WHEATON SPRAGUE
BUILDING ENVELOPE

Thermal Simulation Report
For:

Tony View System

Prepared For:
AV Builders

Issued On:
July 24, 2024

Project Summary:

Wheaton & Sprague Engineering, Inc. (WS) has conducted a finite element analysis (FEA) thermal simulation for glazing assemblies in development by AV Builders. For all FEA procedures, WS utilized THERM 7, WINDOW 7 and OPTICS 6, all of which are computerized solutions developed by Lawrence Berkeley National Laboratory (LBNL).

Dew point analysis was requested for system-specific details of the glazing systems in development. Models were based on CAD drawings developed by WS for AV Builders. The models correspond to the shop drawing set titled "*TONYVIEW" Corner Glazing System, AV Builder Corporation, Design Concept Drawings* dated August 2, 2024. Project specific temperature was set equal to the 99.6% dry bulb heating design temperature provided by 2021 ASHRAE climate data for typical Zone 5 areas of North America. This location was selected to be an extreme temperature area within the dry climate zone which is the current market target for the product.

FEA results contained in this report pertain only to the details modeled by WS. All thermal models are drafted and imported into THERM to be as accurate as the information provided. Minor simplifications in the geometry of a detail are typically required to allow for successful analysis with the THERM software. Variance in actual as-built construction may lead to altered thermal performance at the locations represented in the included details. The results presented herein are intended only as a guide to the actual fenestration system performance and should not be interpreted as actual performance.

Glazing Systems: Tony View system

Glazing Units: The following specification for an insulated glazing unit was used for the thermal modeling purposes:

1" O.A. Solarban 70 insulated glass vision unit
Outer: 1/4" Clear
Cavity: 1/2" air space – Air – stainless steel spacer – 1/2” sightline
Inner: 1/4" Clear, Low-E #3

U-Factor and Dew Point Analysis

FEA results summary: Please refer to the U-value plots and the dewpoint plots on the following pages.

Details of construction for U-Value and Dew Point Analysis: Three models were completed:

Tony View system
1. Head
2. Jamb
3. Sill

Dew Point Modeling Condition: Exterior Temperature: +7.4º F
Interior Temperature: +70º F
Interior Relative Humidity: 30%
Calculated Dew Point Temperature = +37.1º F

U-Value Modeling Condition: Exterior Temperature: -0.4º F
Interior Temperature: +69.8º F
Wind Speed: 12.3 MPH

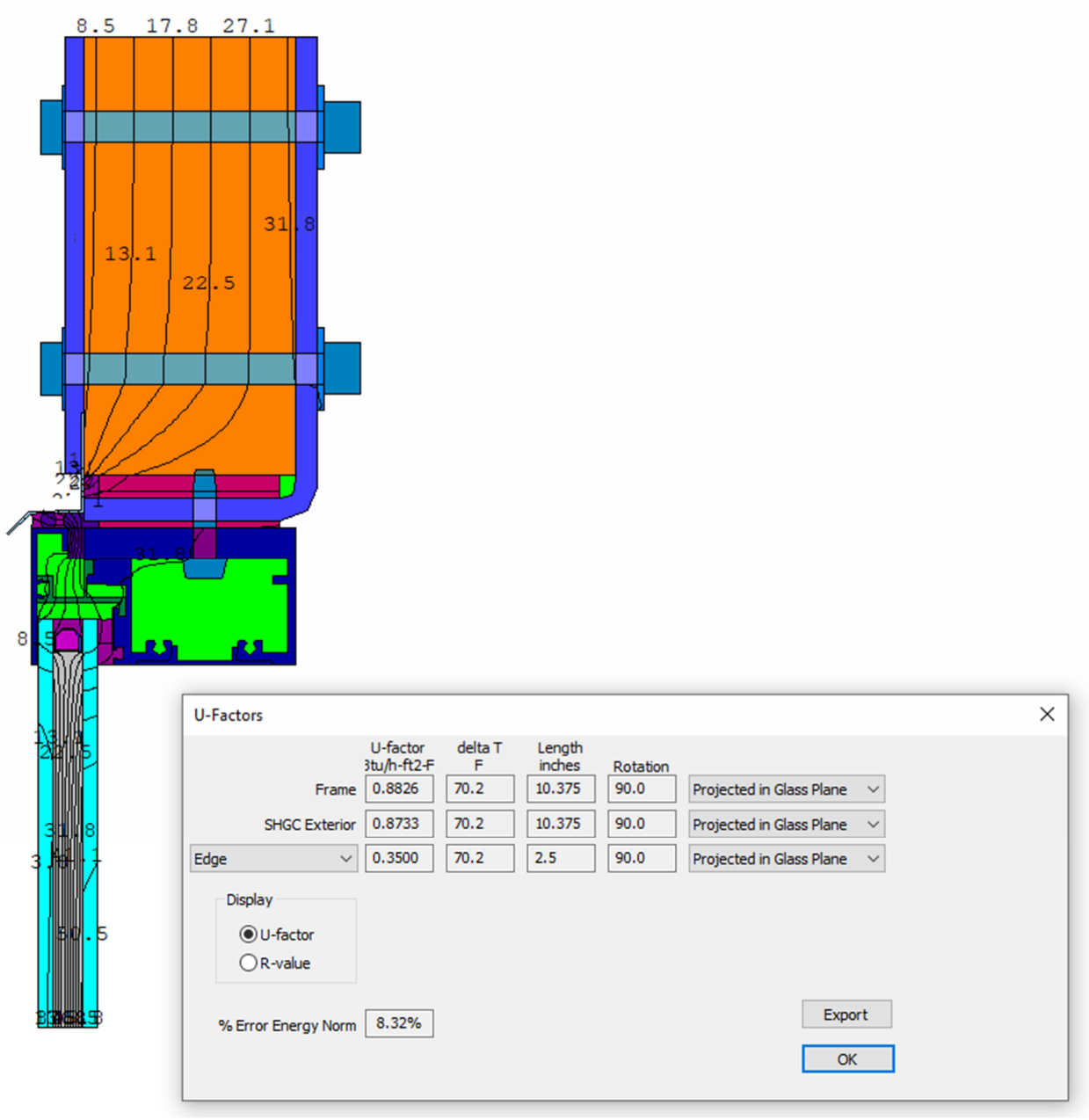
Modeling Assumptions:

1. Models are based on drawings provided by client.
2. The LBNL software is based on ideal steady-state conditions and does not account for any outside influences, three-dimensional interactions or final installation of the fenestration in the field.

Dew Point Analysis Results: The component parts of the system were modeled at the specified conditions to determine the coldest interior metal surface temperature of each typical cross-section. The coldest temperatures can be compared to the dew point temperature at the specified conditions to determine the probability of condensation formation. The temperature distribution plots for the typical system cross-section details are shown below.

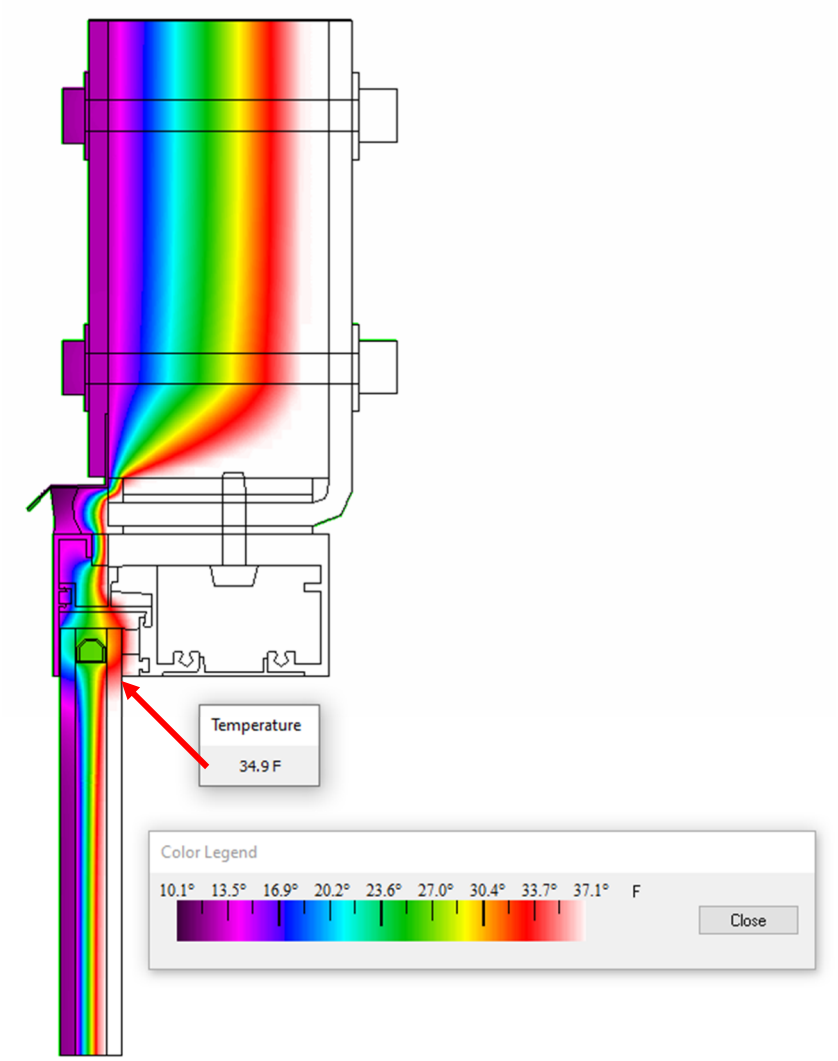
Solar Heat Gain Coefficient (SHGC) Results: Results are displayed in a screenshot provided for each detail which identifies the U-factor and SHGC results for each detail modeled.

Isotherm & U-Values Diagram



Condition Simulated: *Tony View system - Head*

Color Flooded Plot

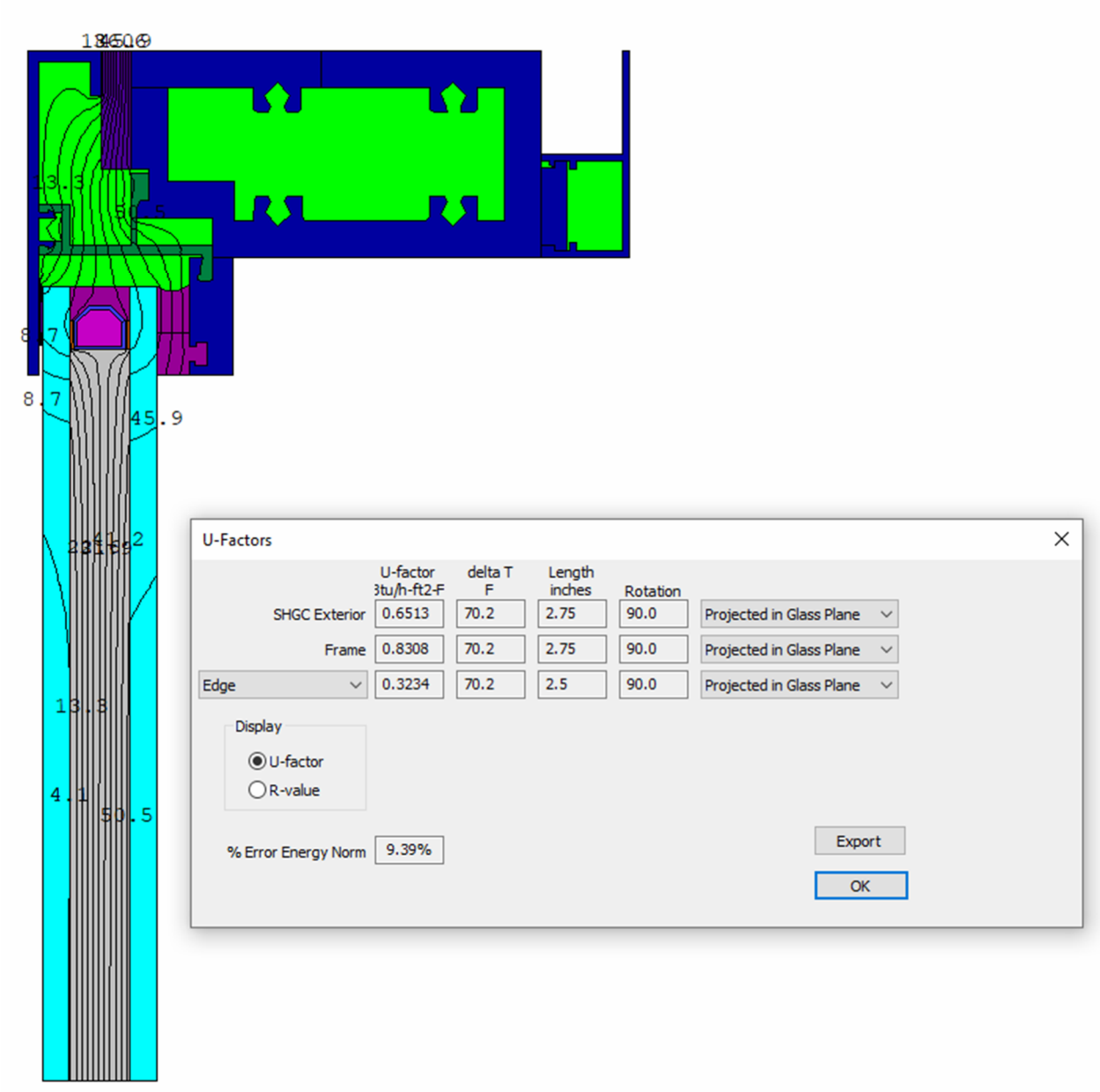


Condition Simulated: *Tony View system - Head*

Boundary Conditions
Exterior Temperature: +7.4º F
Interior Temperature: +70º F
Relative Humidity: 30%
Calculated Dew Point Temperature = +37.1º F

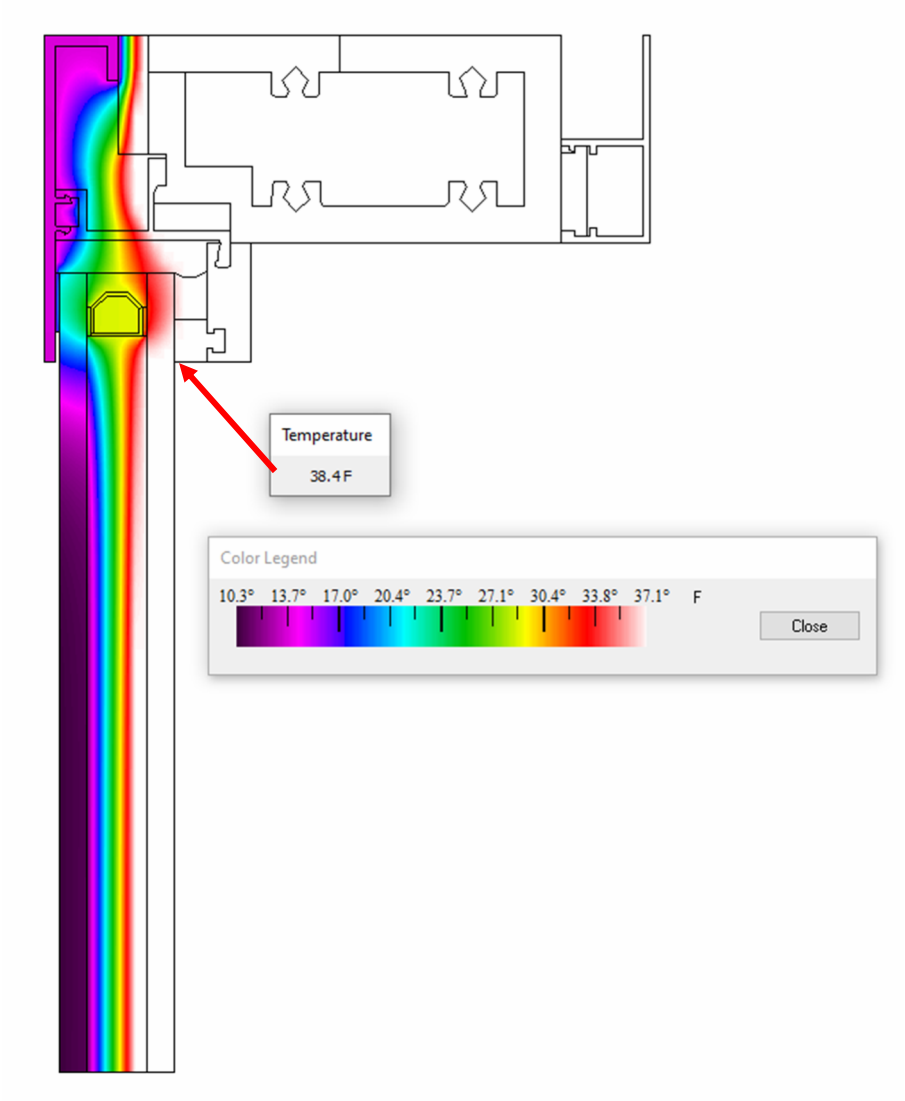
Interior surface temperatures below dewpoint are indicated on the interior face of the interior head gasket, the frame, the aluminum angle, and the interior face of the vision glass immediately adjacent to the head gasket.

Isotherm & U-Values Diagram



Condition Modeled: *Tony View system - Jamb*

Color Flooded Plot

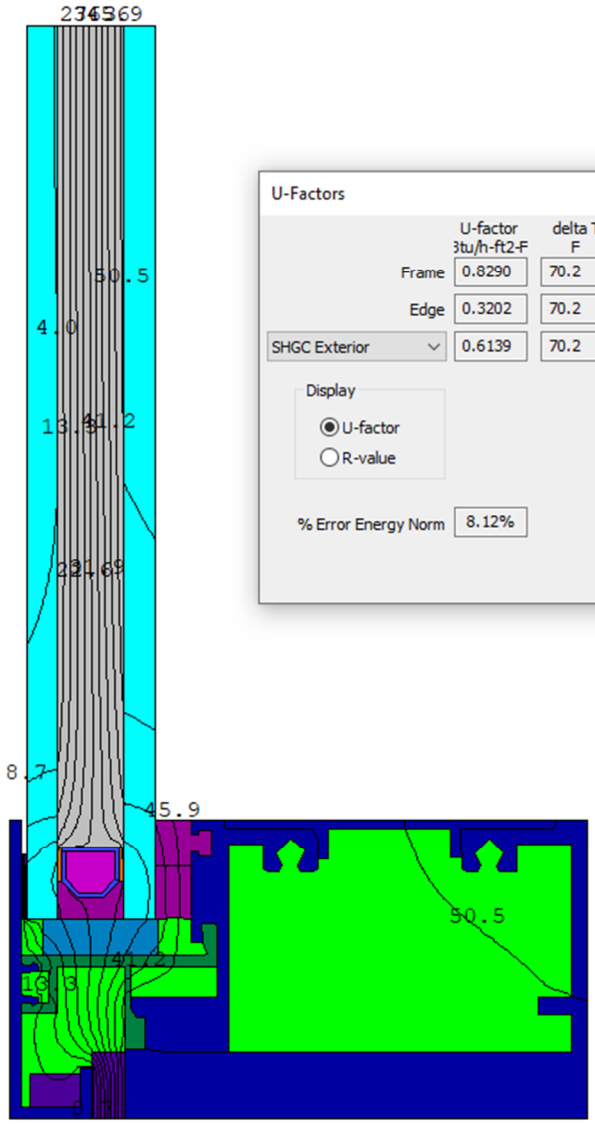


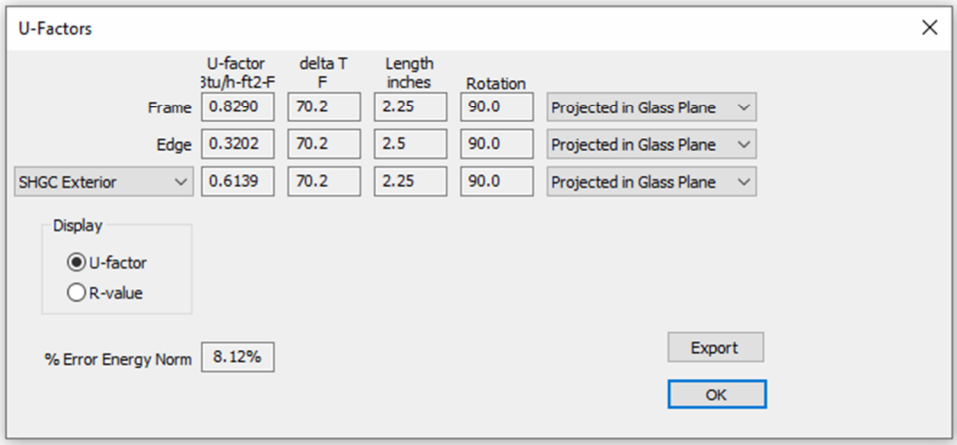
Condition Simulated: *Tony View system - Jamb*

Boundary Conditions
Exterior Temperature: +7.4º F
Interior Temperature: +70º F
Relative Humidity: 30%
Calculated Dew Point Temperature = +37.1º F

Interior surface temperatures below dewpoint are not indicated.

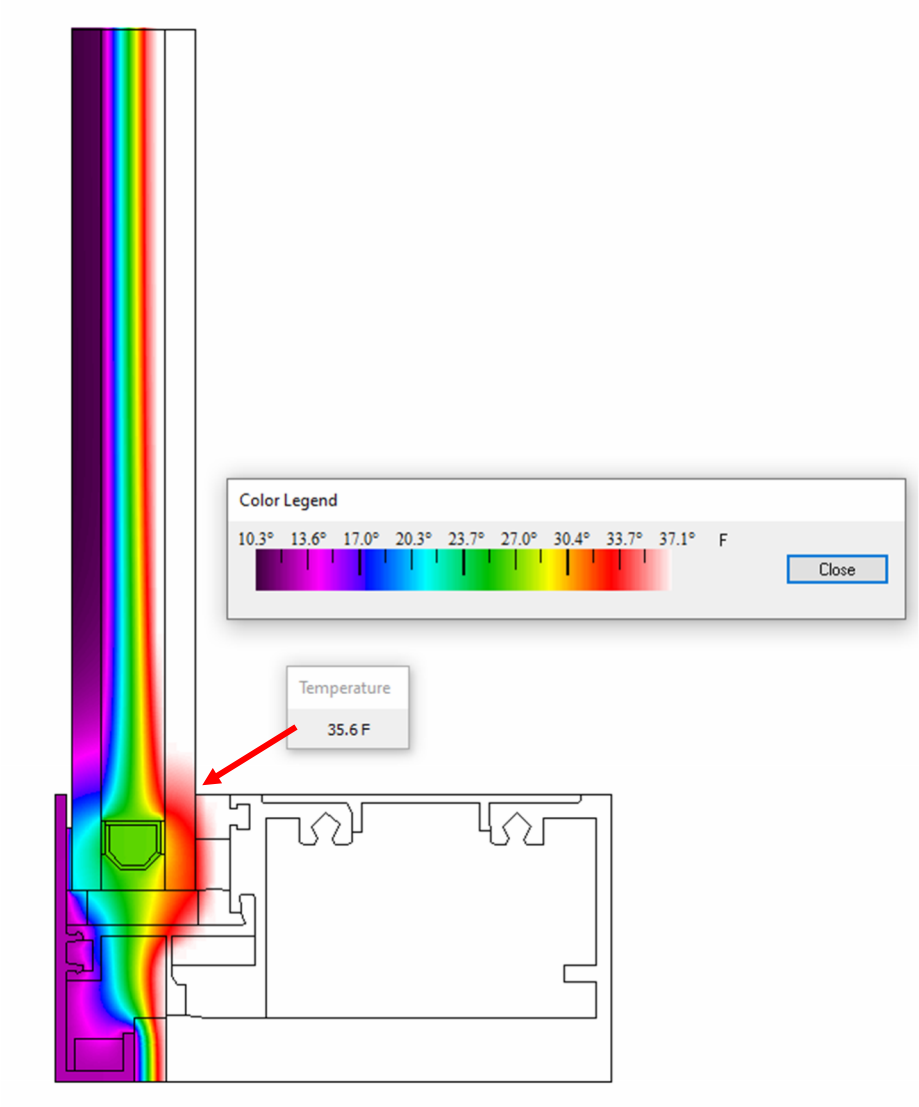
Isotherm & U-Values Diagram





Condition Simulated: *Tony View system - Sill*

Color Flooded Plot



Condition Simulated: *Tony View system - Sill*

Boundary Conditions
Exterior Temperature: +7.4º F
Interior Temperature: +70º F
Relative Humidity: 30%
Calculated Dew Point Temperature = +37.1º F

Interior surface temperatures below dewpoint are indicated on the interior face of the sill frame member interior sill gasket, and the interior face of the vision glass.