



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

**Rendered to:
COEUR D'ALENE WINDOW COMPANY**

**SERIES/MODEL:
3411 Casement**

**Report Number: F3147.01-201-45
Report Date: 02/01/16**



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COMPUTER SIMULATION REPORT**

Rendered to:
COEUR D'ALENE WINDOW COMPANY
3808 N. Sullivan Rd.
Spokane Valley, Washington 99216

Report Number: F3147.01-201-45
Simulation Date: 02/01/16
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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

**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 44.0

Simulations Specimen Description:

Series/Model: 3411 Casement
Type: Casement, Single Vent
Frame Material: VA Vinyl w/ All Members Reinforced
OT Vinyl w/ All Members Reinforced w/ Foam-filled Insulation
Sash Material: VA Vinyl w/ All Members Reinforced
Standard Size: 600mm x 1500mm

Modeling Assumptions/Technical Interpretations:

- 1) Nailing fin was removable and not simulated per NFRC 100-2014 section 4.2.5.A.
- 2) Dividers were not modeled for options where there was at least 3mm of air/gas space between the divider and both adjacent glazing surfaces per NFRC 100-2014, section 4.2.4.1.D.ii.a.
- 3) Multi-purpose products grouped for one validation matrix per NFRC 100-2014, section 4.2.3.2: This product validated the Series 3511 Awning in Architectural Testing, Inc. report number F3148.01-201-45.
- 4) Divider grouping per NFRC 100-2014, section 4.2.4.1: 0.188" x 0.625" rectangular, 0.188" x 0.750" rectangular, 0.188" x 0.813" rectangular, 0.188" x 1.000" rectangular, and 0.217" x 0.709" contour dividers were grouped with 0.188" x 1.000" as group leader.

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 | 0.006503 | 0.008633 | 0.010659 |
| SHGC1 | 0.686259 | 0.623076 | 0.563013 |
| VT0 | 0.000000 | 0.000000 | 0.000000 |
| VT1 | 0.679756 | 0.614442 | 0.552354 |

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

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

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> |
|----------------------|----------------------|
| Series 3411 Casement | F3147.01-201-45 |
| Series 3511 Awning | F3148.01-201-45 |

Spacer Option Description

| <i>Spacer Type</i> | <i>Sealant</i> | | <i>Code</i> |
|--------------------|-----------------|------------------|-------------|
| | <i>Primary</i> | <i>Secondary</i> | |
| Cardinal Endur | Polyisobutylene | Silicone | SS-D |

Grid Option Description

| <i>Grid Size</i> | <i>Grid Type</i> | <i>Grid Pattern</i> |
|------------------|-------------------------------------|---------------------|
| 0.188" x 0.625" | Aluminum Rectangular Grid (Painted) | NFRC Standard |
| 0.188" x 0.750" | Aluminum Rectangular Grid (Painted) | NFRC Standard |
| 0.188" x 1.000" | Aluminum Rectangular Grid (Painted) | NFRC Standard |
| 0.217" x 0.708" | Aluminum Contoured Grid (Painted) | NFRC Standard |

Reinforcement Option Description

| <i>Location</i> | <i>Material</i> |
|----------------------------------|-----------------|
| Large Frame Cavity (Dwg# 310-A1) | Alum. (Mill) |
| Small Frame Cavity (Dwg# 325-A3) | Alum. (Mill) |
| Sash (Dwg# 310-A2) | Alum. (Mill) |

Gas Filling Technique Description

| <i>Fill Type</i> | <i>Method</i> |
|------------------|----------------|
| 90% Argon | Vacuum Chamber |

Edge-of-Glass Construction

| <i>Interior Condition</i> | |
|---------------------------|------------------------|
| | Foam Weather Stripping |
| <i>Exterior Condition</i> | |
| | Vinyl Glazing Bead |

Weatherstripping

| <i>Type</i> | <i>Quantity</i> | <i>Location</i> |
|------------------------|-----------------|---------------------------------|
| Foam Weather Stripping | 1 Row | Frame Perimeter, Sash Perimeter |
| Mohair | 1 Row | Sash Perimeter |

Frame/Sash Materials Finish

| <i>Interior</i> | |
|-----------------|-------|
| | Vinyl |
| <i>Exterior</i> | |
| | Vinyl |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| No Foam (IDs 1-44) | | | | | | | | | | | | |
| 1 | 2mm Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | | CL | SS-D | N,G,S |
| | U-Factor 0.42 | | | SHGC (N / <1 / >1) 0.55 / 0.50 / 0.45 | | | | VT (N / <1 / >1) 0.57 / 0.51 / 0.46 | | | CR 46 | |
| 2 | 2mm 270 Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR 60 | |
| 3 | 2mm 366 Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.45 / 0.40 / 0.36 | | | CR 60 | |
| 4 | 2mm Arg 270 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.32 / 0.30 / 0.27 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR 60 | |
| 5 | 2mm Arg 366 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.23 | | | | VT (N / <1 / >1) 0.45 / 0.40 / 0.36 | | | CR 60 | |
| 6 | 2mm 366 Arg 180 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.43 / 0.39 / 0.35 | | | CR 60 | |
| 7 | 2mm 270 Arg 270 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.33 | | | CR 60 | |
| 8 | 3mm Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | | CL | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.54 / 0.49 / 0.44 | | | | VT (N / <1 / >1) 0.56 / 0.51 / 0.45 | | | CR 45 | |
| 9 | 3mm 180 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.068(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.44 / 0.40 / 0.37 | | | | VT (N / <1 / >1) 0.54 / 0.49 / 0.44 | | | CR 58 | |
| 10 | 3mm 340 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.028(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.13 / 0.12 / 0.11 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | | CR 59 | |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 11 | 3mm 270 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR | 59 |
| 12 | 3mm 366 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.118 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.40 / 0.36 | | | CR | 59 |
| 13 | 3mm 180 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.068(#2) / 0.149(#4) | CL | SS-D | N,G,S |
| | U-Factor 0.25 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | | CR | 46 |
| 14 | 3mm 340 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.028(#2) / 0.149(#4) | CL | SS-D | N,G,S |
| | U-Factor 0.25 | | | SHGC (N / <1 / >1) 0.12 / 0.11 / 0.10 | | | | VT (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | CR | 47 |
| 15 | 3mm 270 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.037(#2) / 0.149(#4) | CL | SS-D | N,G,S |
| | U-Factor 0.25 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.42 / 0.38 | | | CR | 46 |
| 16 | 3mm 366 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.117 | | | | | ARG90 | 0.022(#2) / 0.149(#4) | CL | SS-D | N,G,S |
| | U-Factor 0.24 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.43 / 0.39 / 0.35 | | | CR | 47 |
| 17 | 3mm BZ Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | | BZ | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.34 | | | CR | 45 |
| 18 | 3mm GY Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | | GY | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.40 / 0.37 / 0.33 | | | | VT (N / <1 / >1) 0.37 / 0.34 / 0.30 | | | CR | 45 |
| 19 | 3mm BZ Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.35 / 0.32 / 0.29 | | | CR | 59 |
| 20 | 3mm GY Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | GY | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.32 / 0.29 / 0.26 | | | CR | 59 |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 21 | 3mm Arg 180 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.47 / 0.43 / 0.39 | | | | VT (N / <1 / >1) 0.54 / 0.49 / 0.44 | | | CR | 58 |
| 22 | 3mm Arg 340 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.028(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.29 / 0.27 / 0.24 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | | CR | 59 |
| 23 | 3mm Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.32 / 0.29 / 0.27 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR | 59 |
| 24 | 3mm Arg 366 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.23 | | | | VT (N / <1 / >1) 0.44 / 0.40 / 0.36 | | | CR | 60 |
| 25 | 3mm 270 Arg 3mm BZ - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.129 | | | | | ARG90 | 0.037(#2) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.35 / 0.32 / 0.29 | | | CR | 59 |
| 26 | 3mm 270 Arg 3mm GY - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.129 | | | | | ARG90 | 0.037(#2) | GY | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.32 / 0.29 / 0.26 | | | CR | 59 |
| 27 | 3mm 180 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.068(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.44 / 0.40 / 0.37 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | | CR | 53 |
| 28 | 3mm 340 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.028(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.13 / 0.12 / 0.11 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | | CR | 58 |
| 29 | 3mm 270 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | | CR | 58 |
| 30 | 3mm 366 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.562 | 0.185 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | | CR | 58 |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 31 | 3mm 366 Arg 180 3mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.118 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.42 / 0.38 / 0.34 | | | CR | 60 |
| 32 | 3mm 270 Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.33 | | | CR | 60 |
| 33 | 4mm Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.154 | | | | | ARG90 | | CL | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.52 / 0.47 / 0.43 | | | | VT (N / <1 / >1) 0.56 / 0.50 / 0.45 | | | CR | 45 |
| 34 | 4mm 180 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.160 | 0.563 | 0.154 | | | | | ARG90 | 0.068(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | | CR | 58 |
| 35 | 4mm 270 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.154 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | | CR | 58 |
| 36 | 4mm 366 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.153 | 0.563 | 0.154 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | | CR | 59 |
| 37 | 4mm SCBZ Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.154 | | | | | ARG90 | | BZ | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.15 / 0.14 / 0.12 | | | CR | 45 |
| 38 | 4mm SCBZ Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#3) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.12 / 0.11 / 0.10 | | | | VT (N / <1 / >1) 0.13 / 0.12 / 0.10 | | | CR | 58 |
| 39 | 4mm Arg 180 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.160 | | | | | ARG90 | 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.46 / 0.42 / 0.38 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | | CR | 58 |
| 40 | 4mm Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.31 / 0.29 / 0.26 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | | CR | 58 |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 41 | 4mm Arg 366 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.153 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.22 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | | CR | 59 |
| 42 | 4mm 270 Arg SCBZ 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.154 | | | | | ARG90 | 0.037(#2) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.21 / 0.20 / 0.18 | | | | VT (N / <1 / >1) 0.13 / 0.12 / 0.10 | | | CR | 58 |
| 43 | 4mm 366 Arg 180 4mm - 7/8" | | | | | | | | | | | |
| | 0.153 | 0.563 | 0.160 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.42 / 0.38 / 0.34 | | | CR | 59 |
| 44 | 4mm 270 Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.23 / 0.21 / 0.19 | | | | VT (N / <1 / >1) 0.40 / 0.36 / 0.32 | | | CR | 59 |
| With Foam (IDs 45-92) | | | | | | | | | | | | |
| 45 | 2mm Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | | CL | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.55 / 0.50 / 0.45 | | | | VT (N / <1 / >1) 0.57 / 0.51 / 0.46 | | | CR | 45 |
| 46 | 2mm 270 Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR | 60 |
| 47 | 2mm 366 Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.45 / 0.40 / 0.36 | | | CR | 60 |
| 48 | 2mm Arg 270 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.32 / 0.30 / 0.27 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR | 60 |
| 49 | 2mm Arg 366 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.23 | | | | VT (N / <1 / >1) 0.45 / 0.40 / 0.36 | | | CR | 60 |
| 50 | 2mm 366 Arg 180 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.43 / 0.39 / 0.35 | | | CR | 60 |

**NFRC 100/200/500 Summary Sheet
3411 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) | | | | |
| 51 | 2mm 270 Arg 270 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.687 | 0.087 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | | CL | SS-D N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.33 | | CR 60 | | |
| 52 | 3mm Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | | CL | SS-D N,G,S | |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.54 / 0.49 / 0.44 | | | | VT (N / <1 / >1) 0.56 / 0.51 / 0.45 | | CR 45 | | |
| 53 | 3mm 180 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.068(#2) | | CL | SS-D N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.44 / 0.40 / 0.37 | | | | VT (N / <1 / >1) 0.54 / 0.49 / 0.44 | | CR 58 | | |
| 54 | 3mm 340 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.028(#2) | | CL | SS-D N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.13 / 0.12 / 0.11 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | CR 59 | | |
| 55 | 3mm 270 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#2) | | CL | SS-D N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | CR 59 | | |
| 56 | 3mm 366 Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.118 | | | | | ARG90 | 0.022(#2) | | CL | SS-D N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.40 / 0.36 | | CR 59 | | |
| 57 | 3mm 180 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.068(#2) / 0.149(#4) | | CL | SS-D N,G,S |
| | U-Factor 0.25 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | CR 46 | | |
| 58 | 3mm 340 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.028(#2) / 0.149(#4) | | CL | SS-D N,G,S |
| | U-Factor 0.24 | | | SHGC (N / <1 / >1) 0.12 / 0.11 / 0.10 | | | | VT (N / <1 / >1) 0.26 / 0.23 / 0.21 | | CR 47 | | |
| 59 | 3mm 270 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.037(#2) / 0.149(#4) | | CL | SS-D N,G,S |
| | U-Factor 0.24 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.42 / 0.38 | | CR 46 | | |
| 60 | 3mm 366 Arg 3mm i89 - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.117 | | | | | ARG90 | 0.022(#2) / 0.149(#4) | | CL | SS-D N,G,S |
| | U-Factor 0.24 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.43 / 0.39 / 0.35 | | CR 47 | | |

**NFRC 100/200/500 Summary Sheet
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| 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 | |
| 61 | 3mm BZ Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | | BZ | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.34 | | | CR | 45 |
| 62 | 3mm GY Arg 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | | GY | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.40 / 0.37 / 0.33 | | | | VT (N / <1 / >1) 0.37 / 0.34 / 0.30 | | | CR | 45 |
| 63 | 3mm BZ Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.35 / 0.32 / 0.29 | | | CR | 59 |
| 64 | 3mm GY Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.129 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | GY | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.32 / 0.29 / 0.26 | | | CR | 59 |
| 65 | 3mm Arg 180 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.47 / 0.43 / 0.39 | | | | VT (N / <1 / >1) 0.54 / 0.49 / 0.44 | | | CR | 58 |
| 66 | 3mm Arg 340 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.028(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.29 / 0.27 / 0.24 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | | CR | 59 |
| 67 | 3mm Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.32 / 0.29 / 0.27 | | | | VT (N / <1 / >1) 0.48 / 0.43 / 0.39 | | | CR | 59 |
| 68 | 3mm Arg 366 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.117 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.23 | | | | VT (N / <1 / >1) 0.44 / 0.40 / 0.36 | | | CR | 59 |
| 69 | 3mm 270 Arg 3mm BZ - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.129 | | | | | ARG90 | 0.037(#2) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.35 / 0.32 / 0.29 | | | CR | 59 |
| 70 | 3mm 270 Arg 3mm GY - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.129 | | | | | ARG90 | 0.037(#2) | GY | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.32 / 0.29 / 0.26 | | | CR | 59 |

**NFRC 100/200/500 Summary Sheet
3411 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) | | | | |
| 71 | 3mm 180 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.068(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.44 / 0.40 / 0.37 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | CR | 53 | |
| 72 | 3mm 340 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.028(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.13 / 0.12 / 0.11 | | | | VT (N / <1 / >1) 0.26 / 0.24 / 0.21 | | CR | 58 | |
| 73 | 3mm 270 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.562 | 0.185 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.26 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | CR | 58 | |
| 74 | 3mm 366 Arg 5mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.562 | 0.185 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | CR | 58 | |
| 75 | 3mm 366 Arg 180 3mm - 7/8" | | | | | | | | | | | |
| | 0.117 | 0.625 | 0.118 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.42 / 0.38 / 0.34 | | CR | 60 | |
| 76 | 3mm 270 Arg 270 3mm - 7/8" | | | | | | | | | | | |
| | 0.118 | 0.625 | 0.118 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.24 / 0.22 / 0.20 | | | | VT (N / <1 / >1) 0.41 / 0.37 / 0.33 | | CR | 60 | |
| 77 | 4mm Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.154 | | | | | ARG90 | | CL | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.52 / 0.47 / 0.43 | | | | VT (N / <1 / >1) 0.56 / 0.50 / 0.45 | | CR | 45 | |
| 78 | 4mm 180 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.160 | 0.563 | 0.154 | | | | | ARG90 | 0.068(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.43 / 0.39 / 0.36 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | CR | 57 | |
| 79 | 4mm 270 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.154 | | | | | ARG90 | 0.037(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | CR | 58 | |
| 80 | 4mm 366 Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.153 | 0.563 | 0.154 | | | | | ARG90 | 0.022(#2) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.19 / 0.18 / 0.16 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | CR | 59 | |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 81 | 4mm SCBZ Arg 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.154 | | | | | ARG90 | | BZ | SS-D | N,G,S |
| | U-Factor 0.41 | | | SHGC (N / <1 / >1) 0.25 / 0.23 / 0.21 | | | | VT (N / <1 / >1) 0.15 / 0.14 / 0.12 | | | CR | 45 |
| 82 | 4mm SCBZ Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#3) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.12 / 0.11 / 0.10 | | | | VT (N / <1 / >1) 0.13 / 0.12 / 0.10 | | | CR | 58 |
| 83 | 4mm Arg 180 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.160 | | | | | ARG90 | 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.29 | | | SHGC (N / <1 / >1) 0.46 / 0.42 / 0.38 | | | | VT (N / <1 / >1) 0.53 / 0.48 / 0.43 | | | CR | 58 |
| 84 | 4mm Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.31 / 0.29 / 0.26 | | | | VT (N / <1 / >1) 0.47 / 0.43 / 0.38 | | | CR | 58 |
| 85 | 4mm Arg 366 4mm - 7/8" | | | | | | | | | | | |
| | 0.154 | 0.563 | 0.153 | | | | | ARG90 | 0.022(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.27 / 0.25 / 0.22 | | | | VT (N / <1 / >1) 0.44 / 0.39 / 0.35 | | | CR | 59 |
| 86 | 4mm 270 Arg SCBZ 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.154 | | | | | ARG90 | 0.037(#2) | BZ | SS-D | N,G,S |
| | U-Factor 0.28 | | | SHGC (N / <1 / >1) 0.21 / 0.20 / 0.18 | | | | VT (N / <1 / >1) 0.13 / 0.12 / 0.10 | | | CR | 58 |
| 87 | 4mm 366 Arg 180 4mm - 7/8" | | | | | | | | | | | |
| | 0.153 | 0.563 | 0.160 | | | | | ARG90 | 0.022(#2) / 0.068(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.19 / 0.17 / 0.16 | | | | VT (N / <1 / >1) 0.42 / 0.38 / 0.34 | | | CR | 59 |
| 88 | 4mm 270 Arg 270 4mm - 7/8" | | | | | | | | | | | |
| | 0.157 | 0.563 | 0.157 | | | | | ARG90 | 0.037(#2) / 0.037(#3) | CL | SS-D | N,G,S |
| | U-Factor 0.27 | | | SHGC (N / <1 / >1) 0.23 / 0.21 / 0.19 | | | | VT (N / <1 / >1) 0.40 / 0.36 / 0.32 | | | CR | 59 |
| 89 | 2mm 270 Arg 2mm Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.297 | 0.087 | 0.297 | 0.087 | | | ARG90 | 0.037(#2) | CL | SS-D | N |
| | U-Factor 0.26 | | | SHGC (N) 0.24 | | | | VT (N) 0.44 | | | CR | 61 |
| 90 | 2mm 270 Arg 2mm Arg 2mm - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.297 | 0.087 | 0.297 | 0.087 | | | ARG90 | 0.037(#2) | CL | SS-D | G,S |
| | U-Factor 0.27 | | | SHGC (<1 / >1) 0.22 / 0.20 | | | | VT (<1 / >1) 0.40 / 0.36 | | | CR | 61 |

**NFRC 100/200/500 Summary Sheet
3411 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 | |
| 91 | 2mm 366 Arg 2mm 180 Arg 2mm i89 - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.297 | 0.087 | 0.297 | 0.087 | | | ARG90 | 0.022(#2) / 0.068(#4) / 0.149(#6) | | CL | SS-D N |
| | U-Factor 0.21 | | | SHGC (N) 0.17 | | | | VT (N) 0.38 | | | CR 54 | |
| 92 | 2mm 366 Arg 2mm 180 Arg 2mm i89 - 7/8" | | | | | | | | | | | |
| | 0.087 | 0.297 | 0.087 | 0.297 | 0.087 | | | ARG90 | 0.022(#2) / 0.068(#4) / 0.149(#6) | | CL | SS-D G,S |
| | U-Factor 0.21 | | | SHGC (<1 / >1) 0.16 / 0.14 | | | | VT (<1 / >1) 0.35 / 0.31 | | | CR 54 | |

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.

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 February 1, 2020.

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

For INTERTEK-ATI:

SIMULATED BY:

REVIEWED BY:

Emmett T. Houlihan
Simulation Technician
NFRC Certified Simulator

Andrew C. Walczak
Simulations Project Manager
Simulator-In-Responsible-Charge

ETH: acw/ppk
F3147.01-201-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (18)

Revision Log

| <u>Rev. #</u> | <u>Date</u> | <u>Page(s)</u> | <u>Revision(s)</u> |
|---------------|-------------|----------------|--|
| 01-R0 | 02/01/16 | NA | Original report issue. Work requested by Mr. Blake Doll of Coeur d'Alene Window Company. |

All drawings and Bills of Material used to simulate this product are enclosed in this Appendix

| 3411 Casement | |
|------------------------------------|---------------|
| Part | Part # |
| Casement Main Frame | KE2010 |
| Casement Sash | KE2011 |
| Glazing Bead | KE1994 |
| Setting Block | 6152 |
| Setting Block Glue | IPS-56-1021 |
| Glazing Tape | VG1216W-FC515 |
| Handle/Cover Kit | OP08-7900-00 |
| Sash Bracket Assy | OP05-8000 |
| Track Assy (13" facemount) | OP05-8100 |
| Dual Arm Operator | OP08-7504 |
| 14" Hinge Arm Podwer LH | HG06-7554 |
| 14" Hinge Arm Podwer RH | HG06-7555 |
| 14" Hinge Track H SS Left Hand | HG06-7564 |
| 14" Hinge Track H SS Right Hand | HG06-7565 |
| Lock Handle | LH18-7524-00 |
| 8-32x1/2" Trilobe Truss Head Screw | M13026 |
| Plastic Handle Plate | G2-HNDLPLT-03 |
| Lock Bar Assy 47.9" 4 Pin | LB10-7512 |
| G5 Guide Housing 1005 | LB05-1005-29 |
| G6 Nylon Striker 1013 | LB06-1013-50 |
| Weather Stripping | E51218KN3020 |
| Weather Stripping | U3532-00000 |
| Weather Stripping | 30018745WHGF |

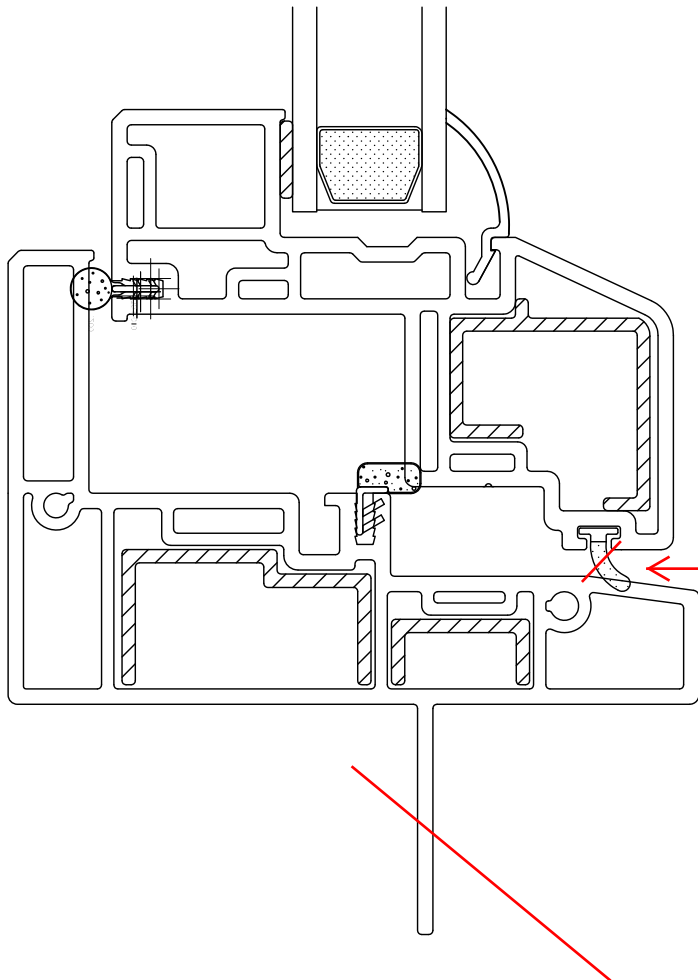
Intertek



Report #: F3147.01-201-45

Date: 01/22/2016

Verified by: *[Signature]*



DWG: 30018745WHGF

| | |
|--|---------------------------------|
| | Report #: F3147.01-201-45 |
| | Date: 01/22/2016 |
| | Verified by: <i>[Signature]</i> |

CYCLOID
DESIGNS



DWG: 310-L2

DATE: 23-MAY-98

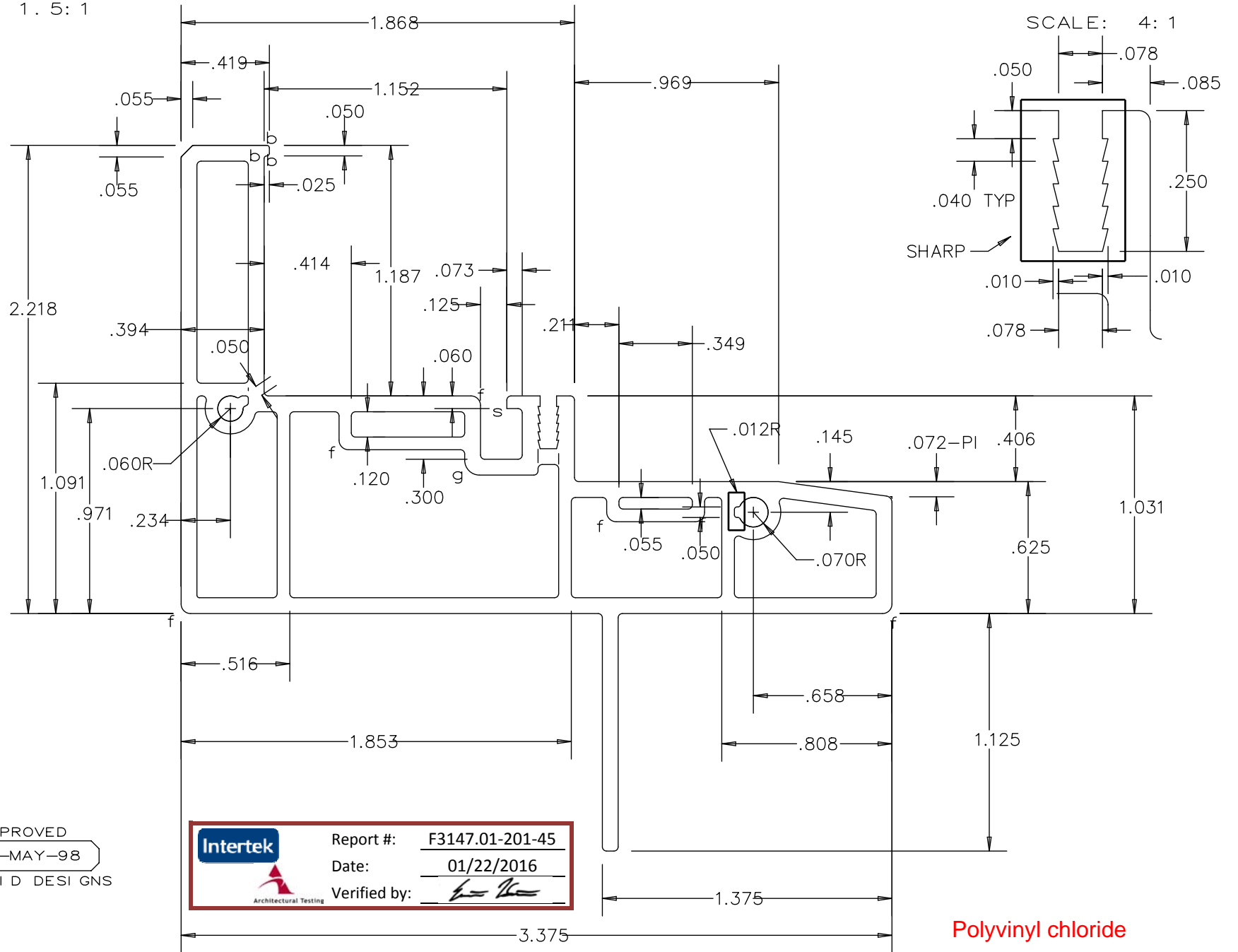
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EXTERNAL WALL: X.XXX
INTERNAL WALL: X.XXX
CORNER TYP: X.XXXR
WEIGHT: X.XXX LB/FT

TITLE: HINGE

SCALE: 1.5:1

- a=.006R
- b=.012R
- c=.015R
- d=.020R
- e=.030R
- f=.045R
- g=.060R
- s=SHARP



APPROVED
23-MAY-98
CYCLOID DESIGNS

| | |
|--|---|
|  Intertek Architectural Testing | Report #: F3147.01-201-45 |
| | Date: 01/22/2016 |
| | Verified by:  |

Polyvinyl chloride

CYCLOID DESIGNS



DWG: 310-D1

DATE: 07-MAY-98

TITLE: CASEMENT FRAME

KE2010

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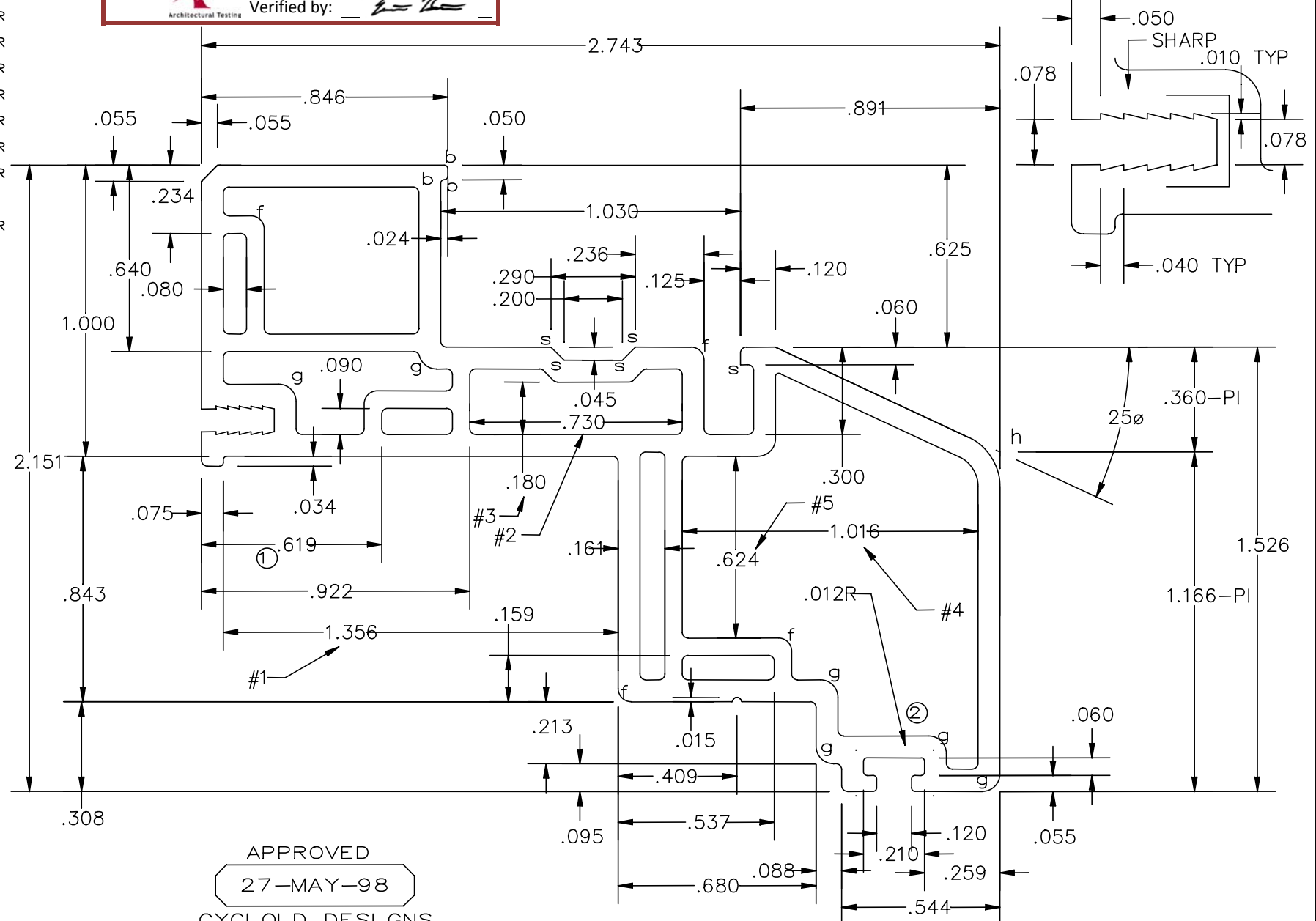
EXTERNAL WALL: 0.075
INTERNAL WALL: 0.060
CORNER TYP: 0.020R
WEIGHT: 0.746 LB/FT



SCALE: 2: 1

- a=0. 006R
- b=0. 012R
- c=0. 015R
- d=0. 020R
- e=0. 030R
- f=0. 045R
- g=0. 060R
- s=SHARP
- h=0. 187R

SCALE: 4: 1



APPROVED
 27-MAY-98
 CYCLOI D DESI GNS

Polyvinyl chloride

| 2 | 07-16-98 | WALL CORRECTED; WT WAS .599 |
|-----|----------|-----------------------------|
| 1 | 07-16-98 | DI MENSION CORRECTED |
| REV | DATE | REMARKS |

CYCLOI D DESI GNS

DWG: 310-D2

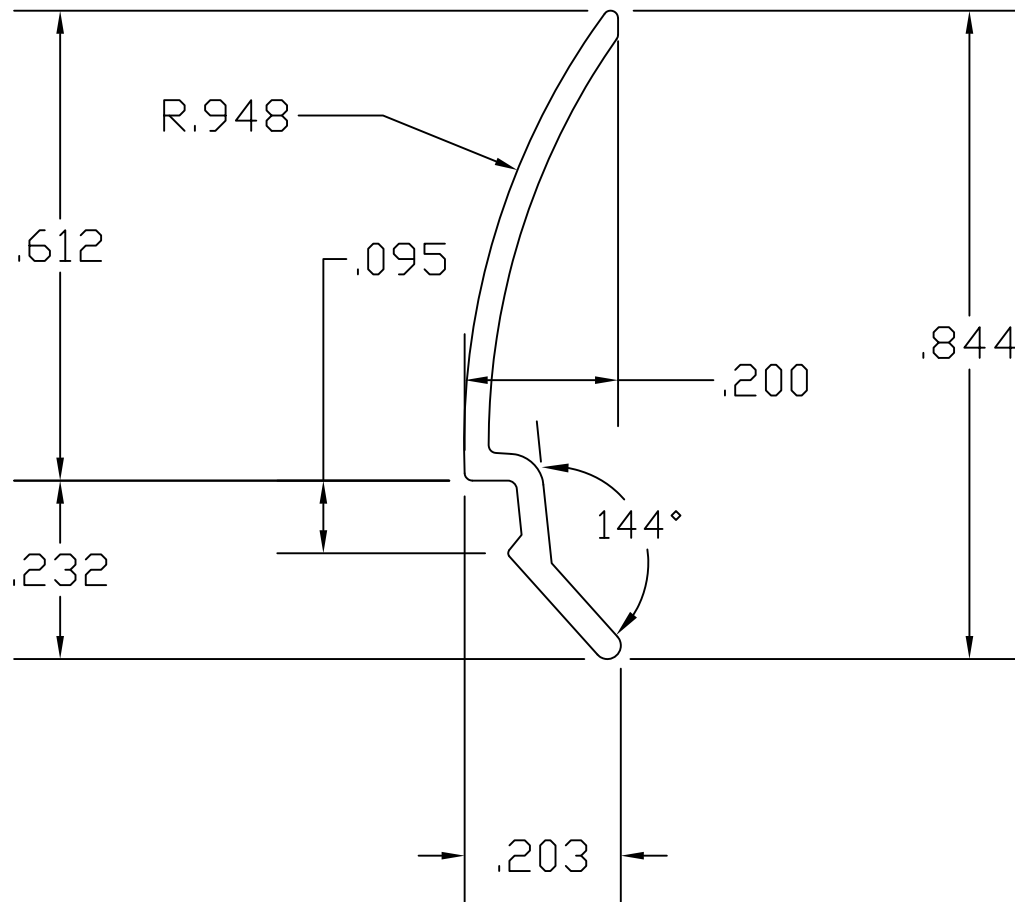
DATE: 23-MAY-98

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 EVERETT, WASHI NGTON
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EXTERNAL WALL: 0. 075
 I NTERNAL WALL: 0. 060
 CORNER TYP: 0. 020R
 WEI GHT: 0. 603 LB/FT

TI TLE: CASEMENT SASH

KE2011



Customer Approval
 By: _____
 Date: _____

Intertek Report #: F3147.01-201-45
 Date: 01/22/2016
 Verified by: *[Signature]*

Polyvinylchloride

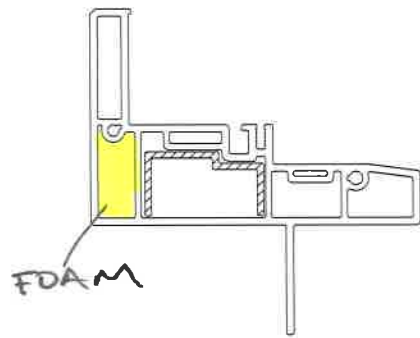
| REV # | DATE | REVISION NOTES |
|-------|------|----------------|
| | | |

| | | |
|--|----------------------------------|-----------------------------|
| External Walls = .065 Internal Walls = .045 | Layout Name: Base | DATE: 4-25-08 |
| | Drawn BY: gmc | SCALE: 4:1 |
| CUSTOMER: RSE | PROJECT: Sierra Classic SlimLine | ACAD#: R1994 Bead |
| | | AREA = .0323 WT/FT = .020 |
| TITLE: Clam Shell Bead | | |

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 Woodbridge, Ontario
 Canada L4L 8Z7
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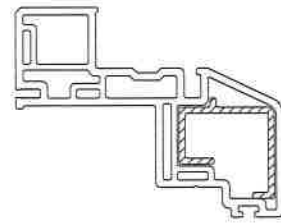
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NO FOAM OR
REINFORCEMENT
FOR 3410 PCL

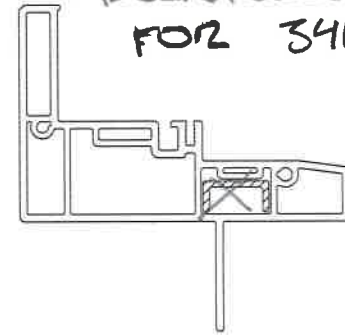


Polyurethane
Foam Insulation

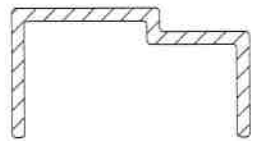
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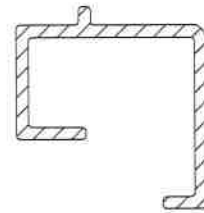
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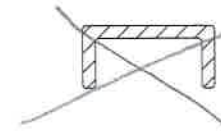
310-A3



$I_{x-x} = 0.005 \text{ in}^4$
 $I_{y-y} = 0.033 \text{ in}^4$
 $S_x = 0.052 \text{ in}^3$
 $Zeta = 3.55^\circ$
 $c = 0.631$
 AREA 0.156
 WT/FT 0.187



$I_{x-x} = 0.016 \text{ in}^4$
 $I_{y-y} = 0.025 \text{ in}^4$
 $S_x = 0.047 \text{ in}^3$
 $Zeta = 25.9^\circ$
 $c = 0.527$
 AREA 0.181
 WT/FT 0.217



AREA 0.077
 WT/FT 0.092

| | |
|--|---------------------------|
| | Report #: F3147.01-201-45 |
| | Date: 01/22/2016 |
| | Verified by: |

CYCLOID
DESIGNS



DWG: 310-A0

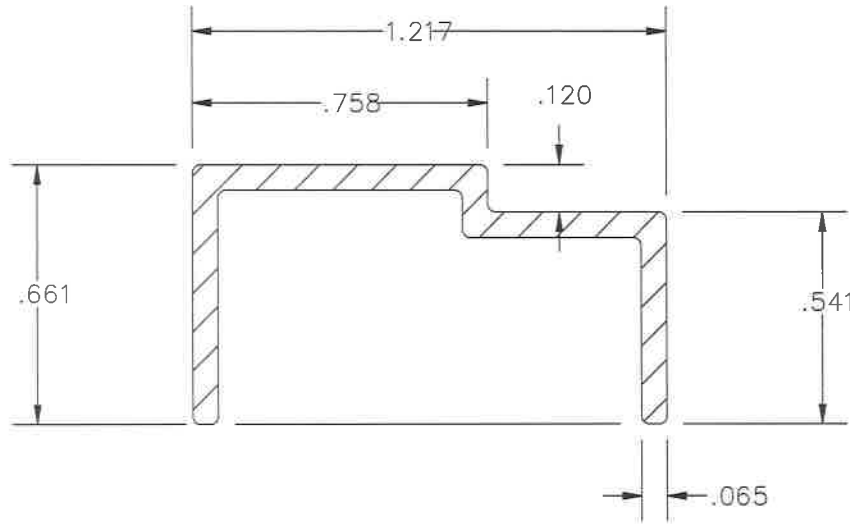
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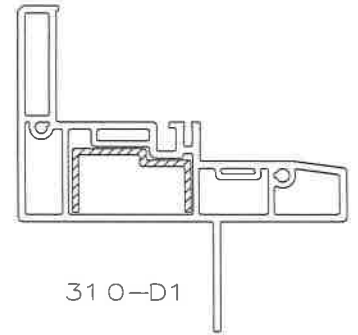
TYPICAL WALL: X.XXX
 CORNER TYP: X.XXX
 AREA: X.XXX IN²
 WEIGHT: X.XXX LB/FT
 ALLOY: 6063T6

TITLE: REINFORCING

SCALE: 2:1



SCALE: 1/2:1



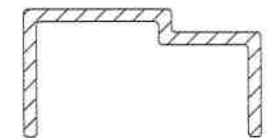
310-D1

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|--|--------------|--------------------|
| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

PHYSICAL PROPERTIES

$I_{x-x} = 0.005 \text{ in}^4$
 $I_{y-y} = 0.033 \text{ in}^4$
 $S_y = 0.052 \text{ in}^3$
 $Zeta = 3.55^\circ$
 $c = 0.631$

Aluminum Alloy
(Mill Finish)

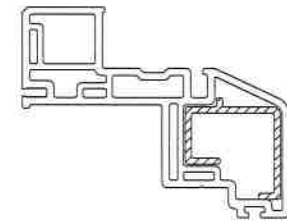
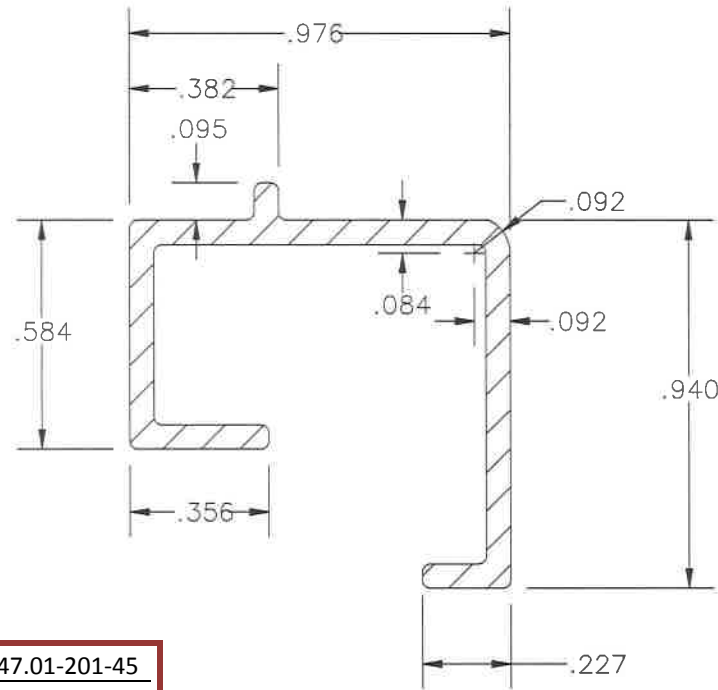


ACTUAL SIZE

| | | | | |
|-----------------|--------------------------|-----------------|--|---|
| CYCLOID DESIGNS | DWG: 310-A1 | DATE: 25-AUG-98 | © 1998 COPYRIGHT ROYAL SIERRA EXTRUSIONS INC RENO, NEVADA ALL RIGHTS RESERVED | TYPICAL WALL: 0.065 CORNER TYP: 0.020 AREA: 0.156 IN ² WEIGHT: 0.187 LB/FT ALLOY: 6063T6 |
| | TITLE: FRAME REINFORCING | | | |

SCALE: 2:1

SCALE: 1/2:1



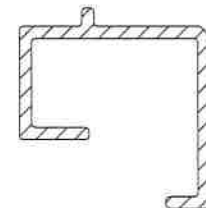
310-D2

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|--|--------------|--------------------|
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| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

PHYSICAL PROPERTIES

$I_{x-x} = 0.016 \text{ in}^4$
 $I_{y-y} = 0.025 \text{ in}^4$
 $S_y = 0.047 \text{ in}^3$
 $Zeta = 25.9^\circ$
 $c = 0.527$

Aluminum Alloy
(Mill Finish)



ACTUAL SIZE

CYCLOID
DESIGNS



DWG: 310-A2

DATE: 25-AUG-98

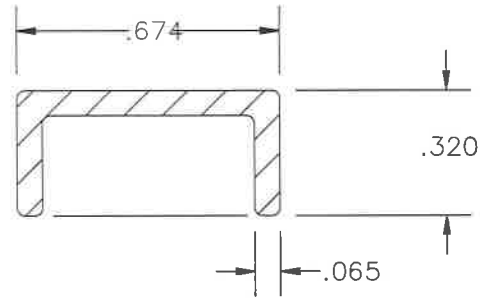
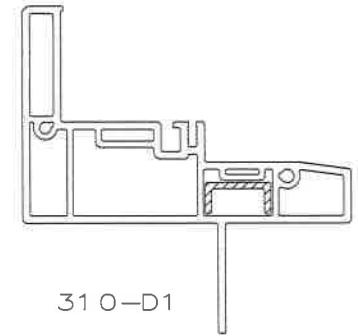
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TYPICAL WALL: 0.062
 CORNER TYP: 0.020
 AREA: 0.181 IN²
 WEIGHT: 0.217 LB/FT
 ALLOY: 6063T6

TITLE: SASH REINFORCEMENT

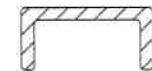
SCALE: 2: 1

SCALE: 1/2: 1



| | |
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| | Date: 01/22/2016 |
| | Verified by: <i>[Signature]</i> |

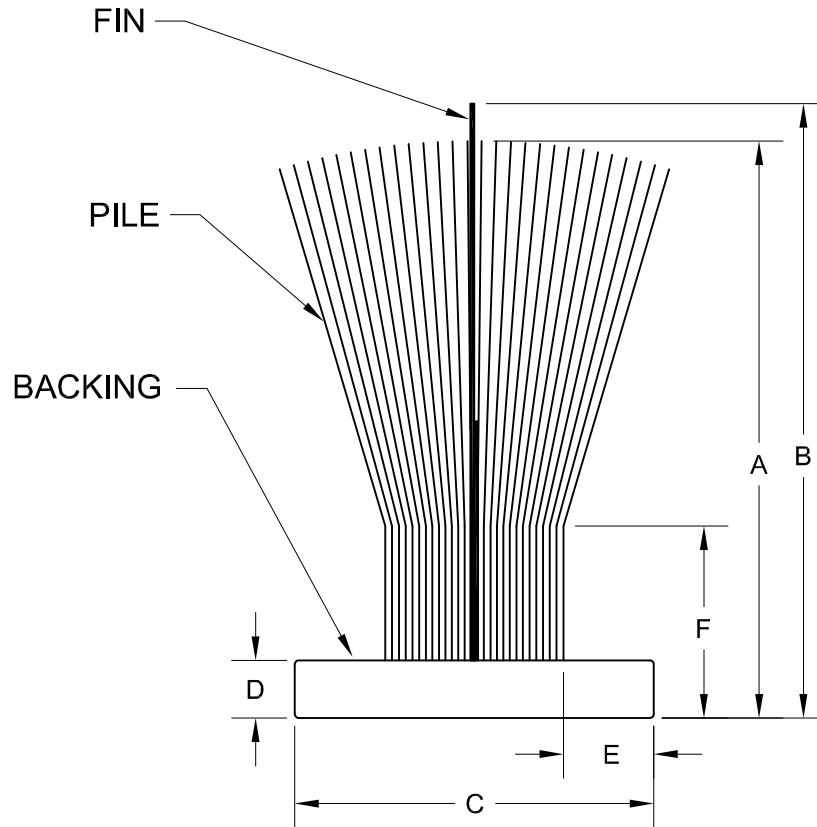
Aluminum Alloy
(Mill Finish)



ACTUAL SIZE

| | | | | |
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| TITLE: HINGE REINFORCEMENT: FRAME | | | | |

GLIDE FIT 187 FLATBACK



| Ref | Description | Dimension | Tolerance |
|-----|-------------------|-----------|----------------|
| A | Pile Height | .300 | +.010 -.005 |
| B | Fin Height | .320 | +/- .010 |
| C | Backing Width | .187 | +/- .005 |
| D | Backing Thickness | .030 | +/- .003 |
| E | Centering | .040 MIN | REFERENCE |
| F | GlideFit | .100 | REFERENCE |

| | | |
|--|--------------|--------------------|
| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

Mohair

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GMS0914

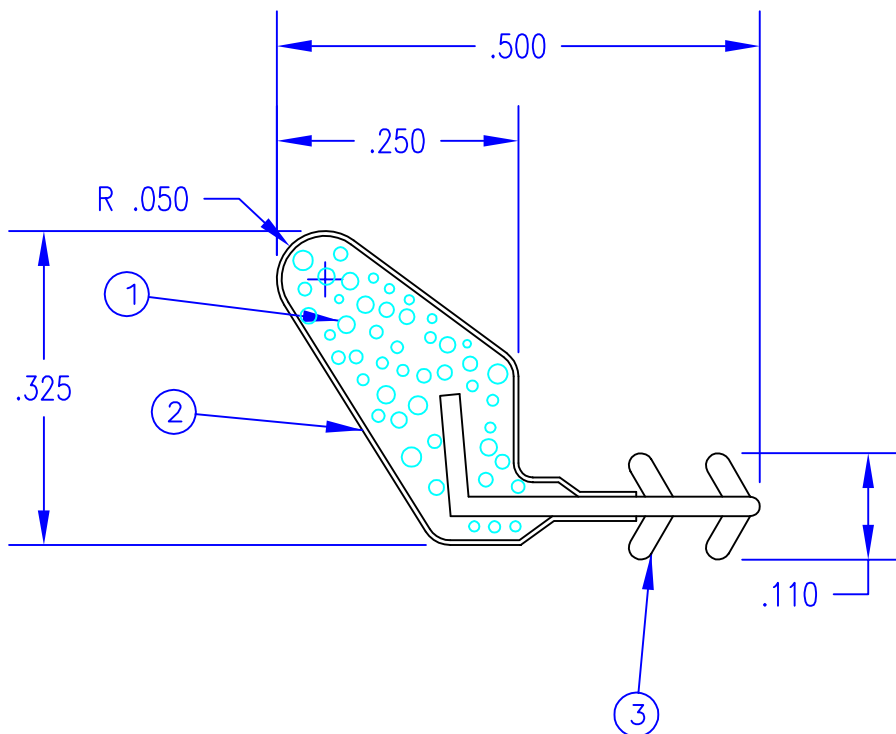
| | | | | | |
|-------|-----------|----------------------------------|---|--|--|
| DATE: | REVISION: | TITLE: GLIDE FIT 187 FLATBACK | DIMENSIONS ARE IN INCHES UNLESS INDICATED OTHERWISE | | Engineered Solutions. Trusted Results. 159 WALKER RD. STATESVILLE NC 28625 |
| | | DRAWN: JM | CHECKED: | TOLERANCES-UNLESS INDICATED OTHERWISE | |
| | | DATE: 1/15/16 | SCALE: 10:1 | Fractions ±1/64" Decimals .X ±.020" Angles .XX ±.010" .XXX ±.005" | |
| | | MATERIAL | Polypropylene | | DRAWING/PART No. |
| | | | | | 30018745WHGF |
| | | | | | REV. |



ROCHESTER DIVISION
PRODUCT PRINT

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| Revisions | | | |
|-----------|-------------------------------|---------|-----|
| Lev | Description | Date | By |
| (A) | THIS PART SUPERSEDES UC302671 | 6/30/04 | EJL |
| (B) | | | |
| (C) | | | |



Foam
Weatherstripping/
Polyvinyl chloride

| | | |
|---------------------------|--------------|--------------------|
| Architectural Testing | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

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UNLESS PRINTER IS QUALIFIED

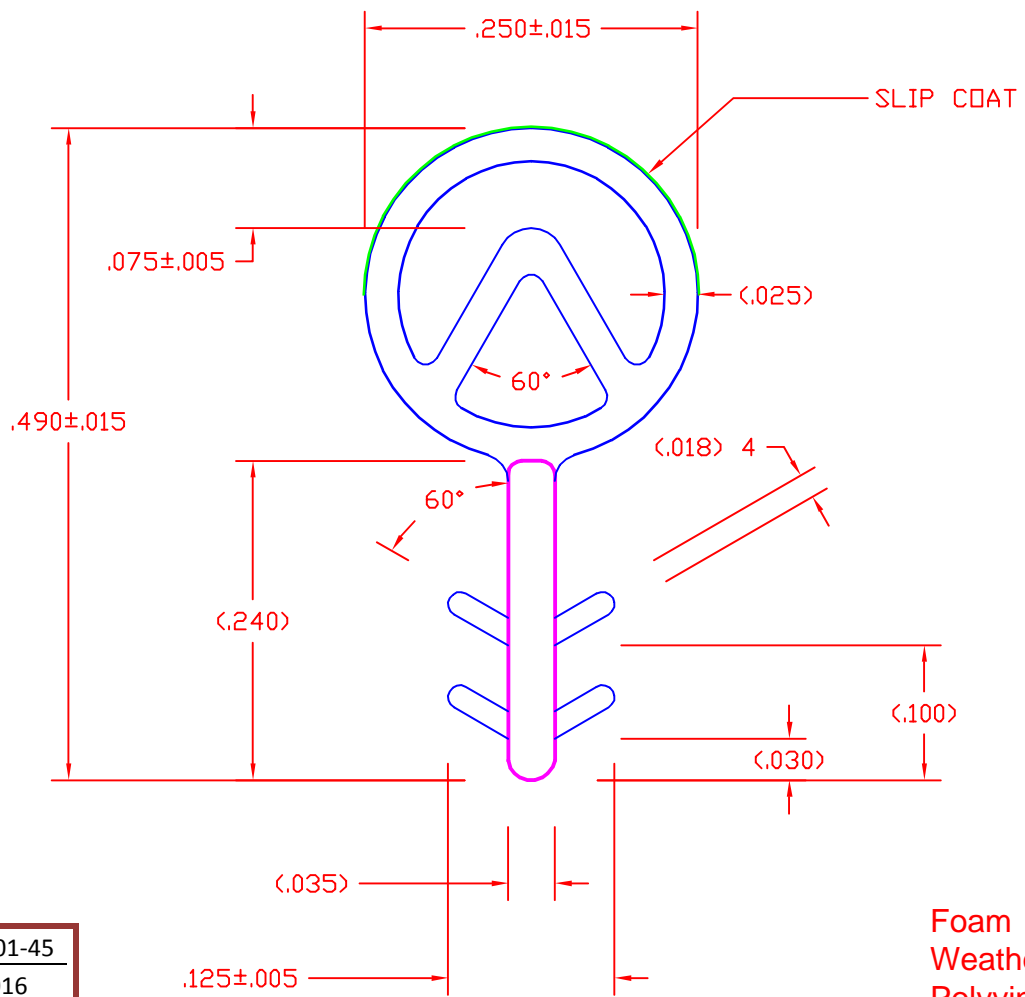
DE0021FM.dwg

| | | | |
|--|------------------------|-------------------|-----------------|
| DECIMAL DIMENSIONS ± _____ UNLESS OTHERWISE SPECIFIED mm. <input checked="" type="checkbox"/> Inch <input checked="" type="checkbox"/> | (4) | | |
| | (3) | SEE B.O.M. | INSERT PC20819 |
| | (2) | SEE B.O.M. | PE LINER |
| | (1) | SEE B.O.M. | URETHANE FOAM |
| Date: 3/2/01 | Sheet 1 of 1 | Item | R.M. Number |
| Drawn Scale: 5 : 1 | Approved: | Drawn: ED LEE | Title: QEZD-250 |
| Cad File No. UC26711A | Part No. U35 - - - - - | Dwg. No. UC302671 | |

2

1

| REV | DESCRIPTION | ECR # |
|-----|-------------|-------|
| | | |



Intertek Report #: F3147.01-201-45
 Date: 01/22/2016
 Verified by: *[Signature]*

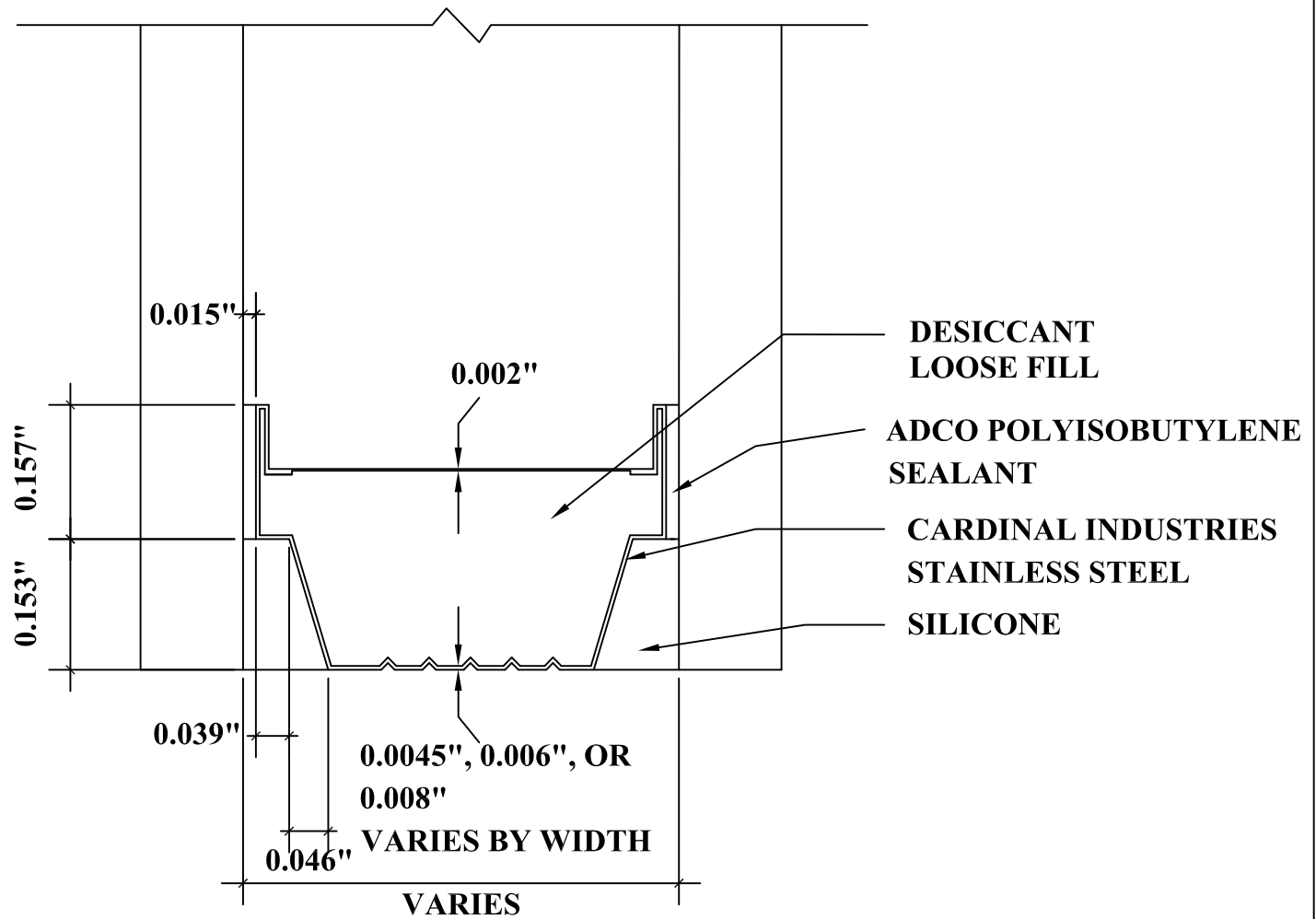
Architectural Testing

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| | | | | |
|------------------------------------|-------------------------------------|-------|--|-----|
| DRAWN CAB 02/01/12 | ULTRAFAB www.ultrafab.com | | 1050 HOOK ROAD FARMINGTON, NY 14425 PHN (585) 924-2186 FAX (585) 924-7680 WWW.ULTRAFAB.COM | |
| CHECKED | | | | |
| ENGINEER | UCx DIVISION | | TITLE E512 | |
| MAT'L: POLYPROPYLENE/TPE | SCALE: DO NOT SCALE DRAWING | SHEET | SIZE DWG NO | REV |
| | | | | OF |

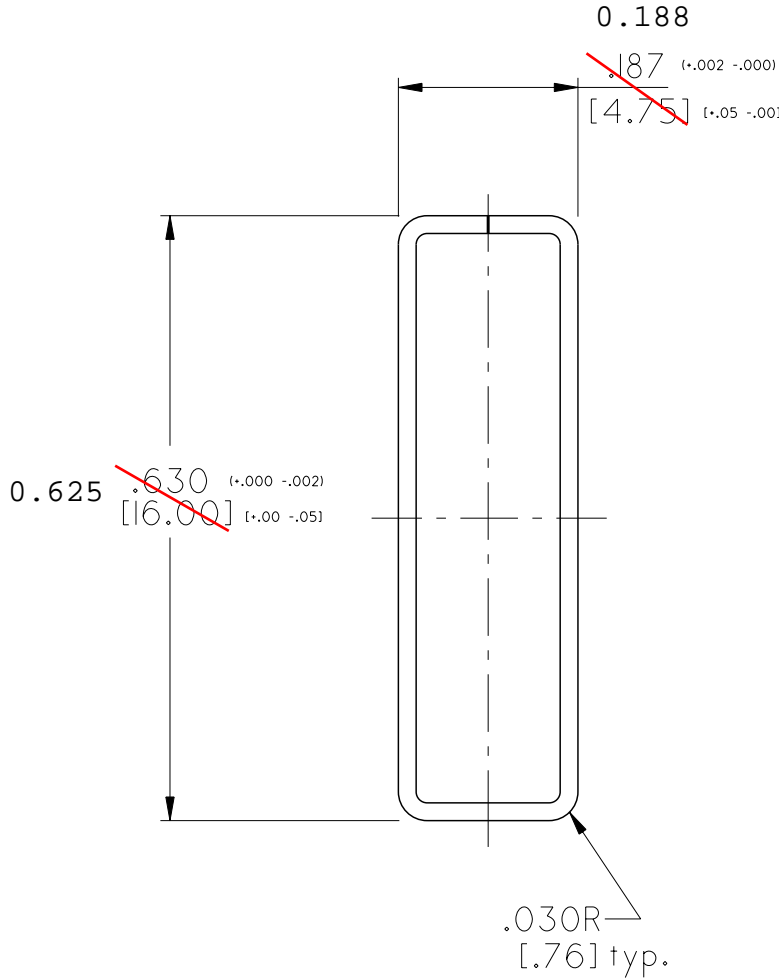
2

1



DETAIL FOR THERMAL MODELING OF
CARDINAL ENDUR SPACER (SS-D)

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

| | | |
|--|--------------|--------------------|
| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

FILENAME: \\MB\0185\316X58

| DATE | SYM. | REVISION | AUTH. | DRN. | CK. |
|------|------|----------|-------|------|-----|
|------|------|----------|-------|------|-----|

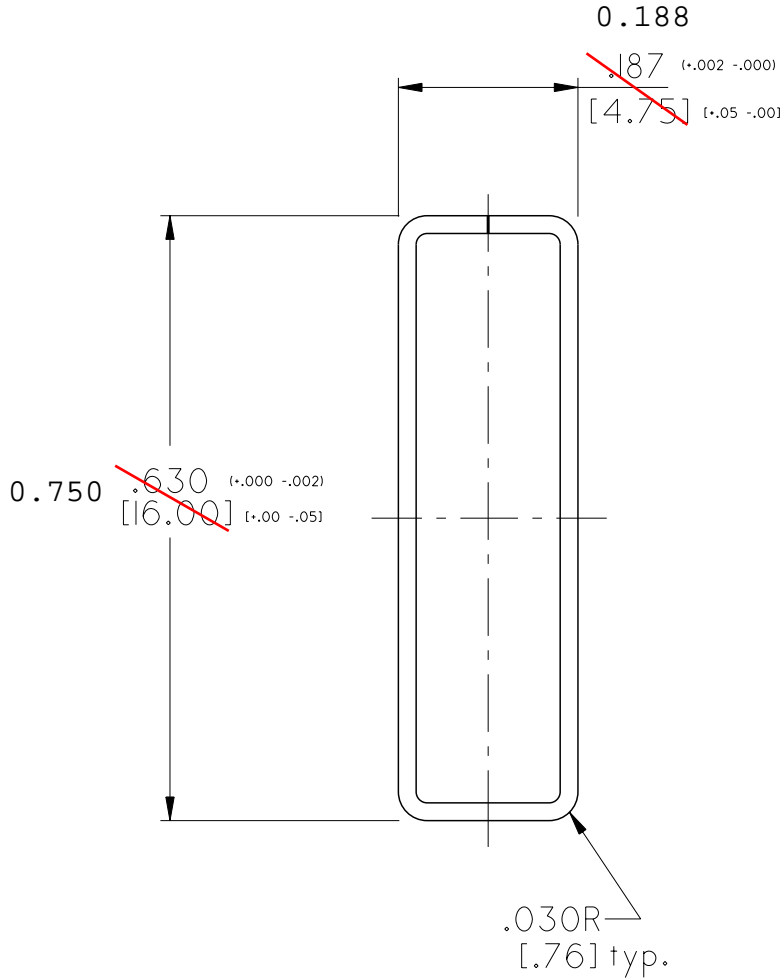


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| | | | | | |
|---|--|---|--|--|--|
| TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1° | | TITLE <h2>3/16 x 5/8 MB (Muntin Bar)</h2> | | DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO. | |
| MATL. .0185 [.47mm] 3105-H24 Aluminum | | FINISH ALL BUT ANODIZED | | | |
| SCALE 5:1 | | DATE 6/15/99 | | DWG. NO. 1020101018XX140 | |

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

| | | |
|--|--------------|--------------------|
| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

FILENAME: \\MB\0185\316X58

| DATE | SYM. | REVISION | AUTH. | DRN. | CK. |
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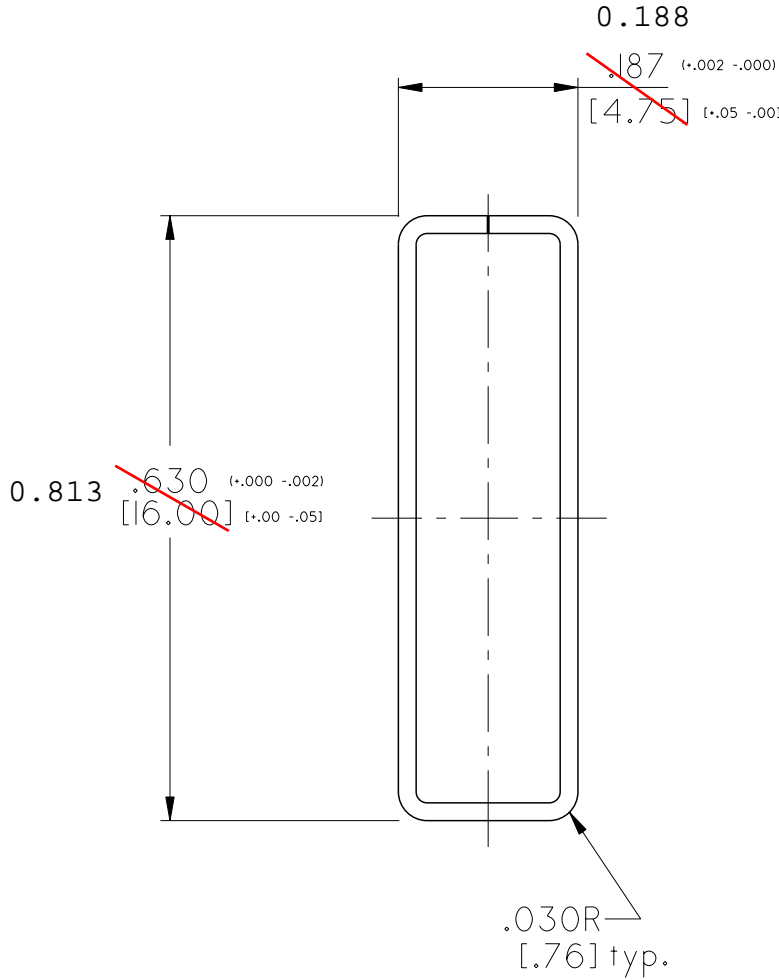


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| | | | | | |
|---|--|--|--|--|--|
| TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1° | | TITLE 3/16 x 5/8 MB (Muntin Bar) | | DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO. | |
| MATL. .0185 [.47mm] 3105-H24 Aluminum | | FINISH ALL BUT ANODIZED | | | |
| SCALE 5:1 | | DATE 6/15/99 | | DWG. NO. 1020101018XX140 | |

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

| | | |
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| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

FILENAME: \\MB\0185\316X58

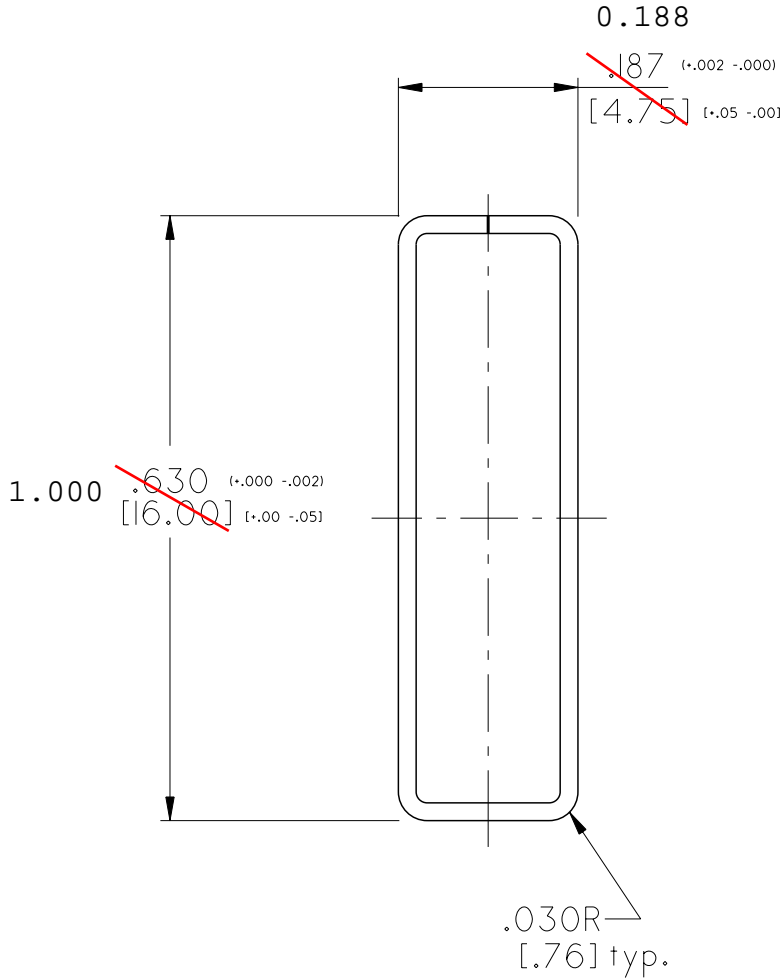
| DATE | SYM. | REVISION | AUTH. | DRN. | CK. |
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INFORMATION SHOWN ON THIS PRINT IS PROPRIETARY. THIS DRAWING IS NOT TO BE REPRODUCED EITHER WHOLLY OR IN PART WITHOUT THE EXPRESS PERMISSION OF ALLMETAL INC.

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|---|--|--|--|--|--|
| TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1° | | TITLE 3/16 x 5/8 MB (Muntin Bar) | | DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO. | |
| MATL. .0185 [.47mm] 3105-H24 Aluminum | | FINISH ALL BUT ANODIZED | | SCALE: 5:1 DATE: 6/15/99 DWG. NO.: 1020101018XX140 | |

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

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FILENAME: \\MB\0185\316X58

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| DATE | SYM. | REVISION | AUTH. | DRN. | CK. |
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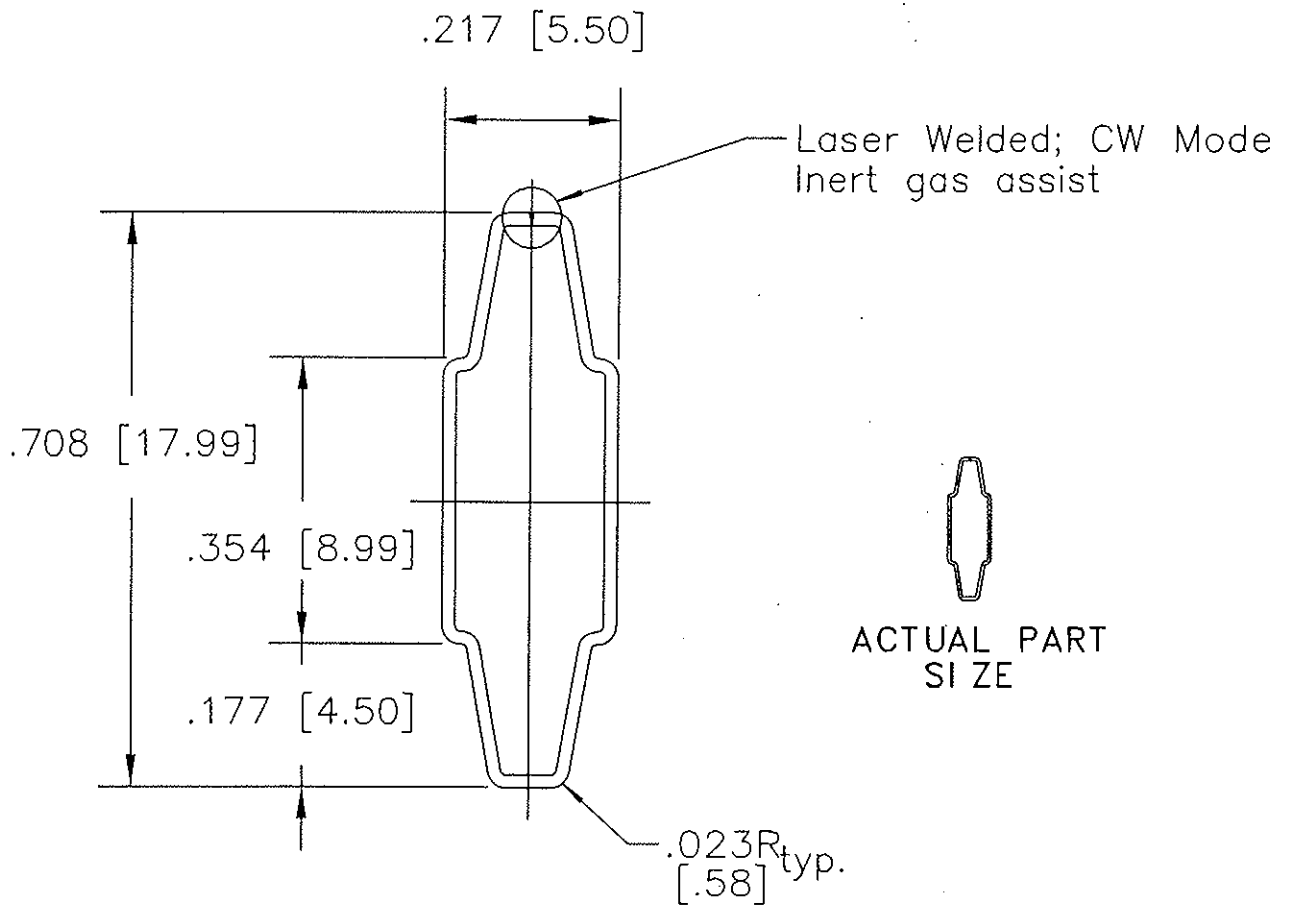


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|---|--|--|--|--|--|
| TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1° | | TITLE 3/16 x 5/8 MB (Muntin Bar) | | DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO. | |
| MATL. .0185 [.47mm] 3105-H24 Aluminum | | FINISH ALL BUT ANODIZED | | SCALE: 5:1 DATE: 6/15/99 DWG. NO.: 1020101018XX140 | |

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



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| | Report #: | F3147.01-201-45 |
| | Date: | 01/22/2016 |
| | Verified by: | <i>[Signature]</i> |

| DATE | SYM. | REVISION | AUTH. | DRN. | CK. |
|---------|------|--|-------|------|-----|
| 4/17/97 | | Weld note changed, Title block changed | | | GRM |
| 12/9/92 | | Initial Release | | | GRM |



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| TOLERANCES EXCEPT AS NOTED | | TITLE 5.5 x 18mm Contour Muntin Bar (CMB) | | DRN. BY <i>G. Matthews</i> | |
| DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 | | MATERIAL .016" [.41mm] 3105 Aluminum | | FINISH FULL RANGE (MILL, ANOD., PAINTED) | |
| DECIMAL MM .XX .XXX ± .13 .06 | | SCALE 4:1 | | DATE 4/17/97 | |
| ANGULAR ± 1' | | DWG. NO. 1020301010XX255 | | APPR. BY | |
| | | | | S.O. NO. | |

FILENAME:CMB5518J