

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

*(Revised)*

**Rendered to:  
NEON ENERGY**

**SERIES/MODEL:  
ULTRA Sliding Door**

**Report Number: H0122.02-301-45**  
**Original Report Date: 04/06/17**  
**Revised Report Date: 12/12/18**

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

*(Revised)*

Rendered to:  
NEON ENERGY  
4989 East La Palma Ave.  
Anaheim, California 92807

Report Number: H0122.02-301-45  
Simulation Date: 04/06/17  
Original Report Date: 04/06/17  
Revised Report Date: 12/12/18

### **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 100-2017: Procedure for Determining Fenestration Product U-Factors*

*ANSI/NFRC 200-2017: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*

*NFRC 500-2017: Procedure for Determining Fenestration Product Condensation Resistance Values*

### **Software:**

**Frame and Edge Modeling:** THERM 7.4.4  
**Center-of-Glass Modeling:** WINDOW 7.4.14  
**Total Product Calculations:** WINDOW 7.4.14  
**Spectral Data Library:** IGDB 61.0

### **Simulations Specimen Description:**

**Series/Model:** ULTRA Sliding Door  
**Type:** Sliding Glass Door, Sliding Glass Door (XX or OX)  
**Frame Material:** AT Aluminum w/ Thermal Breaks - All Members  
**Sash Material:** AU Thermally Improved  
**Standard Size:** 2000mm x 2000mm



**Modeling Assumptions/Technical Interpretations:**

- 1) To prevent air infiltration, tape was applied to all interior sash crack locations.
- 2) Sill with and without reinforcement grouped per ANSI/NFRC 100-2018, Section 4.2.1.E. Sill with reinforcement is the 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 7.4.14. 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 | 0.010739    | 0.013828     | 0.016705     |
| SHGC1 | 0.742387    | 0.650919     | 0.565769     |
| VT0   | 0.000000    | 0.000000     | 0.000000     |
| VT1   | 0.731648    | 0.637090     | 0.549065     |

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

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

**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> |             |
| Aluminum Spacer         | Butyl Rubber   | Silicone         | A1-D        |
| Chromatech Ultra Spacer | Butyl Rubber   | Polysulphide     | TS-D        |
| Swisspacer              | Butyl Rubber   | Silicone         | TP-D        |

**Grid Option Description**

| <i>Grid Size</i> | <i>Grid Type</i> | <i>Grid Pattern</i> |
|------------------|------------------|---------------------|
| None             | -                | -                   |

**Reinforcement Option Description**

| <i>Location</i> | <i>Material</i> |
|-----------------|-----------------|
| None            | -               |

**Gas Filling Technique Description**

| <i>Fill Type</i> | <i>Method</i> |
|------------------|---------------|
| 90% Argon        | Dual Probe    |

**Edge-of-Glass Construction**

|                           |   |
|---------------------------|---|
| <i>Interior Condition</i> | EPDM gasket between the glass and the glazing stop. |
| <i>Exterior Condition</i> | EPDM gasket between the glass and the glazing stop. |

**Weatherstripping**

| <i>Type</i> | <i>Quantity</i> | <i>Location</i>                  |
|-------------|-----------------|----------------------------------|
| EPDM Gasket | 2 Rows          | All members of the sash          |
| EPDM Gasket | 1 Row           | Each meeting stile               |
| Mohair      | 1 Row           | Head, sill and jambs             |
| Mohair      | 2 Rows          | Each meeting stile and top rails |

**Frame/Sash Materials Finish**

|                 |                  |
|-----------------|------------------|
| <i>Interior</i> | Painted Aluminum |
| <i>Exterior</i> | Painted Aluminum |



### NFRC 100/200/500 Summary Sheet ULTRA Sliding Door

| 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)<br><small>Grids (None / &lt;1 / &gt;=1)</small> |                  |             |                  | Visible Transmittance (VT)<br><small>Grids (None / &lt;1 / &gt;=1)</small> |                  |      | Condensation Resistance |           |
| 1  | SNX 5123 / Arg / Clr - 24mm (6mm-6mm)              |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.221  | 0.472       | 0.224            |  |                  |             |                  | ARG90  | 0.021(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.41                                      |             |                  | SHGC (N) 0.18  |                  |             |                  | VT (N) 0.37  |                  |      | CR 39                   |           |
| 2  | SNX 6227 / Arg / Clr - 24mm (6mm-6mm)              |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.221  | 0.472       | 0.224            |  |                  |             |                  | ARG90  | 0.020(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.41                                      |             |                  | SHGC (N) 0.20  |                  |             |                  | VT (N) 0.45  |                  |      | CR 39                   |           |
| 3  | ClimaGuard Premium T / Arg / Clr - 25mm (6mm-5mm)  |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.230  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.035(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.42                                      |             |                  | SHGC (N) 0.38  |                  |             |                  | VT (N) 0.56  |                  |      | CR 38                   |           |
| 4  | SN 4023 / Arg / Clr - 25mm (6mm-5mm)               |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.230  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.026(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.42                                      |             |                  | SHGC (N) 0.17  |                  |             |                  | VT (N) 0.29  |                  |      | CR 38                   |           |
| 5  | SN 5128 / Arg / Clr - 25mm (6mm-5mm)               |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.230  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.025(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.41                                      |             |                  | SHGC (N) 0.20  |                  |             |                  | VT (N) 0.37  |                  |      | CR 38                   |           |
| 6  | SN 6234 / Arg / Clr - 25mm (6mm-5mm)               |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.230  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.026(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.42                                      |             |                  | SHGC (N) 0.23  |                  |             |                  | VT (N) 0.45  |                  |      | CR 38                   |           |
| 7  | SN 7037 / Arg / Clr - 25mm (6mm-5mm)               |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.230  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.022(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.41                                      |             |                  | SHGC (N) 0.26  |                  |             |                  | VT (N) 0.51  |                  |      | CR 38                   |           |
| 8  | ClimaGuard Neutral 70 / Arg / Clr - 25mm (6mm-5mm) |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.226  | 0.551       | 0.185            |  |                  |             |                  | ARG90  | 0.171(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.45                                      |             |                  | SHGC (N) 0.40  |                  |             |                  | VT (N) 0.50  |                  |      | CR 38                   |           |
| 9  | SNX 6227 / Arg / Clr - 24mm (4mm-4mm)              |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.151  | 0.630       | 0.154            |  |                  |             |                  | ARG90  | 0.020(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.42                                      |             |                  | SHGC (N) 0.20  |                  |             |                  | VT (N) 0.46  |                  |      | CR 38                   |           |
| 10 | ClimaGuard Premium T / Arg / Clr - 24mm (4mm-4mm)  |             |                  |  |                  |             |                  |  |                  |      |                         |           |
|    | 0.151  | 0.630       | 0.154            |  |                  |             |                  | ARG90  | 0.035(#2)        | CL   | A1-D                    | N         |
|    | U-Factor 0.42                                      |             |                  | SHGC (N) 0.39  |                  |             |                  | VT (N) 0.56  |                  |      | CR 38                   |           |



**NFRC 100/200/500 Summary Sheet  
ULTRA Sliding Door**

| 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)<br>Grids (None / <1 / >=1) |                  |             |                  | Visible Transmittance (VT)<br>Grids (None / <1 / >=1) |                       |      | Condensation Resistance |           |
| 11 | SN 4023 / Arg / Clr - 24mm (4mm-4mm)                    |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.151   | 0.630       | 0.154            |   |                  |             |                  | ARG90   | 0.026(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.42   |             |                  | SHGC (N) 0.17   |                  |             |                  | VT (N) 0.29   |                       |      | CR                      | 38        |
| 12 | SN 5128 / Arg / Clr - 24mm (4mm-4mm)                    |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.151   | 0.630       | 0.154            |   |                  |             |                  | ARG90   | 0.025(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.42   |             |                  | SHGC (N) 0.20   |                  |             |                  | VT (N) 0.37   |                       |      | CR                      | 38        |
| 13 | SN 6234 / Arg / Clr - 24mm (4mm-4mm)                    |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.151   | 0.630       | 0.154            |   |                  |             |                  | ARG90   | 0.026(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.42   |             |                  | SHGC (N) 0.24   |                  |             |                  | VT (N) 0.46   |                       |      | CR                      | 38        |
| 14 | SN 7037 / Arg / Clr - 24mm (4mm-4mm)                    |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.151   | 0.630       | 0.154            |   |                  |             |                  | ARG90   | 0.022(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.42   |             |                  | SHGC (N) 0.26   |                  |             |                  | VT (N) 0.51   |                       |      | CR                      | 38        |
| 15 | ClimaGuard Neutral 70 / Arg / Clr - 24mm (4mm-4mm)      |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.148   | 0.630       | 0.154            |   |                  |             |                  | ARG90   | 0.171(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.45   |             |                  | SHGC (N) 0.42   |                  |             |                  | VT (N) 0.50   |                       |      | CR                      | 38        |
| 16 | ClimaGuard Neutral 70 / Air / Clr - 25mm (6mm-5mm)      |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.226   | 0.551       | 0.185            |   |                  |             |                  | AIR   | 0.171(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.48   |             |                  | SHGC (N) 0.41   |                  |             |                  | VT (N) 0.50   |                       |      | CR                      | 38        |
| 17 | ClimaGuard Neutral 70 / Air / Clr - 22mm (4mm-4mm)      |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.148   | 0.551       | 0.154            |   |                  |             |                  | AIR   | 0.171(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.48   |             |                  | SHGC (N) 0.42   |                  |             |                  | VT (N) 0.50   |                       |      | CR                      | 39        |
| 18 | ClimaGuard Neutral 70 / Arg / Clr - 22mm (4mm-4mm)      |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.148   | 0.551       | 0.154            |   |                  |             |                  | ARG90   | 0.171(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.45   |             |                  | SHGC (N) 0.42   |                  |             |                  | VT (N) 0.50   |                       |      | CR                      | 39        |
| 19 | SNX 5123 / Arg / Clr - 24mm (6mm-5mm)                   |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.221   | 0.472       | 0.185            |   |                  |             |                  | ARG90   | 0.021(#2)             | CL   | A1-D                    | N         |
|    | U-Factor 0.41   |             |                  | SHGC (N) 0.18   |                  |             |                  | VT (N) 0.37   |                       |      | CR                      | 39        |
| 20 | SNX 5123 / Arg / 3mmClr-030PVB-3mmIS20 - 24mm (6mm-6mm) |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.221   | 0.470       | 0.264            |   |                  |             |                  | ARG90   | 0.021(#2) / 0.198(#4) | CL   | TS-D                    | N         |
|    | U-Factor 0.36   |             |                  | SHGC (N) 0.17   |                  |             |                  | VT (N) 0.36   |                       |      | CR                      | 40        |



**NFRC 100/200/500 Summary Sheet  
ULTRA Sliding Door**

| 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)<br>Grids (None / <1 / >=1) |                  |             |                  | Visible Transmittance (VT)<br>Grids (None / <1 / >=1) |                       |      | Condensation Resistance |           |
| 21 | SN 5128 / Arg / IS20 - 24mm (6mm-6mm)                                       |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.230   | 0.472       | 0.221            |   |                  |             |                  | ARG90   | 0.025(#2) / 0.198(#4) |      | CL                      | TP-D N    |
|    | U-Factor 0.36   |             |                  | SHGC (N) 0.19   |                  |             |                  | VT (N) 0.36   |                       |      | CR                      | 41        |
| 22 | 4mmClr-075PVB-4mmPlanistarSun / Arg / 3mmClr-075PVB-3mmClr - 24mm (8mm-6mm) |             |                  |   |                  |             |                  |   |                       |      |                         |           |
|    | 0.384   | 0.394       | 0.311            |   |                  |             |                  | ARG90   | 0.026(#2)             |      | CL                      | A1-D N    |
|    | U-Factor 0.41   |             |                  | SHGC (N) 0.25   |                  |             |                  | VT (N) 0.50   |                       |      | CR                      | 39        |



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 April 6, 2022.

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:

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David L. Everitt  
Simulation Technician

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Kenny C. White  
Laboratory Manager  
Simulator-In-Responsible-Charge

DLE:dle

H0122.02-301-45

Attachments (pages): This report is complete only when all attachments listed are included.  
Appendix A: Drawings and Bills of Material (30)





### Revision Log

| <u>Rev. #</u> | <u>Date</u> | <u>Page(s)</u> | <u>Revision(s)</u>  |
|---------------|-------------|----------------|---|
| .01R0         | 04/06/17    | All            | Original Report Issue. Work Requested by Andreas Georgakis of Neon Energy.                                |
| .02R0         | 07/25/18    | All            | All therm models updated. All options updated and recalculated in W7. Drawing packet updated.             |
| .02R1         | 07/30/18    | All            | Updating modeling assumptions and drawing packet.   |
| .02R2         | 07/31/18    | All            | Updated head profile to include VS 84 part. All options updated and recalculated. Drawing packet updated. |
| .02R3         | 08/17/18    | All            | SHGC Table updated.   |
| .02R4         | 08/27/18    | All            | SHGC Table updated.   |
| .02R5         | 10/02/18    | All            | Manufacturer product code updated for option #22.   |
| .02R6         | 10/23/18    | All            | Frame material under Simulation Specimen Description updated to AT. No change to existing results.        |
| .02R7         | 12/12/18    | All            | Corrected meeting rail drawing in drawing packet. No change to results.                                   |



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

**Appendix A**

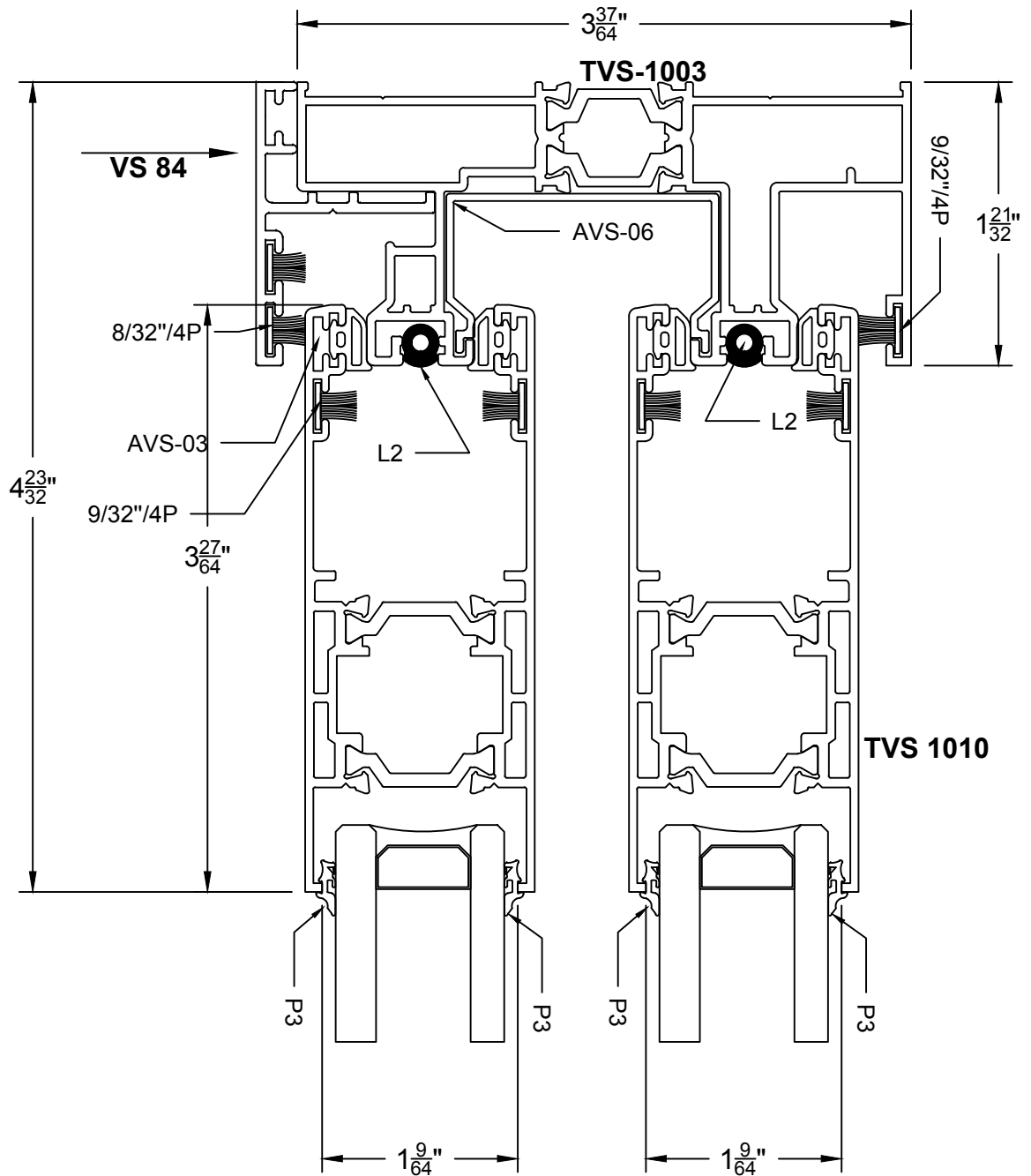
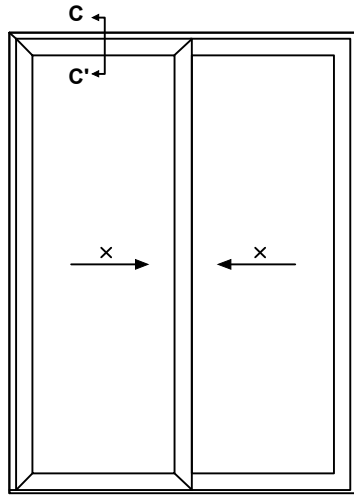
H0122.02-301-45





# VERTICAL SECTION C-C'

Scale. 1:1



**intertek**  
Total Quality. Assured.

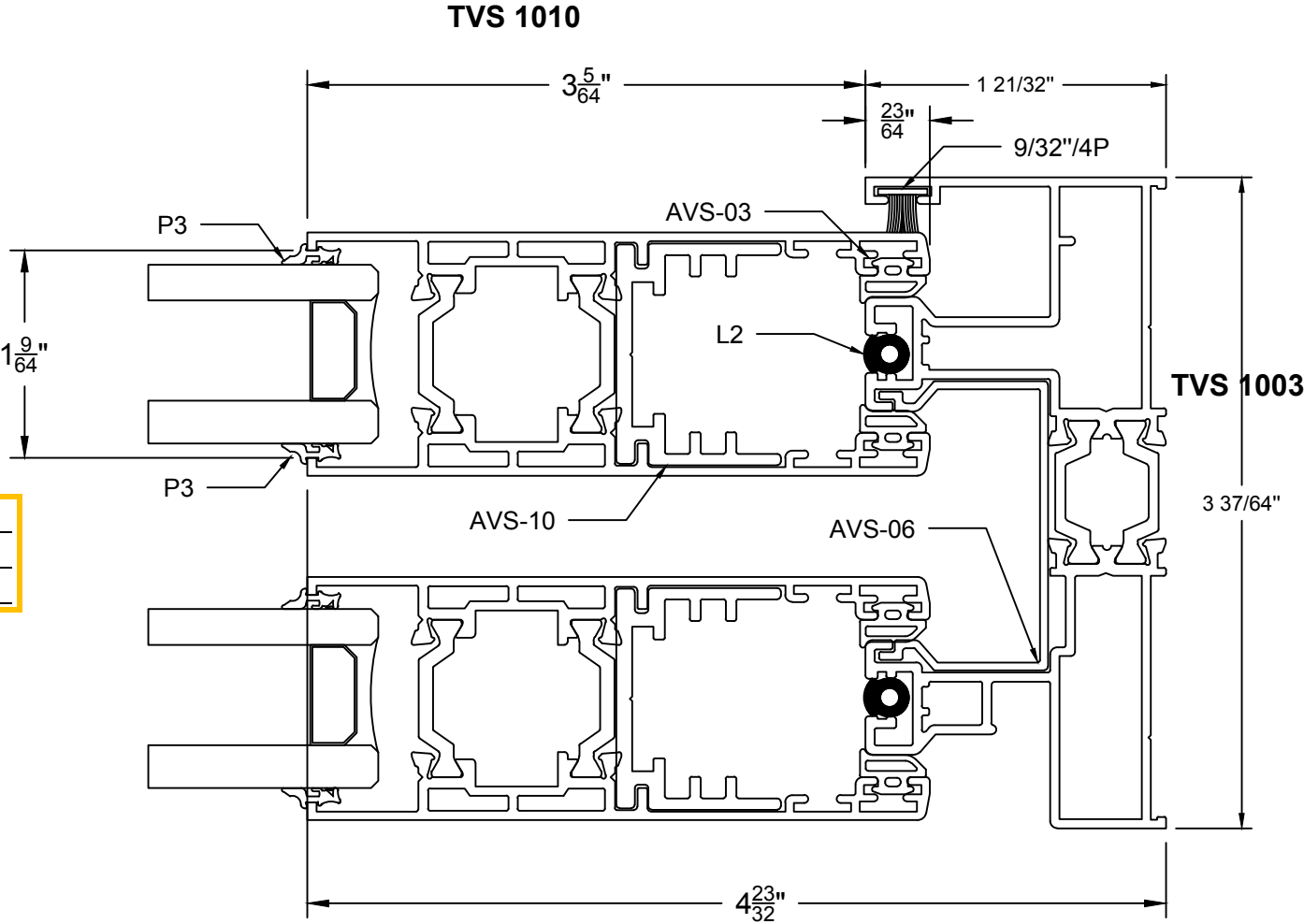
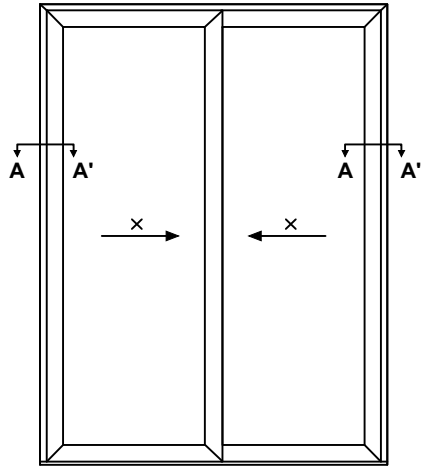
Report #: H0122.02-301-45

Date: 07/25/18

Verified by: *[Signature]*

# HORIZONTAL SECTION A-A'

Scale. 1:1



**intertek**  
Total Quality Assured.

|              |   |
|--------------|---|
| Report #:    | H0122.02-301-45   |
| Date:        | 07/25/18  |
| Verified by: |  |

# VERTICAL SECTION B-B'

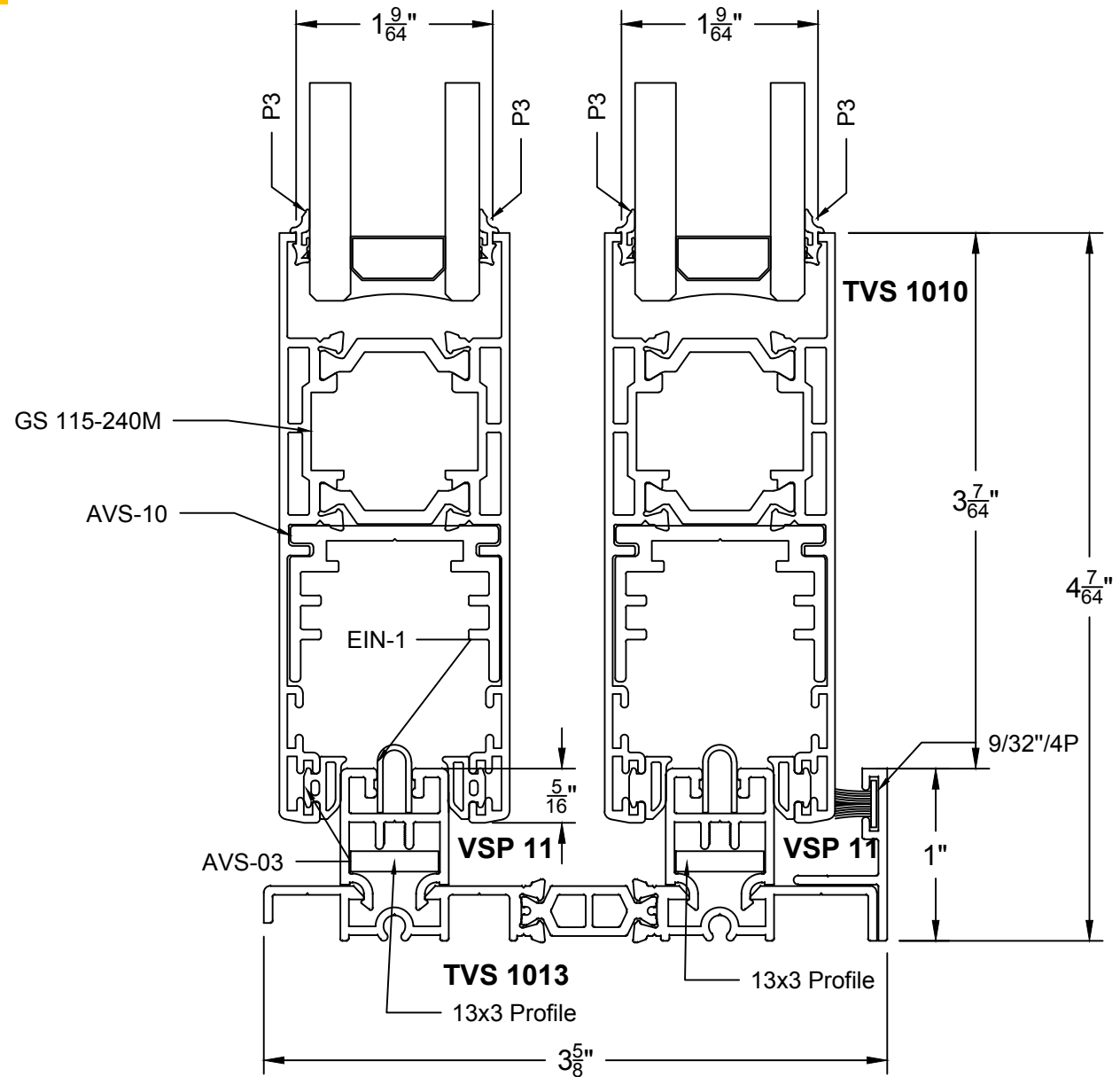
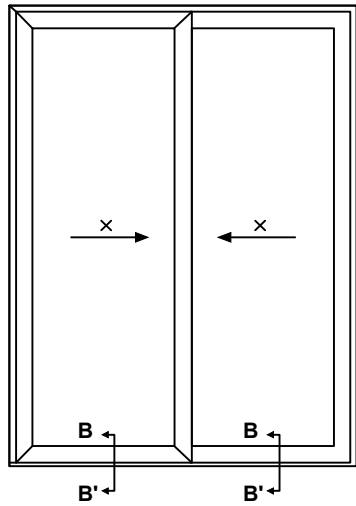
Scale. 1:1

**intertek**  
Total Quality. Assured.

Report #: H0122.02-301-45

Date: 07/25/18

Verified by: *David Smith*



# VERTICAL SECTION B-B'

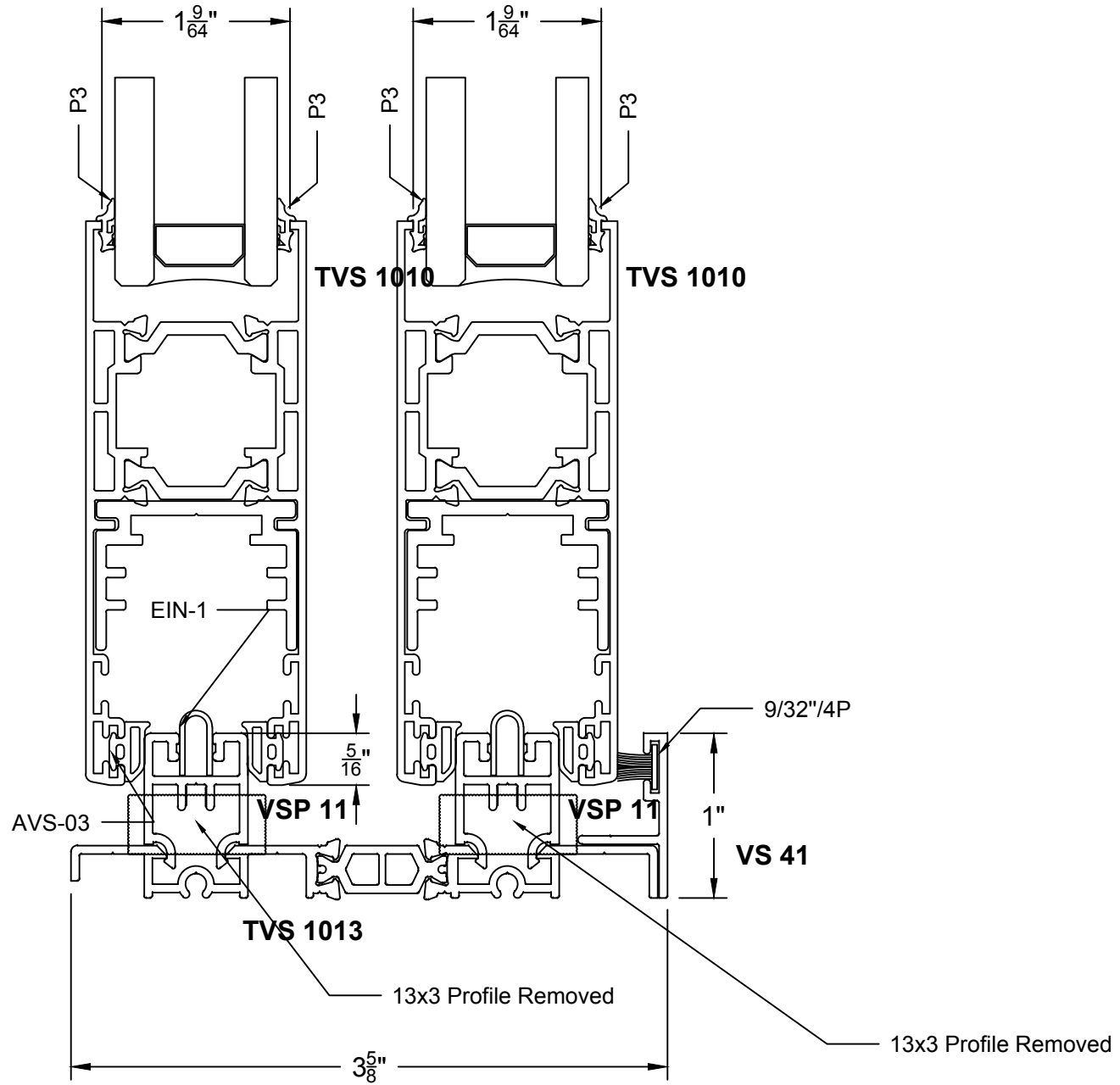
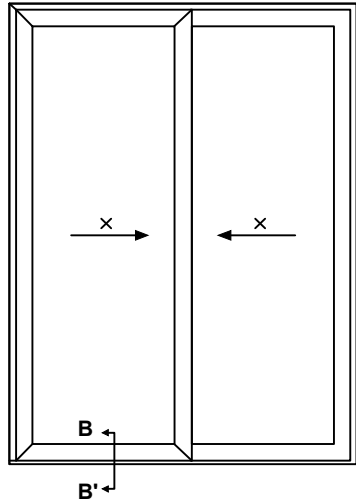
Scale. 1:1



Report #: H0122.02-301-45

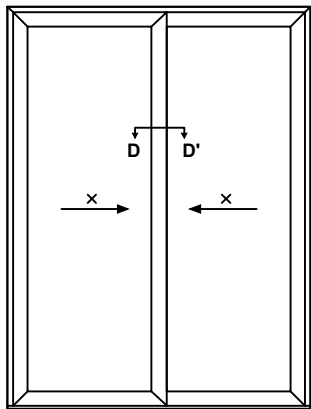
Date: 07/25/18

Verified by:

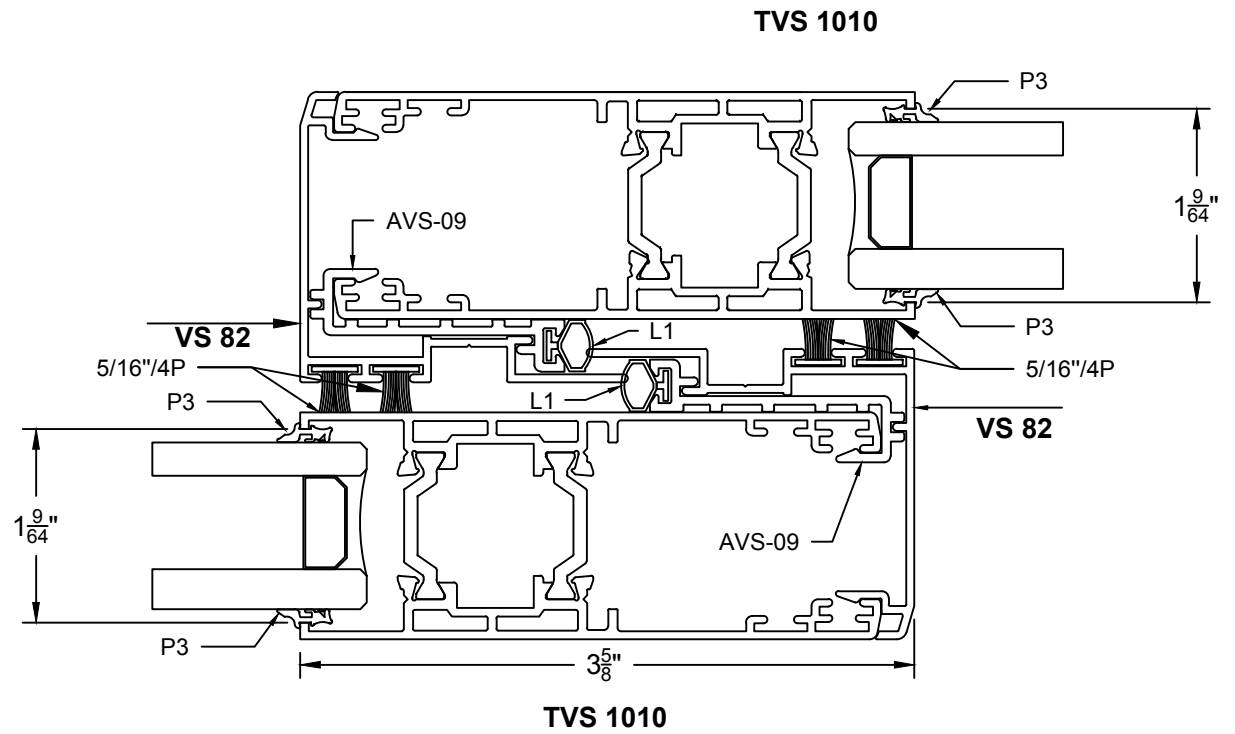


# HORIZONTAL SECTION D-D'

Scale. 1:1

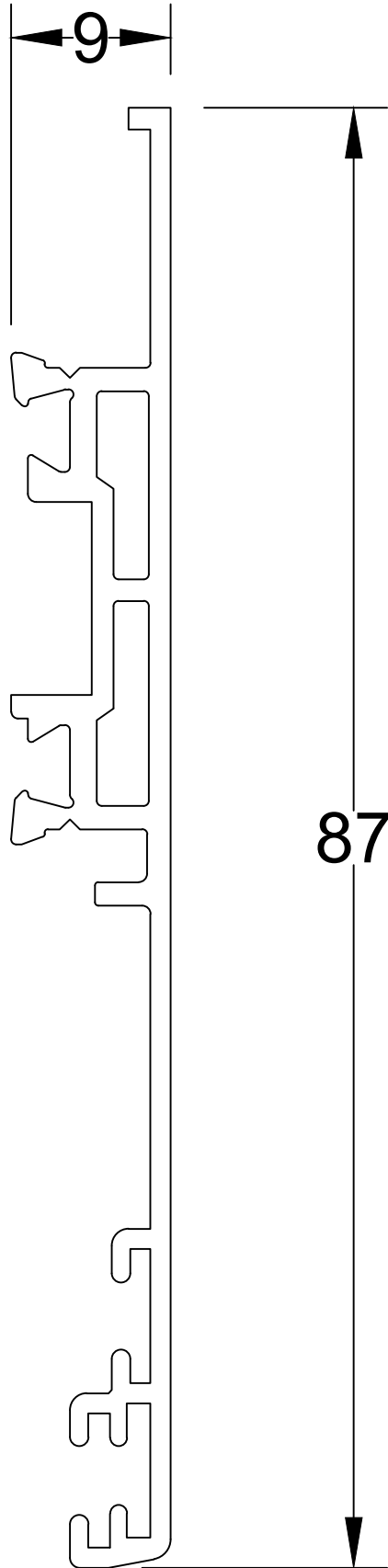


|  |              |                 |
|--|--------------|-----------------|
| <b>intertek</b><br>Total Quality. Assured. | Report #:    | H0122.02-301-45 |
|  | Date:        | 12/12/18        |
|  | Verified by: |                 |

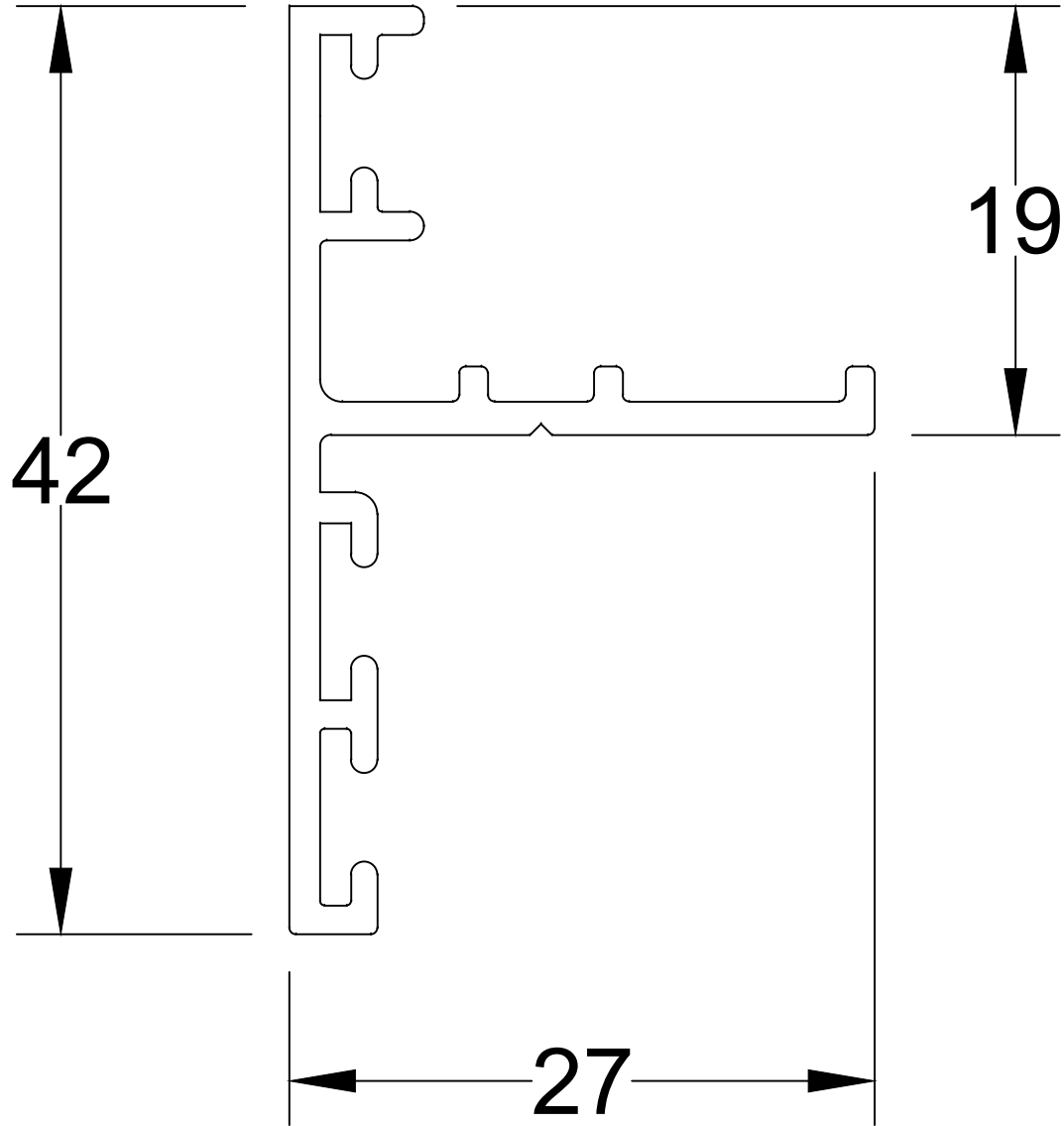




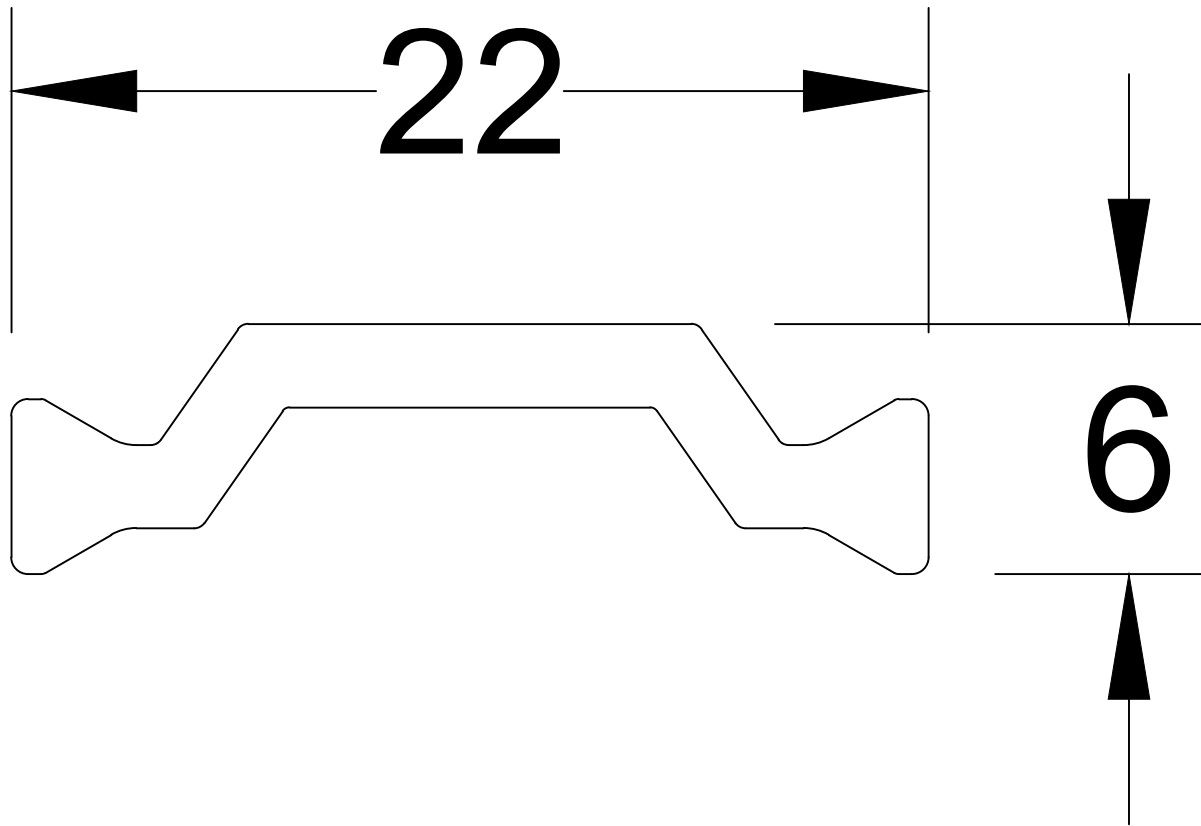
# TVS 1010



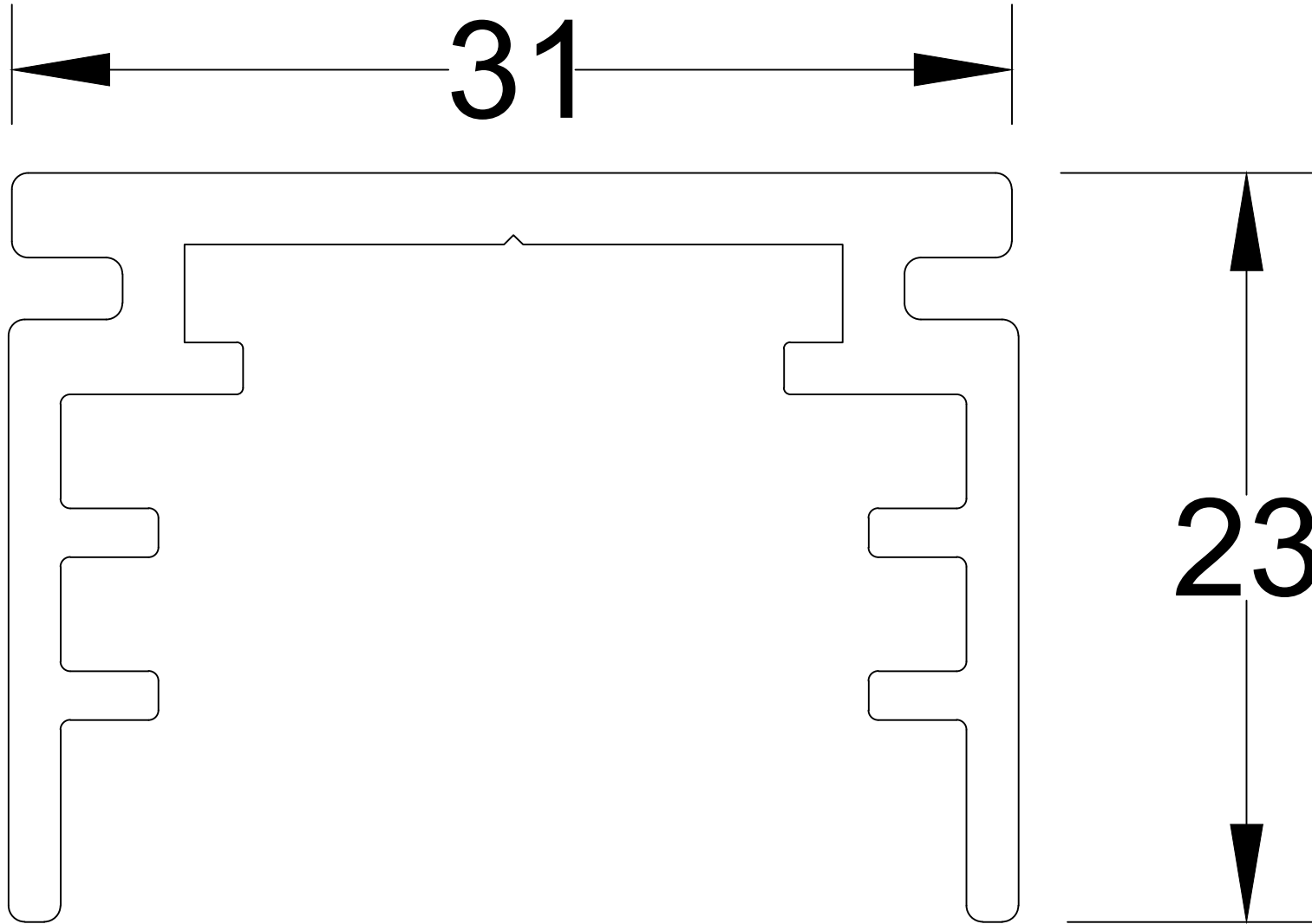
# VS 84



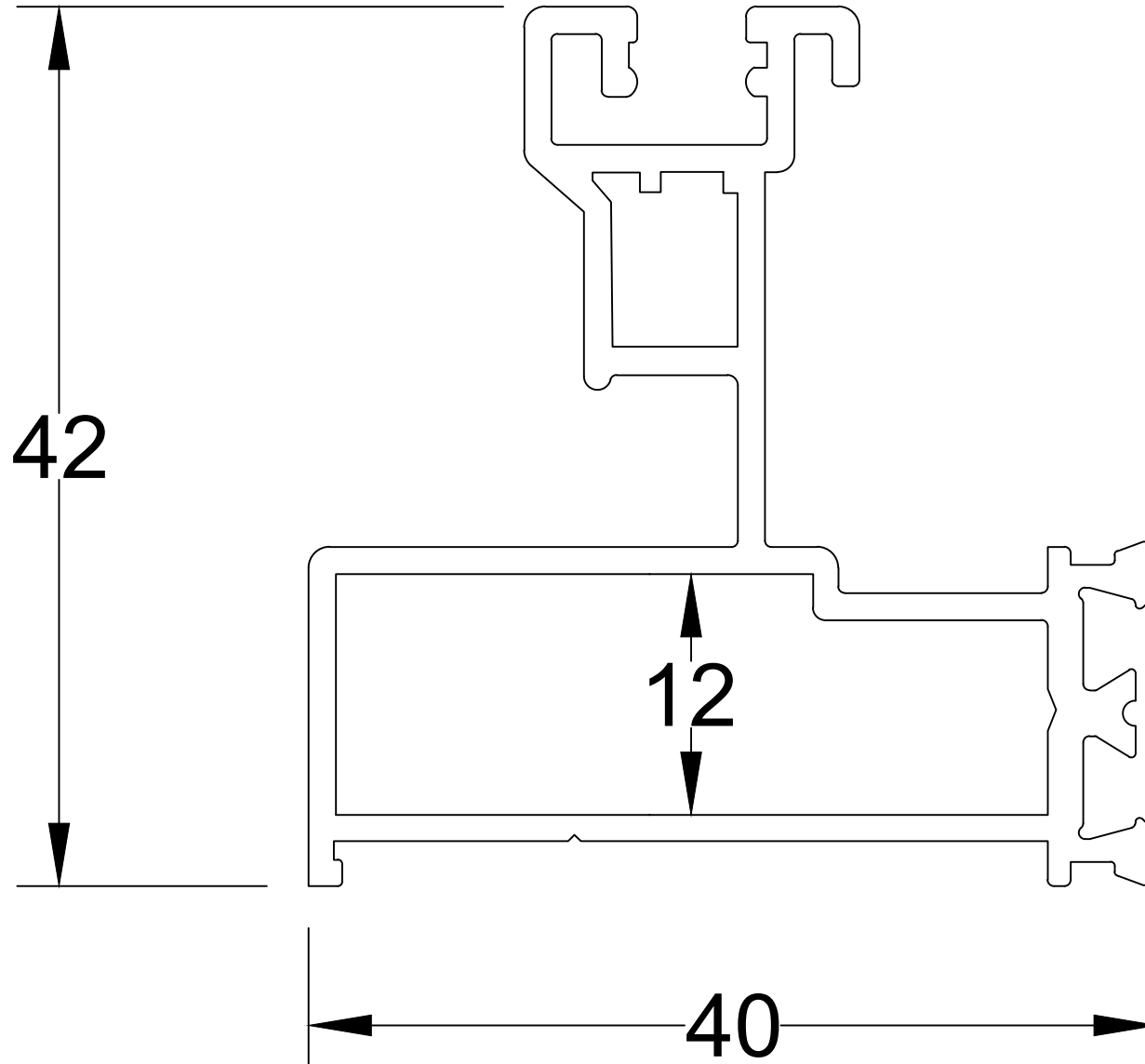
# Sash Thermal Break



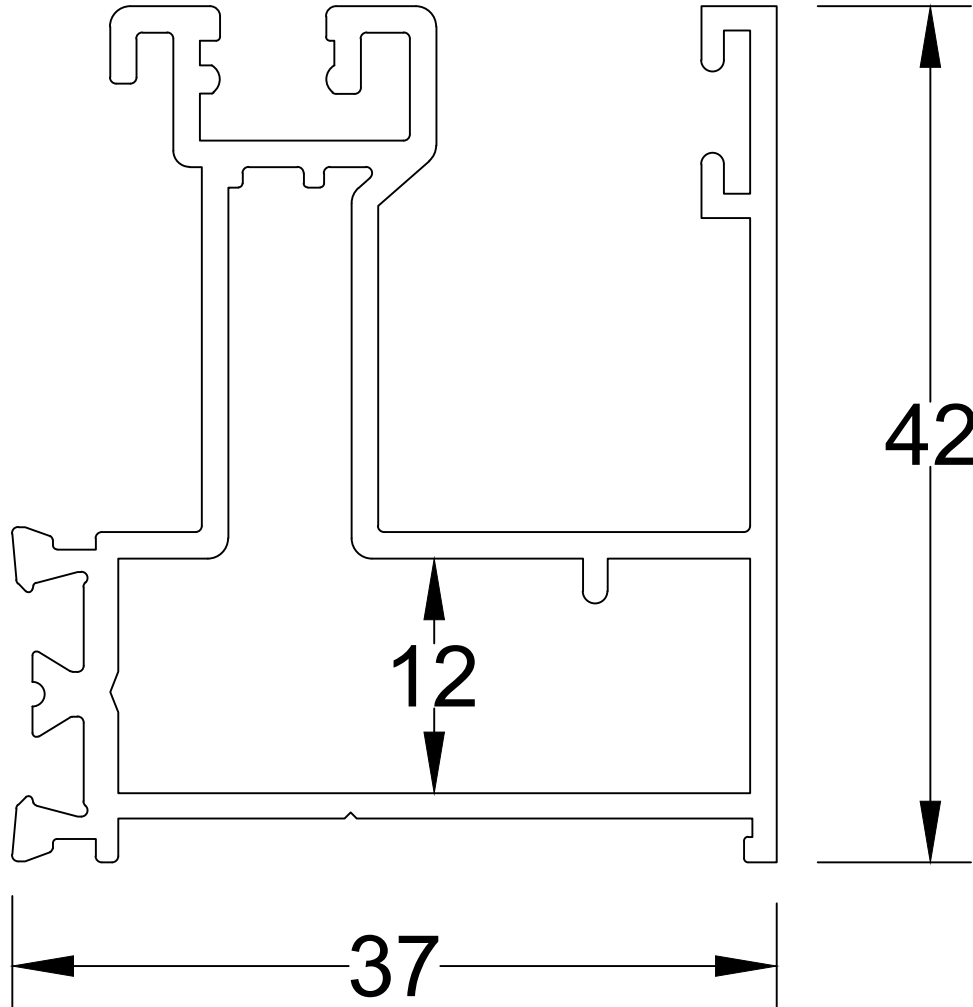
# AVS-10



# TVS-1003 a

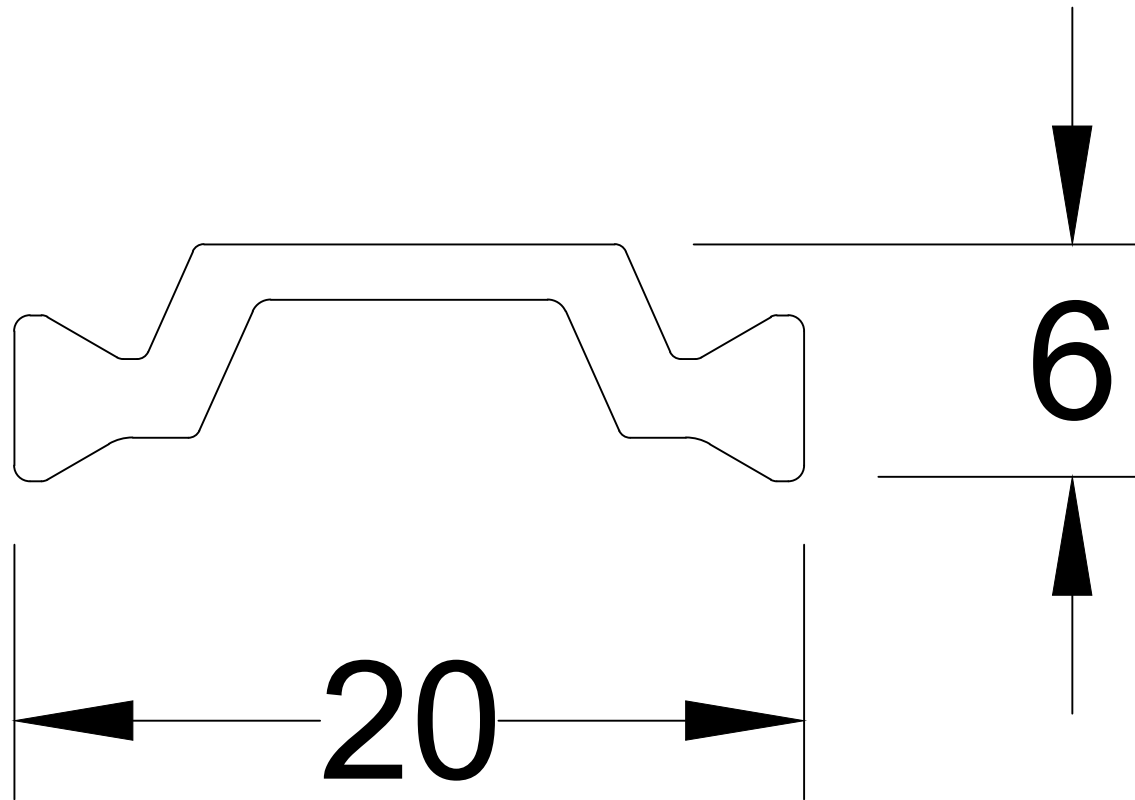


# TVS-1003 b

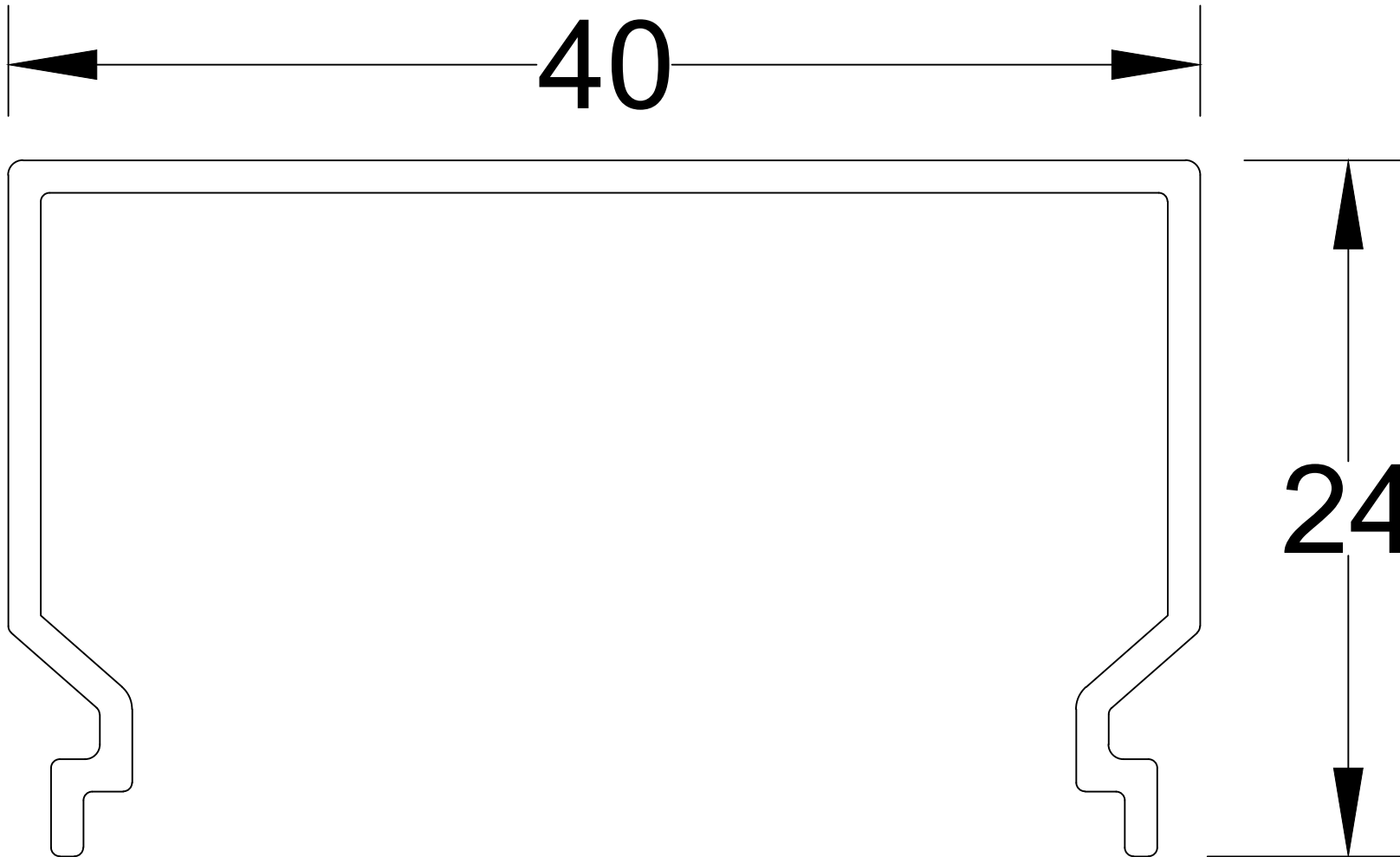


# Head/Jamb Thermal Break

|  |              |   |
|--|--------------|---|
| <b>intertek</b><br>Total Quality. Assured. | Report #:    | H0122.02-301-45   |
|  | Date:        | 07/25/18  |
|  | Verified by: |  |

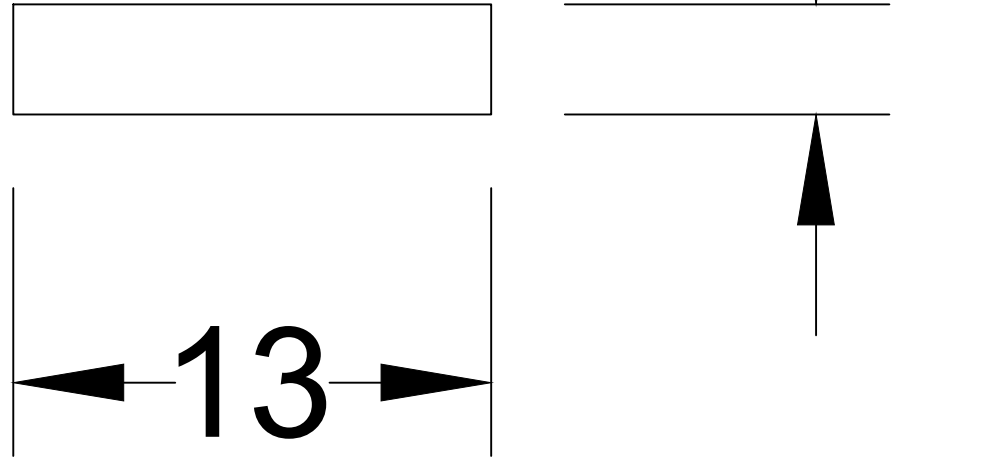


# AVS-06



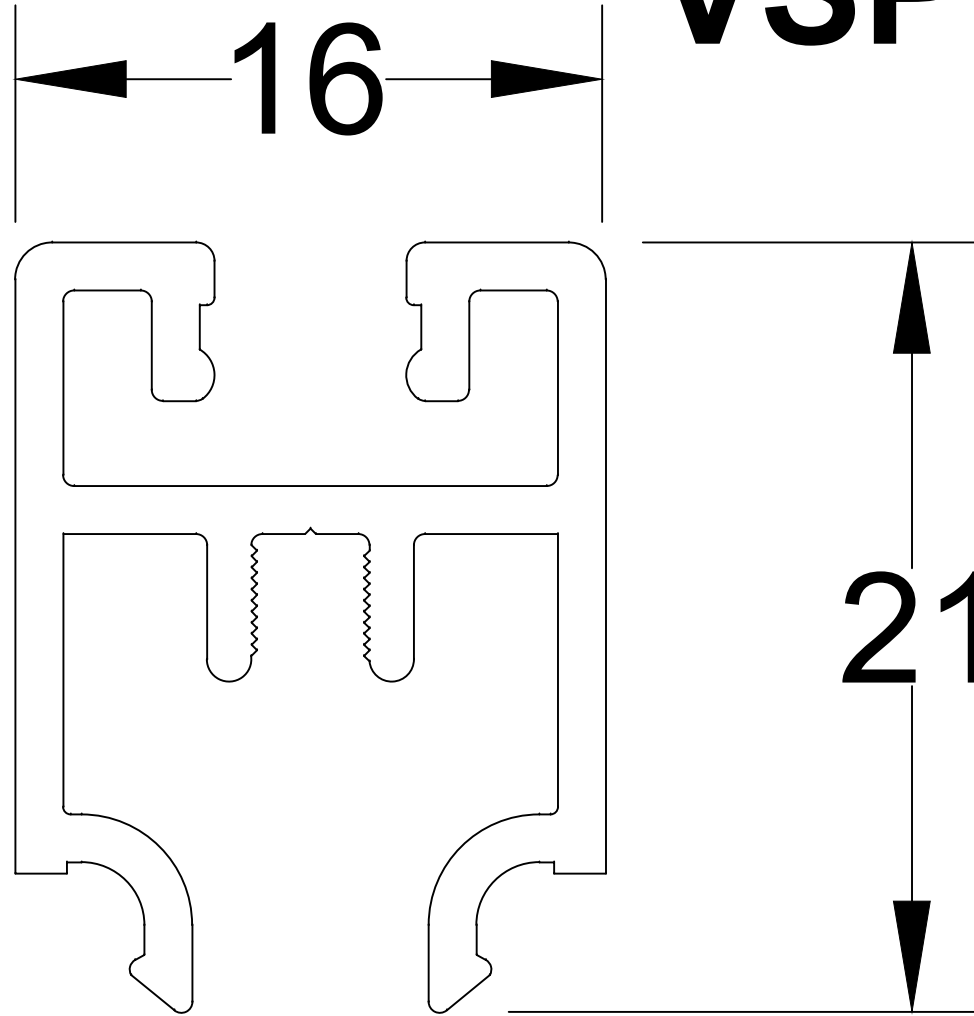




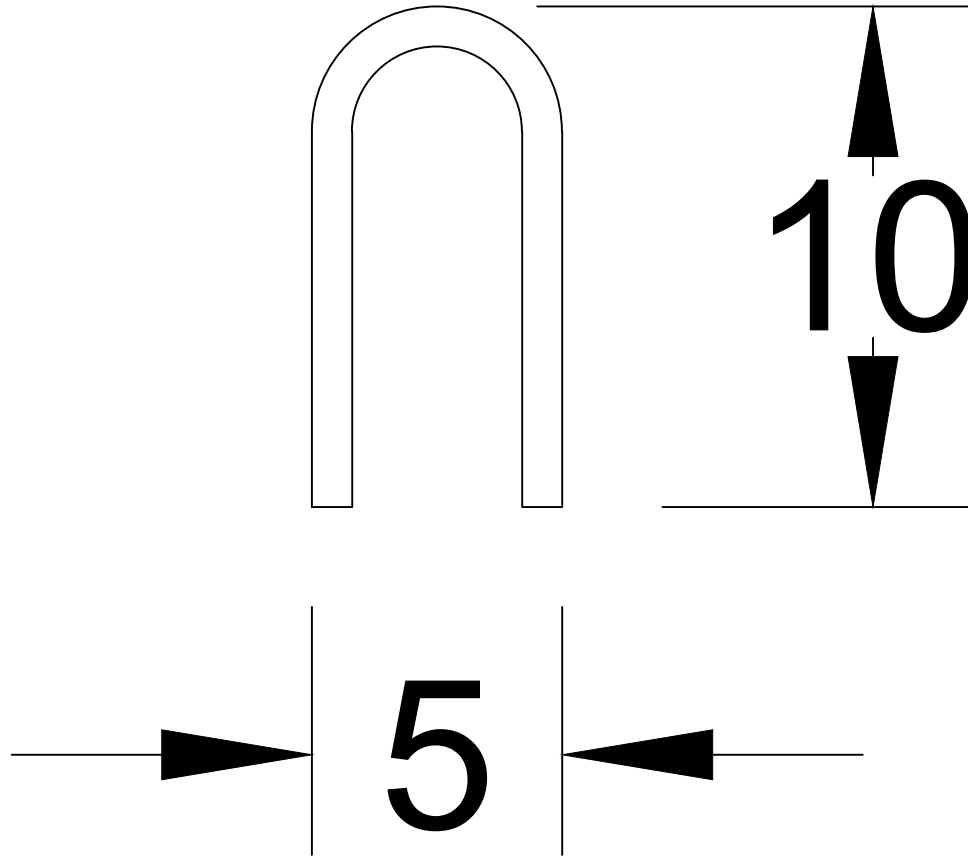


# Sill Reinforcement

# VSP 11



# EIN-1



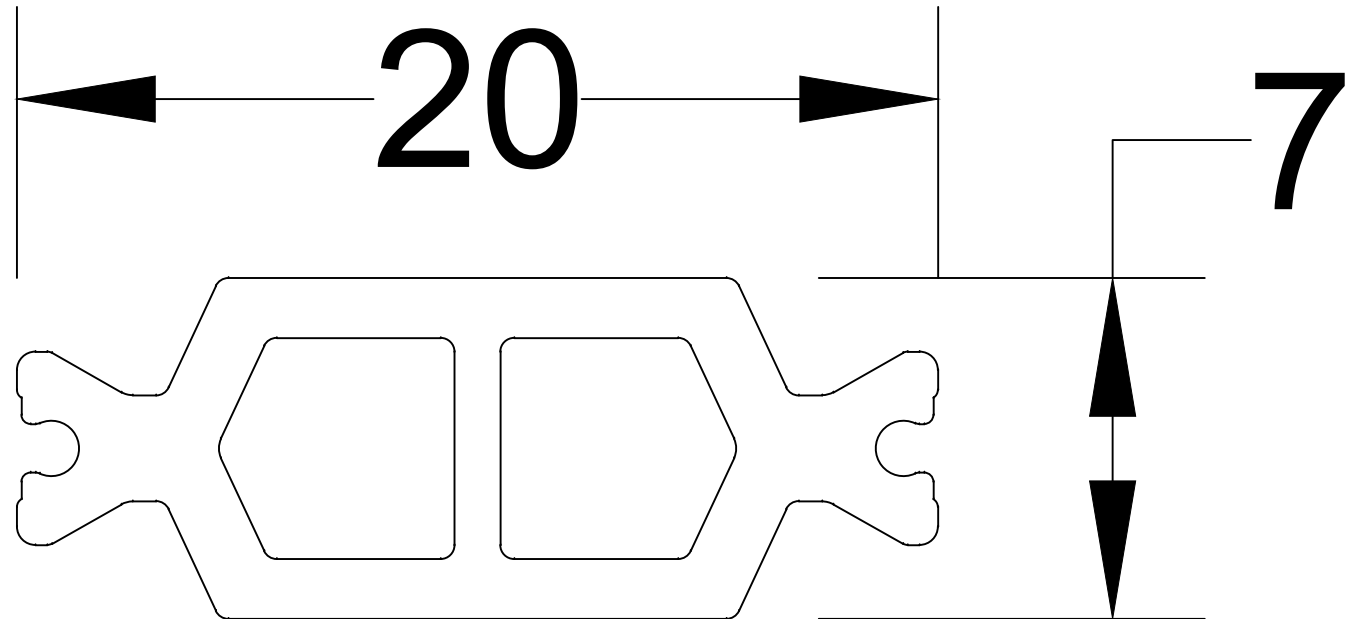
# Sill Thermal Break

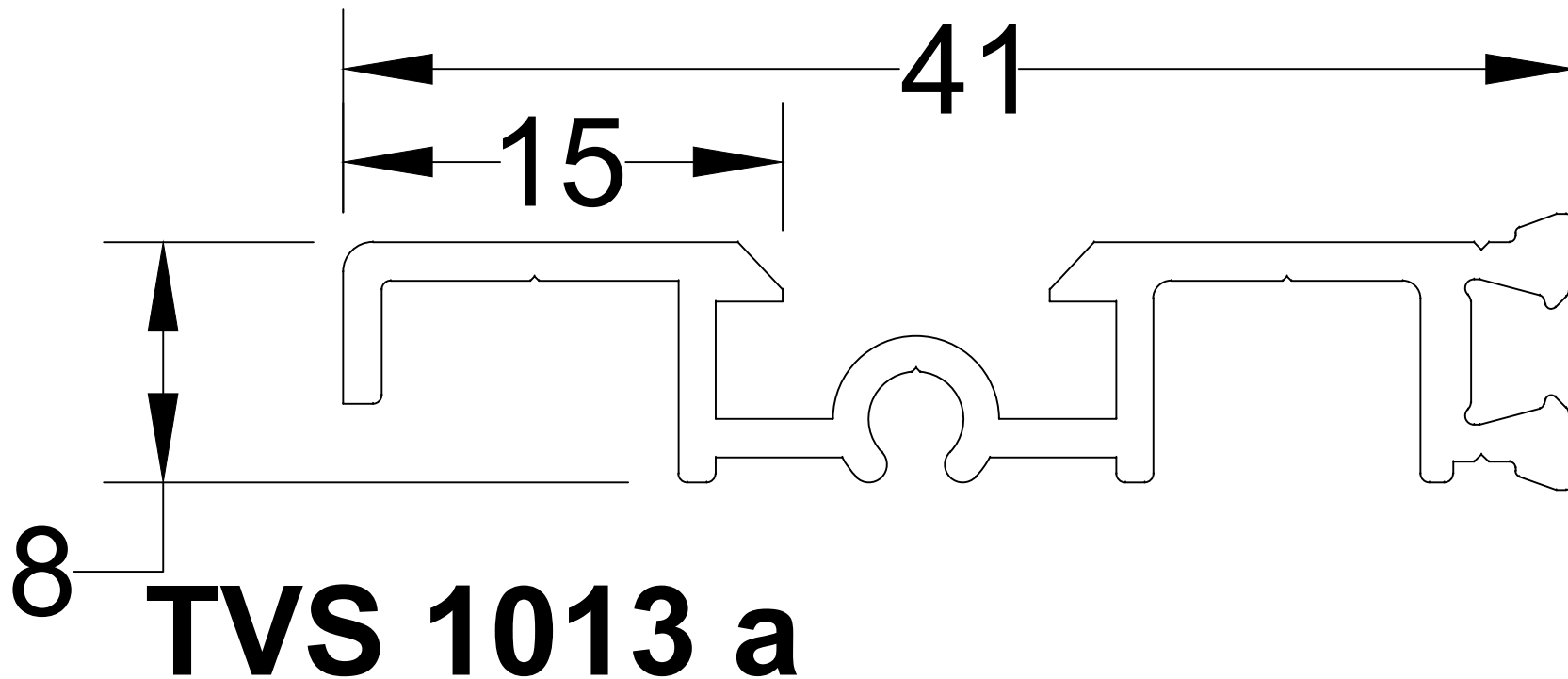
**intertek**  
Total Quality. Assured.

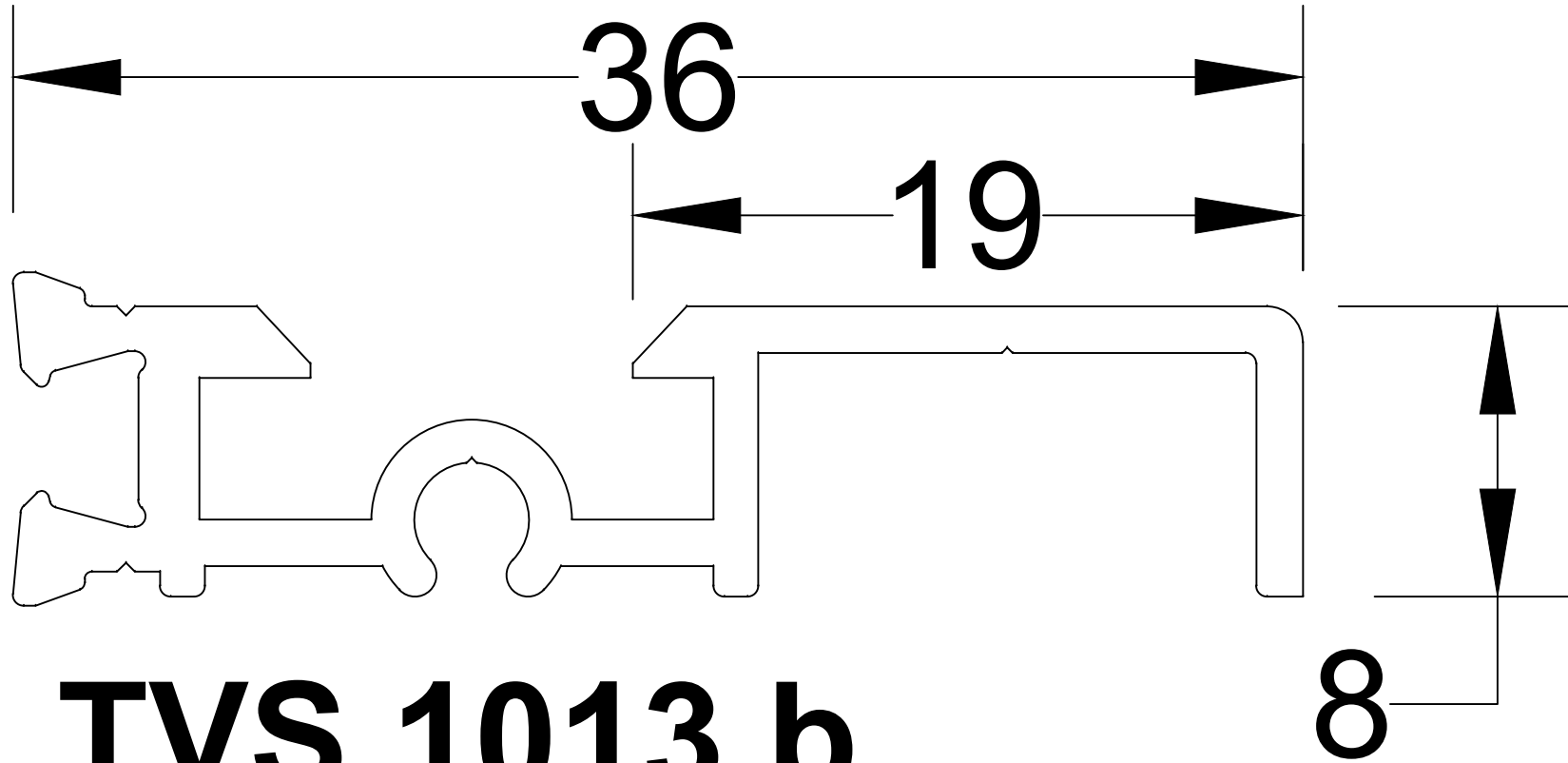
Report #: H0122.02-301-45

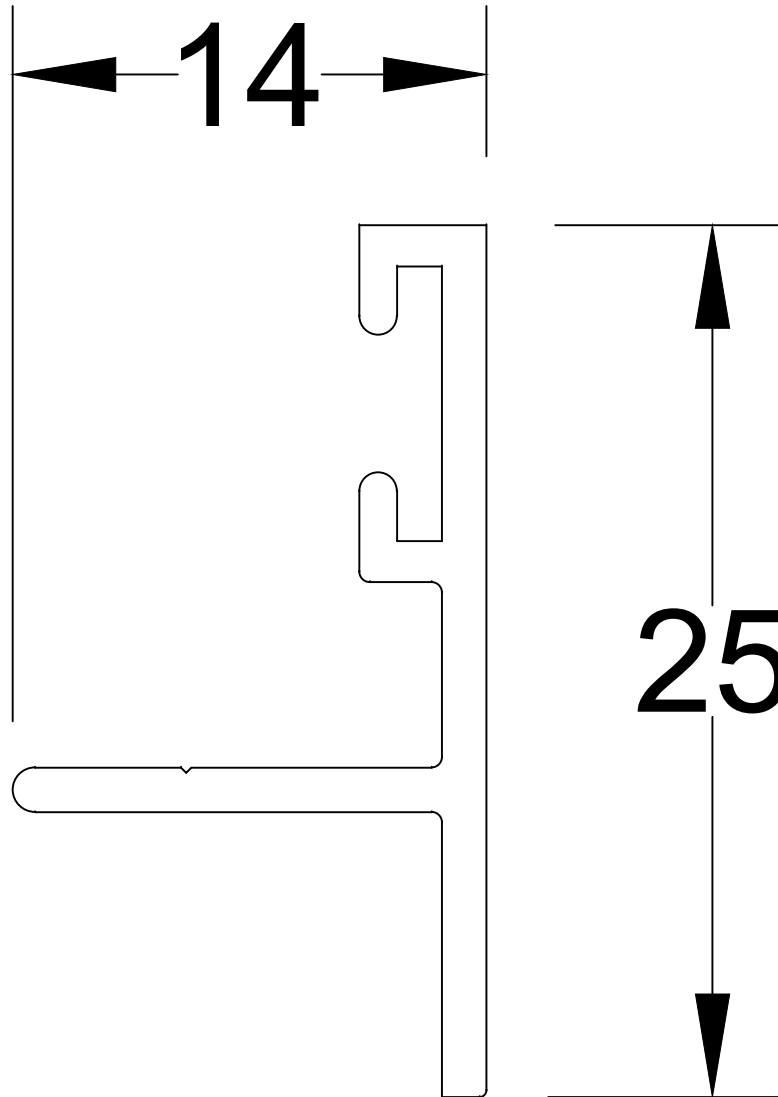
Date: 07/25/18

Verified by: *D.J. Smith*





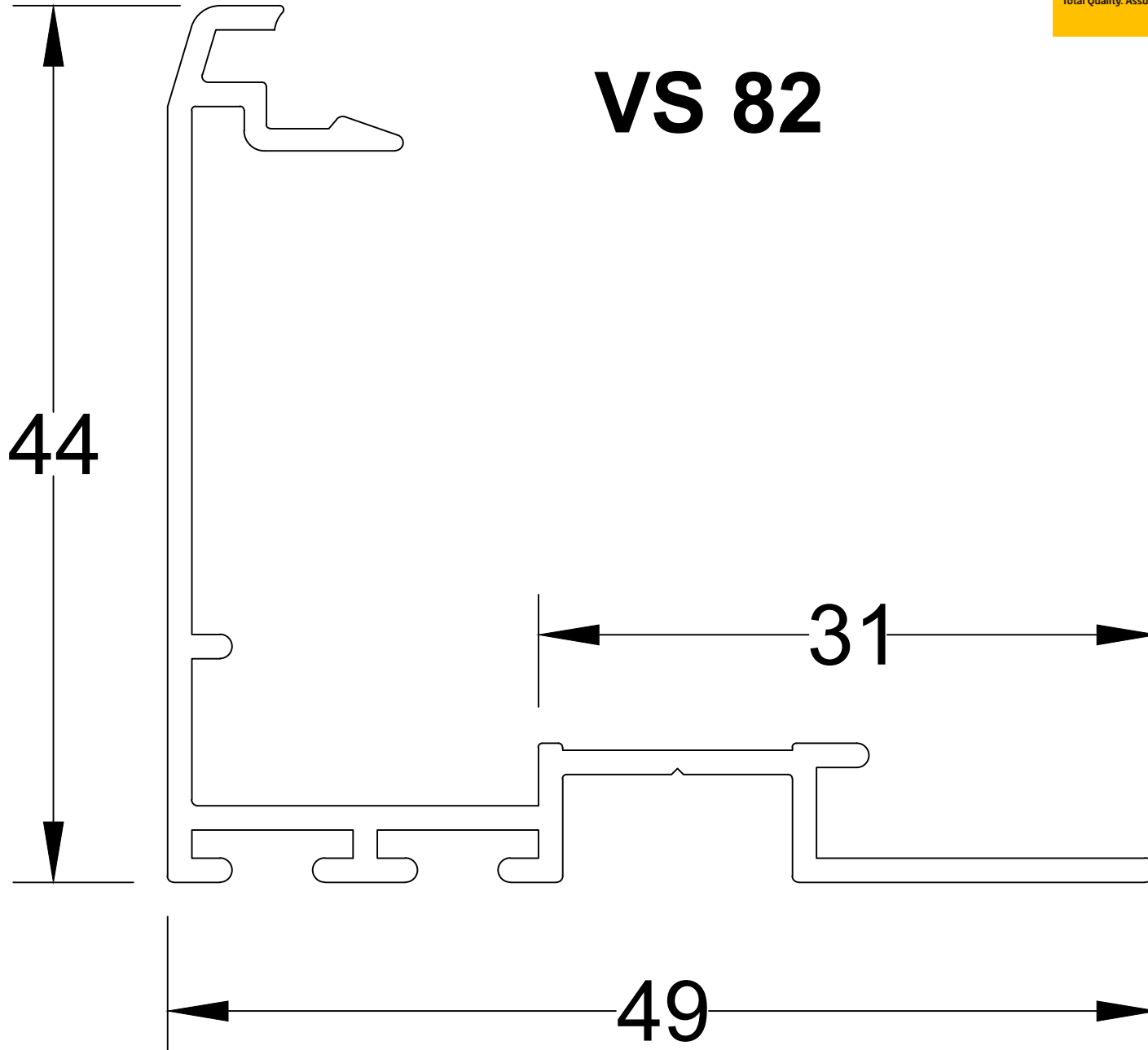




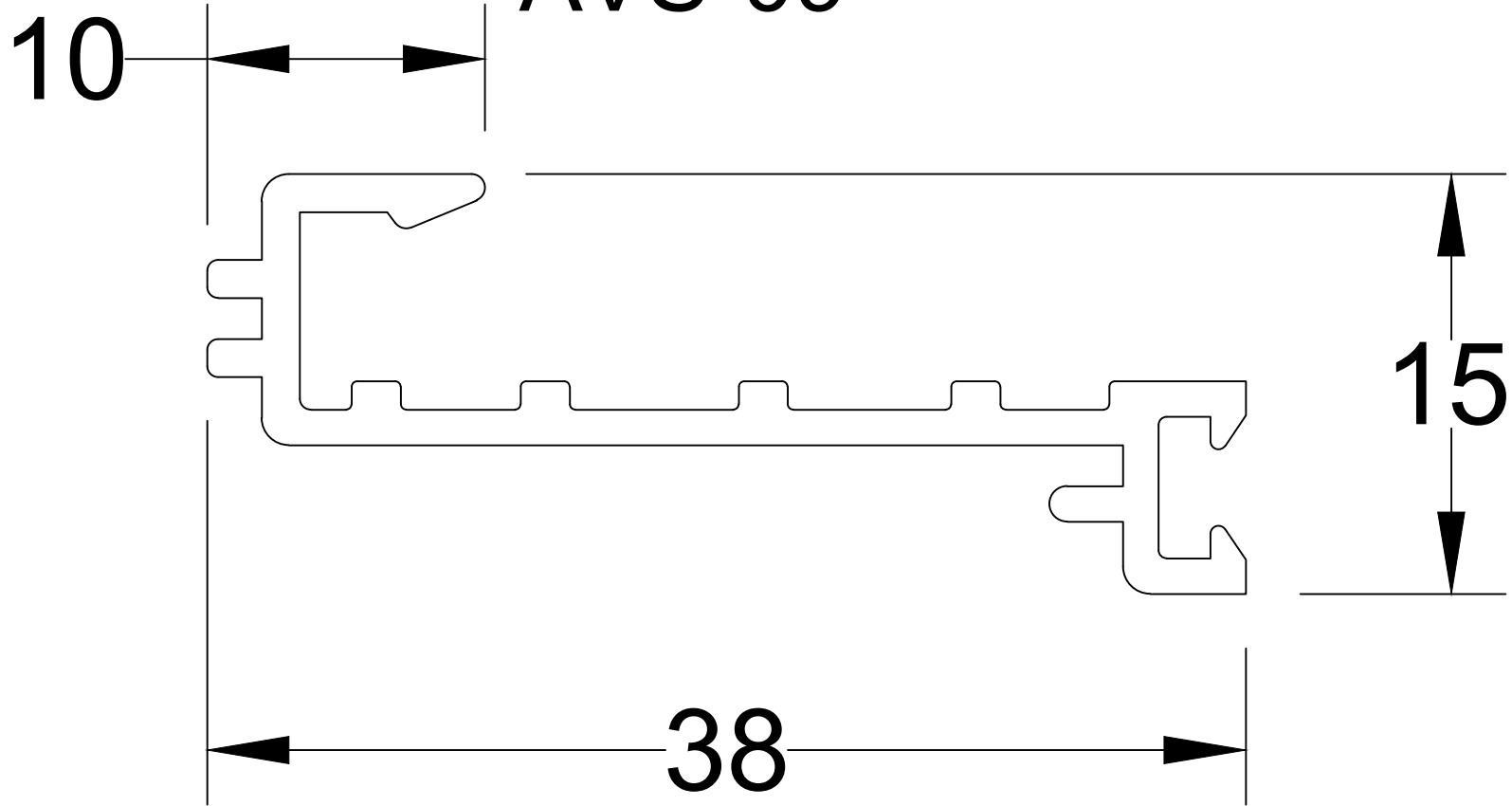
**TVS 1013 c**

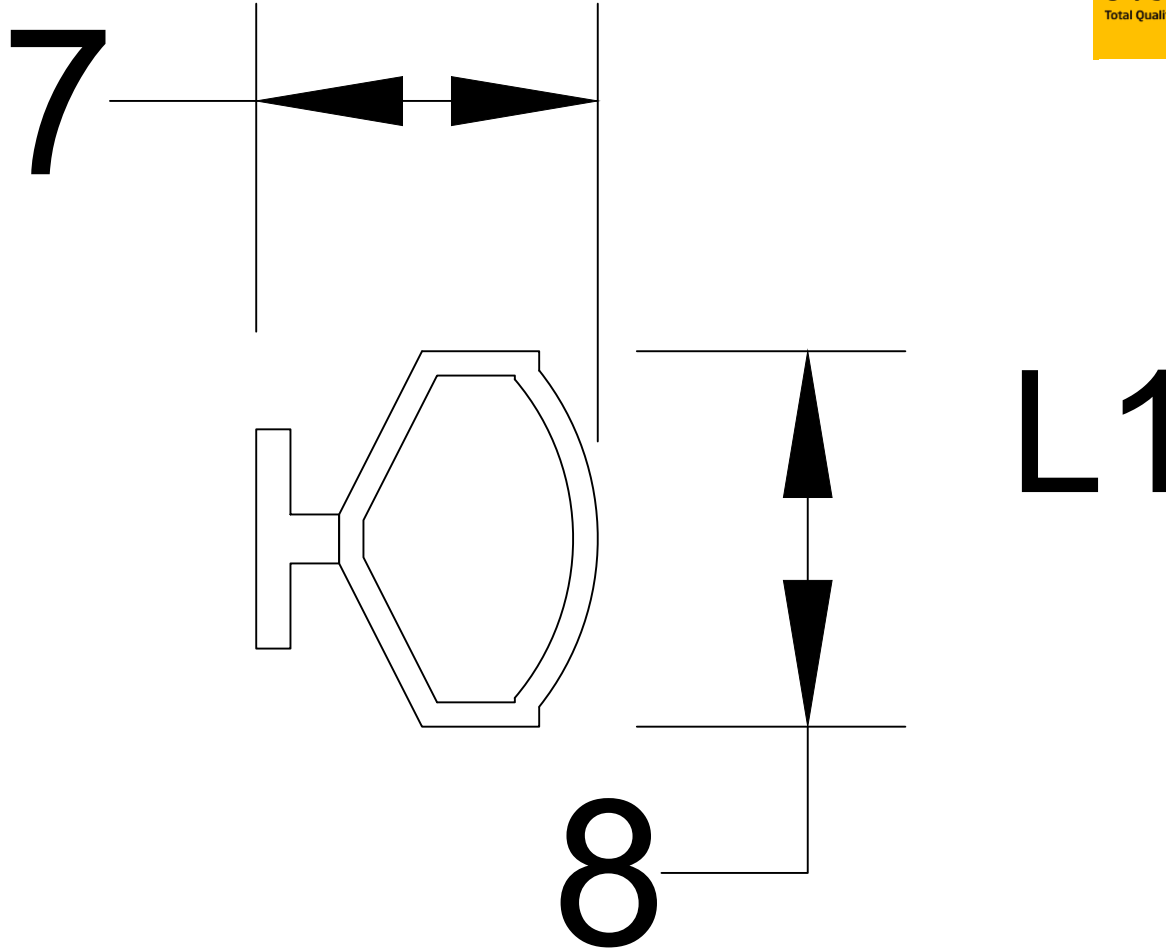


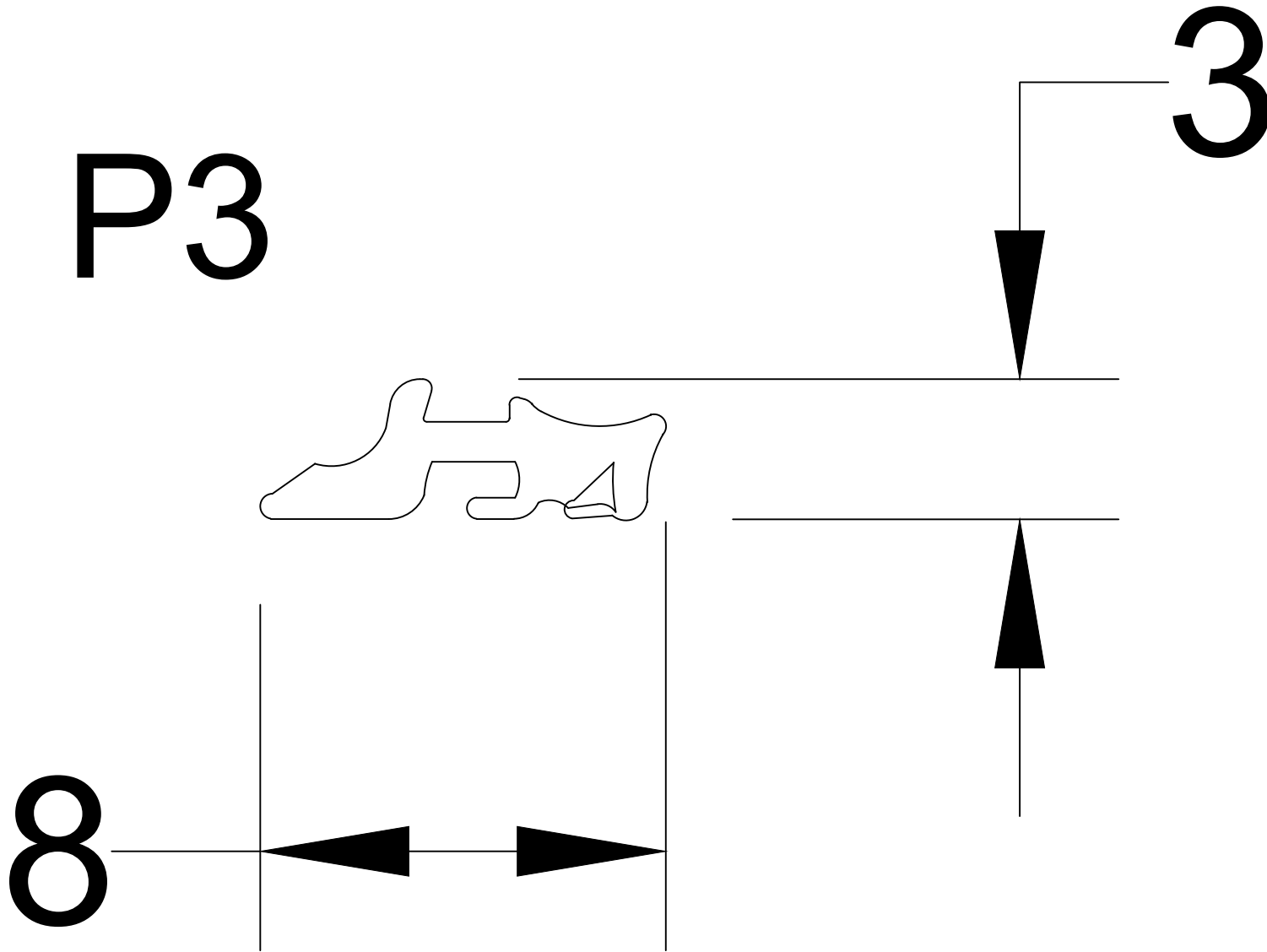
# VS 82



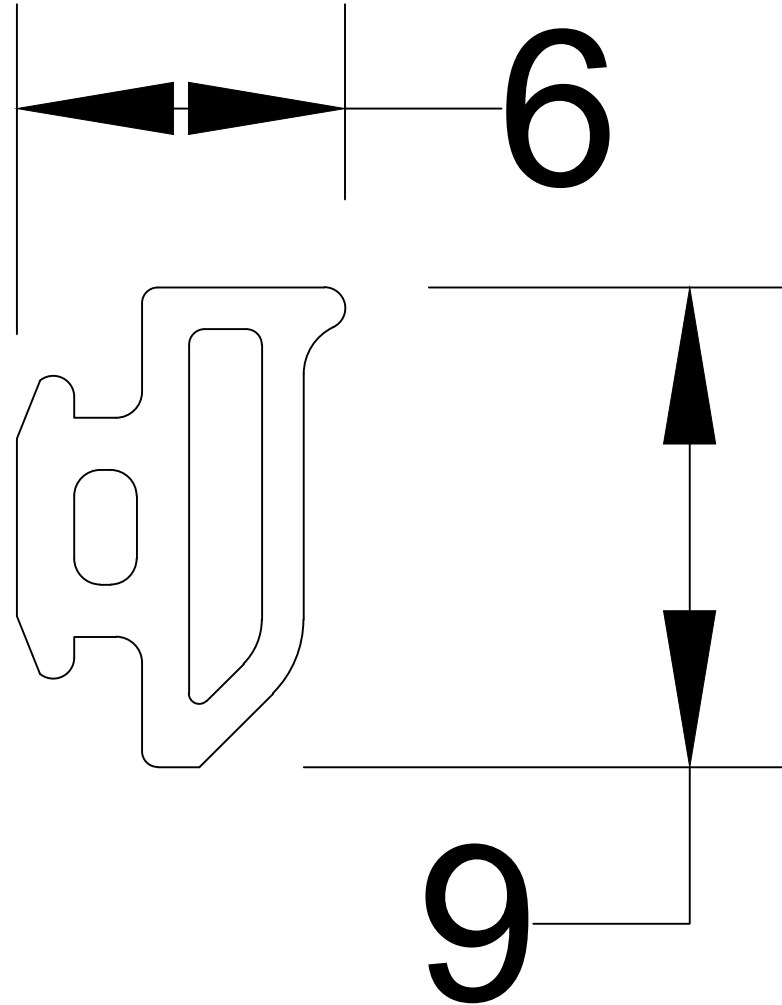
AVS-09

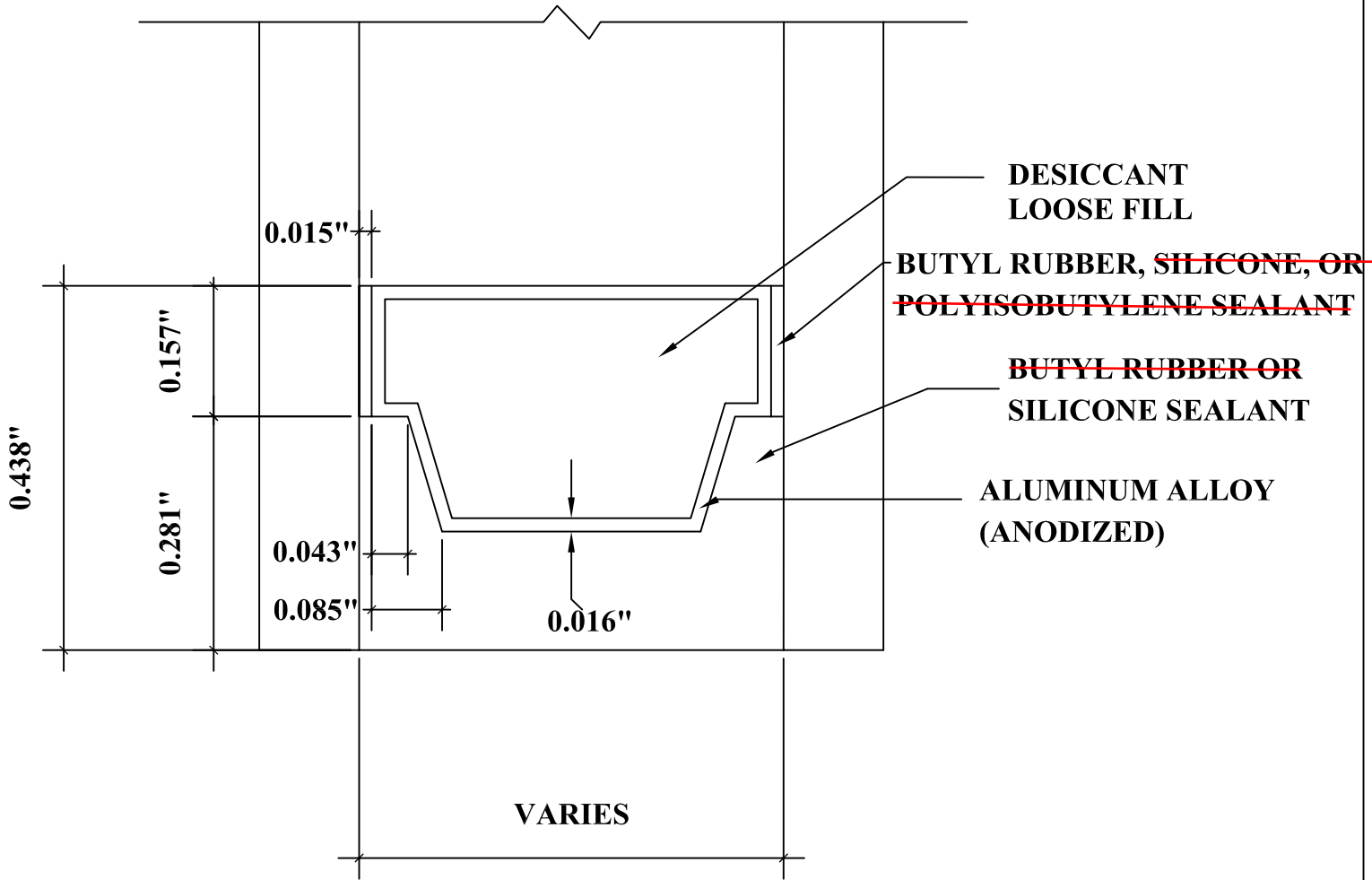




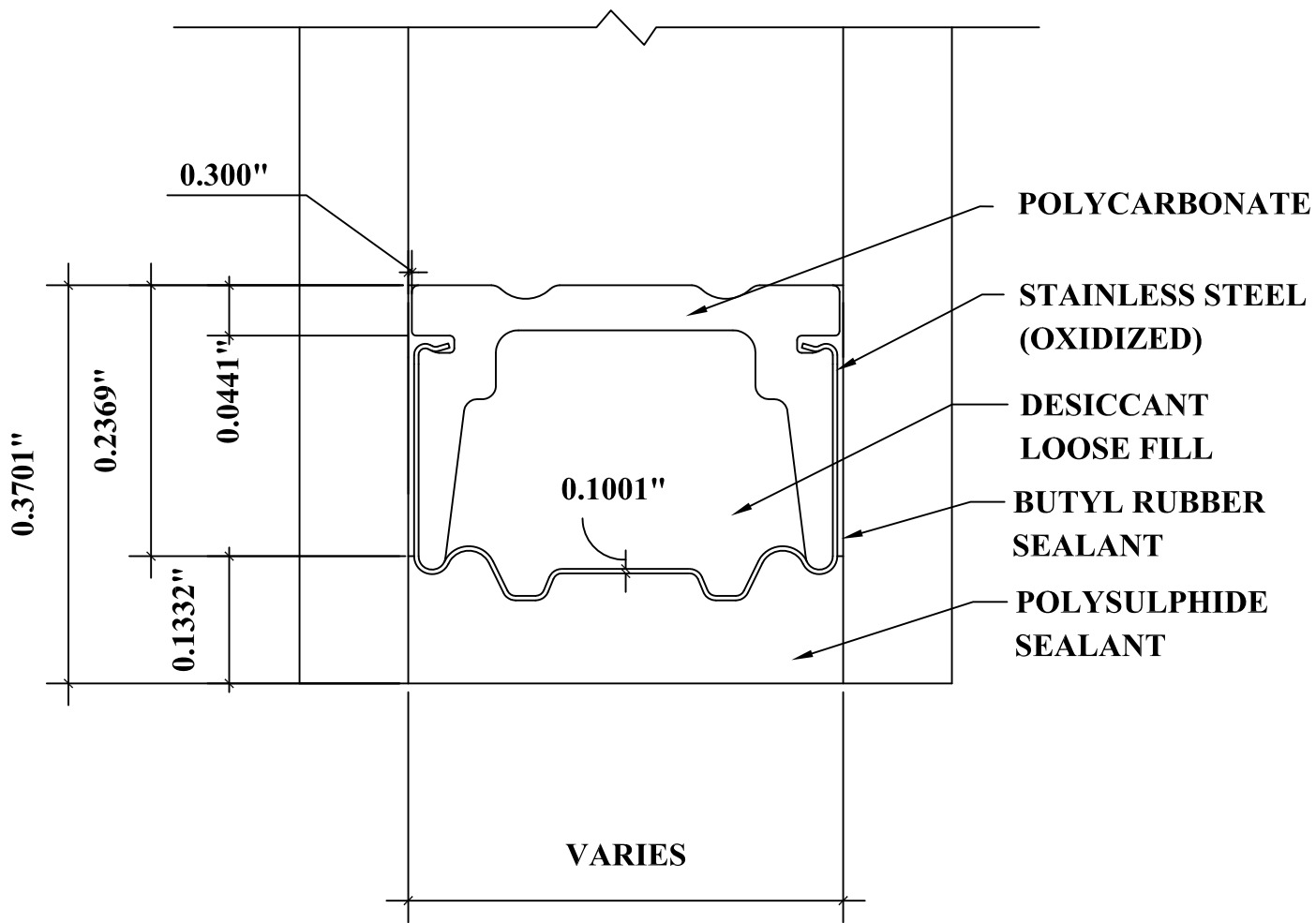


# AVS-03

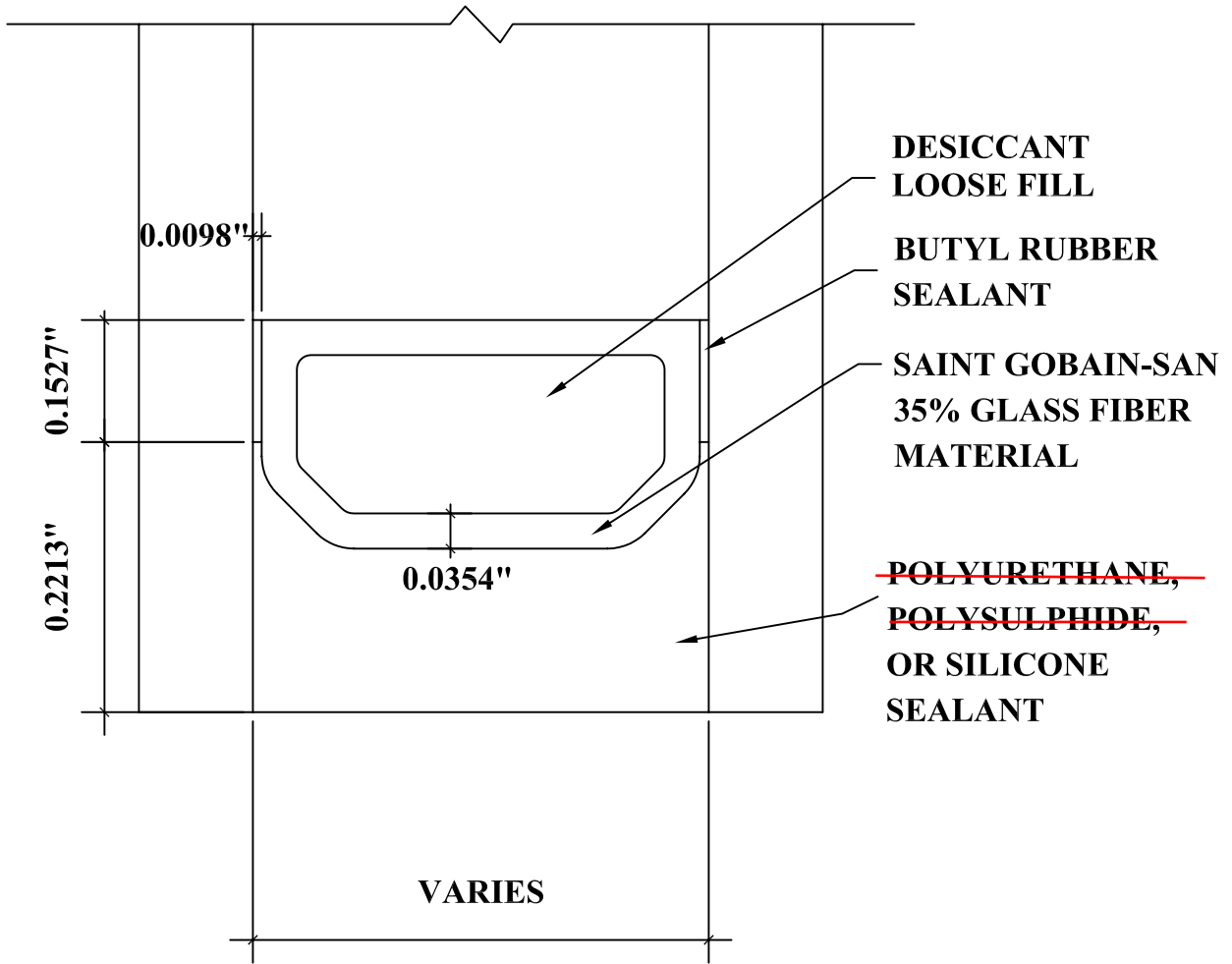




DETAIL FOR THERMAL MODELING OF  
ALUMINUM SPACER (A1-D)



DETAIL FOR THERMAL MODELING OF  
ROLLTECH CHROMATECH ULTRA SPACER (TS-D)



DETAIL FOR THERMAL MODELING OF  
SAINT-GOBAIN SWISSPACER (TP-D)