G
	U-Factor 0.26			SHGC (N / <1) 0.21 / 0.19				VT (N / <1) 0.48 / 0.44			CR 55	
75	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.022(#2)	CL	SU-D	N
	U-Factor 0.22			SHGC (N) 0.20				VT (N) 0.45			CR 64	
76	E366/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.022(#2)	CL	SU-D	G
	U-Factor 0.23			SHGC (<1) 0.18				VT (<1) 0.41			CR 64	
77	E270/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.53 / 0.48			CR 59	
	E270/ARG95/CLR (SS/SS) 1"											
	0.118	0.750	0.118					ARG95	0.037(#2)	CL	SU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.28 / 0.26				VT (N / <1) 0.52 / 0.48			CR 59	
78	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2)	CL	SU-D	N
	U-Factor 0.22			SHGC (N) 0.26				VT (N) 0.49			CR 64	
79	E270/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2)	CL	SU-D	G
	U-Factor 0.23			SHGC (<1) 0.24				VT (<1) 0.44			CR 64	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
80	E270/ARG95/CS73 (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.27 / 0.25				VT (N / <1) 0.49 / 0.45			CR 47	
	E270/ARG95/CS73 (SS/SS) 1"											
	0.118	0.750	0.123					ARG95	0.037(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.26 / 0.24				VT (N / <1) 0.47 / 0.43			CR 47	
81	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	SU-D	N
	U-Factor 0.18			SHGC (N) 0.24				VT (N) 0.41			CR 70	
82	E270/ARG95/CLR/ARG95/E270 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.037(#2) / 0.037(#5)	CL	SU-D	G
	U-Factor 0.19			SHGC (<1) 0.22				VT (<1) 0.38			CR 70	
83	E272/ARG95/CLR (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.32 / 0.29				VT (N / <1) 0.54 / 0.49			CR 59	
	E272/ARG95/CLR (SS/SS) 1"											
	0.117	0.750	0.118					ARG95	0.042(#2)	CL	SU-D	N,G
	U-Factor 0.27			SHGC (N / <1) 0.31 / 0.29				VT (N / <1) 0.54 / 0.49			CR 59	
84	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2)	CL	SU-D	N
	U-Factor 0.22			SHGC (N) 0.29				VT (N) 0.50			CR 64	
85	E272/ARG95/CLR/ARG95/CLR (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2)	CL	SU-D	G
	U-Factor 0.23			SHGC (<1) 0.27				VT (<1) 0.45			CR 64	
86	E272/ARG95/CS73 (SS/SS) 1"											
	0.087	0.813	0.087					ARG95	0.042(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.30 / 0.28				VT (N / <1) 0.51 / 0.46			CR 47	
	E272/ARG95/CS73 (SS/SS) 1"											
	0.117	0.750	0.123					ARG95	0.042(#2) / 0.148(#4)	CL	SU-D	N,G
	U-Factor 0.23			SHGC (N / <1) 0.30 / 0.27				VT (N / <1) 0.49 / 0.44			CR 47	

**NFRC 100/200/500 Summary Sheet
CG Thermaforce (Casement)**

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) <small>Grids (None / <1 / >=1)</small>				Visible Transmittance (VT) <small>Grids (None / <1 / >=1)</small>			Condensation Resistance	
87	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	SU-D	N
	U-Factor 0.18			SHGC (N) 0.27				VT (N) 0.44			CR	70
88	E272/ARG95/CLR/ARG95/E272 (SS/SS/SS) 1"											
	0.087	0.359	0.087	0.359	0.087			ARG95	0.042(#2) / 0.042(#5)	CL	SU-D	G
	U-Factor 0.19			SHGC (<1) 0.25				VT (<1) 0.40			CR	70

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.

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 Certification Authorization Report (CAR) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes. The ratings values were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy.

Intertek-ATI is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The values included in this report are not considered in compliance with ANSI/NFRC 100, ANSI/NFRC 200, and/or NFRC 500 unless the associated validation test requirements have been satisfied, as applicable.

This report is reissued in the name of Climate Guard Manufacturing through written authorization of Deceuninck North America, LLC, to whom the original report was rendered. The original Deceuninck North America, LLC report number is D4782.01-116-45.

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period. The test record retention end date for this report is January 25, 2014.

Results obtained are simulated values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the product simulated. This report may not be reproduced, except in full, without the written approval of Intertek-ATI

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D4782.04-116-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (11)