



NATIONAL CERTIFIED TESTING LABORATORIES

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Simulation Performance, Solar Heat Gain Coefficient, Visible Transmittance and Condensation Resistance Calculation Report

REPORT NO: NCTL-110-13687-01
SIMULATION DATE: 03/16/11
REPORT DATE: 03/16/11

Client: Remodelers Supply Center
2622 North Pulaski
Chicago, IL 60639

Product Line: Remodelers Supply Center 2000 Vinyl Horizontal Slider

Specification: NFRC 100-2010: "Procedure for Determining Fenestration Product U-Factors".
NFRC 200-2010: "Procedure for Determining Fenestration Product Solar Heat
Gain Coefficients and Visible Transmittance at Normal Incidence".
NFRC 500-2010: "Procedure for Determining Fenestration Product
Condensation Resistance Values".
Therm 5.x / Window 5.x NFRC Simulation Manual (Approved at test date)
Therm 6.x / Window 6.x NFRC Simulation Manual (Approved at test date)

**Procedures
and
Compliance:** All U-factor, Solar Heat Gain Coefficients, Visible Transmittance and
Condensation Resistance values were calculated using the following
characteristics: a default value of 0.30 solar absorptance for all products other
than window glazed wall and sloped glazing which have a solar absorptance of
0.50. The best glazing option was used as the configuration for SHGC and VT
specialty products table. NCTL is a NFRC accredited simulation laboratory and
this simulation was conducted in full compliance with NFRC requirements. This
report does not constitute an opinion or endorsement by the laboratory. Ratings
values included in this report are for submittal 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. Rounding per NFRC
601-2010: "NFRC Unit and Measurement Policy".

PRODUCT LINE DESCRIPTION

General: The product line modeled is Remodelers Supply Center 2000 Vinyl Horizontal
Slider.

Model Size Simulations: 1500mm x 1200mm (59.055" x 47.244")

Weatherseals:

| Location | Weather Seal Description |
|---------------|------------------------------------|
| Left Head | (3) single strips of weather-strip |
| Left Jamb | (3) single strips of weather-strip |
| Left Sill | (3) single strips of weather-strip |
| Meeting Stile | (2) single strips of weather-strip |
| Right Head | (3) single strips of weather-strip |
| Right Jamb | (3) single strips of weather-strip |
| Right Sill | (3) single strips of weather-strip |

Gas Fillings: Not applicable.

| Gas Type | Filling Technique | Percentage |
|------------------------|-------------------|------------|
| Argon | Double probe | 95% |
| 22% Krypton /68% Argon | Single probe | 90% |

Reinforcement: Not applicable. **Edge – of - Glass – Construction:** Exterior silicone back bedding and Interior Vinyl Glazing Bead.

Finish: Vinyl

Frame Description:

| Code | Type | Definition |
|------|-------|--|
| VY | Vinyl | All members are vinyl with no reinforcements |

Sash Description:

| Code | Type | Definition |
|------|-------|--|
| VY | Vinyl | All members are vinyl with no reinforcements |

Spacer and Sealant:

| Code | Type | Definition |
|------|-----------------------|---|
| CU-D | Coated Steel U-Shaped | Coated Steel (galvanized or tinplated) U-shaped spacer system embedded in sealant |

Dividers: Where applicable, dividers were not modeled because the gap between dividers and lites were greater than 3mm. For Solar Heat Gain and Visual Light Transmittance default dividers less than 1” and greater or equal to 1” and default patterns were used for simulations.

Divider Description: 0.1875” x 0.610” Painted Aluminum Rectangular.

Continuous Hardware Description: Not applicable.

Modeling Assumptions and Comments Deemed Important:*Sealing Rules:*

All cavities that are opened to the exterior within a frame section shall be modeled according to ISO 15099, Section 6.7.1, which states that cavities greater than 2mm but equal to or less than 10 mm shall be modeled as “slightly ventilated air cavities”. For physical testing purposes the product is sealed at the inside surface with tape or equivalent to prevent air infiltration. Air cavities created by this sealing technique must be simulated with the standard NFRC “Frame Cavity” material. If cavities on the frame are sealed (covered) to the surround panel with tape or equivalent, those cavities are also filled with NFRC “Frame Cavity” material within the simulation model. If the frame is not covered or sealed, those areas are left hollow or opened within the simulation model.

Continuous elements:

All elements continuous within the product line are identified from the Bill-of-Materials and detailed drawings via the referenced dimensions and cut lengths as compared to the overall size of the product.

General Notes:

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.

Miscellaneous assumptions:

1. The screen extrusions were not modeled.
2. All radii are simulated at angles.
3. Any spacer simulated using a spacer system from the Frame Spacer Library match the required configurations for this manufacturer’s spacer system.
4. The modeling was performed in accordance with the manufacturer’s assembly drawing from a DXF file.

Component Area and Frame Heights:

Frame heights, calculated areas, area weighted values for U-factor, SHGC, and VT, and center –of-glazing are located in approved NFRC simulation programs for all individual products.

NCTL Therm Section Filename Methodology

| Filename Codes Example: HD-CU-D-F1_003.THM | |
|--|----------------------|
| HD | Frame Section (Head) |
| CU-D | Spacer (Intercept) |
| F1 | Frame Description |
| _003 | Glazing ID #3 |

| PRODUCT | Product Number | Pane ID #1 | Pane ID #2 | Pane ID #3 | Pane Thickness #1 | Pane Thickness #2 | Pane Thickness #3 | Gap 1 | Gap 2 | Gap Fill 1 | Gap Fill 2 | % of Gap Fill 1 | % of Gap Fill 2 | Emissivity Surface 1 | Emissivity Surface 2 | Emissivity Surface 3 | Emissivity Surface 4 | Emissivity Surface 5 | Emissivity Surface 6 | Tint | Spacer | Grid Type | Grid Size | U-factor | Condensation Resistance | SHGC NO GRID | SHGC GRID<1" | SHGC GRID>=1" | VT NO GRID | VT GRID<1" | VT GRID >=1" |
|---------|----------------|------------------|------------------|-------------|-------------------|-------------------|-------------------|-------|-------|------------|------------|-----------------|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------|--------|-----------|-----------|----------|-------------------------|--------------|--------------|---------------|------------|------------|--------------|
| | 1 | 2.5mm CLEAR | 2.5mm CLEAR | | 0.086 | 0.086 | | 0.679 | | AIR | | | | | | | | | | CL | CU-D | N,G | 0.75 | 0.46 | 46 | 0.61 | 0.55 | N/A | 0.63 | 0.56 | N/A |
| | 2 | 2mm Comfort E-PS | 2.5mm CLEAR | | 0.087 | 0.086 | | 0.679 | | AIR | | | | 0.148 | | | | | | OT | CU-D | N,G | 0.75 | 0.36 | 50 | 0.52 | 0.47 | N/A | 0.59 | 0.52 | N/A |
| | 3 | 2mm Comfort E-PS | 2.5mm CLEAR | | 0.087 | 0.086 | | 0.679 | | ARG | | 95 | | 0.148 | | | | | | OT | CU-D | N,G | 0.75 | 0.33 | 53 | 0.52 | 0.47 | N/A | 0.59 | 0.52 | N/A |
| | 4 | 2.5mm TIAC36 | 2.5mm CLEAR | | 0.087 | 0.086 | | 0.679 | | ARG | | 95 | | 0.034 | | | | | | CL | CU-D | N,G | 0.75 | 0.30 | 55 | 0.28 | 0.25 | N/A | 0.52 | 0.47 | N/A |
| | 5 | 2.5mm CARD-366 | 2.5mm CLEAR | | 0.087 | 0.086 | | 0.679 | | ARG | | 95 | | 0.022 | | | | | | CL | CU-D | N,G | 0.75 | 0.29 | 55 | 0.21 | 0.19 | N/A | 0.50 | 0.44 | N/A |
| | 6 | 2.5mm CARD-270 | 2.5mm CLEAR | | 0.087 | 0.086 | | 0.679 | | ARG | | 95 | | 0.037 | | | | | | CL | CU-D | N,G | 0.75 | 0.30 | 55 | 0.28 | 0.25 | N/A | 0.54 | 0.48 | N/A |
| | 7 | 2.5mm TIAC36 | 2mm Comfort E-PS | | 0.087 | 0.087 | | 0.679 | | ARG | | 95 | | 0.034 | | 0.148 | | | | OT | CU-D | N,G | 0.75 | 0.25 | 44 | 0.27 | 0.24 | N/A | 0.49 | 0.43 | N/A |
| | 8 | 2.5mm CLEAR | 2.5mm CLEAR | 2.5mm CLEAR | 0.086 | 0.086 | 0.086 | 0.309 | 0.309 | AIR | AIR | | | | | | | | | CL | CU-D | N | | 0.36 | 52 | 0.56 | N/A | N/A | 0.58 | N/A | N/A |
| | 9 | 2mm Comfort E-PS | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | AIR | AIR | | | 0.148 | | | | | | OT | CU-D | N | | 0.32 | 55 | 0.48 | N/A | N/A | 0.54 | N/A | N/A |
| | 10 | 2mm Comfort E-PS | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.148 | | | | | | OT | CU-D | N | | 0.28 | 58 | 0.48 | N/A | N/A | 0.54 | N/A | N/A |
| | 11 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.034 | | | | | | CL | CU-D | N | | 0.28 | 59 | 0.26 | N/A | N/A | 0.48 | N/A | N/A |
| | 12 | 2.5mm CARD-366 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.022 | | | | | | CL | CU-D | N | | 0.27 | 59 | 0.20 | N/A | N/A | 0.46 | N/A | N/A |
| | 13 | 2.5mm CARD-270 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.037 | | | | | | CL | CU-D | N | | 0.27 | 59 | 0.27 | N/A | N/A | 0.49 | N/A | N/A |
| | 14 | 3mm CLEAR | 3mm CLEAR | | 0.123 | 0.123 | | 0.639 | | AIR | | | | | | | | | | CL | CU-D | N,G | 0.75 | 0.46 | 45 | 0.60 | 0.54 | N/A | 0.62 | 0.55 | N/A |
| | 15 | 3mm Comfort E-PS | 3mm CLEAR | | 0.123 | 0.123 | | 0.639 | | AIR | | | | 0.148 | | | | | | OT | CU-D | N,G | 0.75 | 0.36 | 50 | 0.49 | 0.44 | N/A | 0.56 | 0.50 | N/A |
| | 16 | 3mm Comfort E-PS | 3mm CLEAR | | 0.123 | 0.123 | | 0.639 | | ARG | | 95 | | 0.148 | | | | | | OT | CU-D | N,G | 0.75 | 0.35 | 52 | 0.49 | 0.44 | N/A | 0.56 | 0.50 | N/A |
| | 17 | 3mm TIAC36 | 3mm CLEAR | | 0.118 | 0.123 | | 0.639 | | ARG | | 95 | | 0.034 | | | | | | CL | CU-D | N,G | 0.75 | 0.29 | 55 | 0.28 | 0.25 | N/A | 0.51 | 0.46 | N/A |
| | 18 | 3mm CARD-366 | 3mm CLEAR | | 0.117 | 0.123 | | 0.639 | | ARG | | 95 | | 0.022 | | | | | | CL | CU-D | N,G | 0.75 | 0.29 | 55 | 0.21 | 0.19 | N/A | 0.49 | 0.44 | N/A |
| | 19 | 3mm CARD-270 | 3mm CLEAR | | 0.118 | 0.123 | | 0.639 | | ARG | | 95 | | 0.037 | | | | | | CL | CU-D | N,G | 0.75 | 0.30 | 55 | 0.28 | 0.25 | N/A | 0.53 | 0.47 | N/A |

| PRODUCT | Product Number | Pane ID #1 | Pane ID #2 | Pane ID #3 | Pane Thickness #1 | Pane Thickness #2 | Pane Thickness #3 | Gap 1 | Gap 2 | Gap Fill 1 | Gap Fill 2 | % of Gap Fill 1 | % of Gap Fill 2 | Emissivity Surface 1 | Emissivity Surface 2 | Emissivity Surface 3 | Emissivity Surface 4 | Emissivity Surface 5 | Emissivity Surface 6 | Tint | Spacer | Grid Type | Grid Size | U-factor | Condensation Resistance | SHGC NO GRID | SHGC GRID<1" | SHGC GRID>=1" | VT NO GRID | VT GRID<1" | VT GRID >=1" |
|---------|----------------|------------------|------------------|--------------|-------------------|-------------------|-------------------|-------|-------|------------|------------|-----------------|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------|--------|-----------|-----------|----------|-------------------------|--------------|--------------|---------------|------------|------------|--------------|
| | 20 | 3mm TIAC36 | 3mm Comfort E-PS | | 0.118 | 0.123 | | 0.639 | | ARG | | 95 | | 0.034 | 0.148 | | | | | OT | CU-D | N,G | 0.75 0.25 | 44 | 0.26 | 0.24 | N/A | 0.47 | 0.41 | N/A | |
| | 21 | 2.5mm CLEAR | 2.5mm CLEAR | 2.5mm CLEAR | 0.086 | 0.086 | 0.086 | 0.309 | 0.309 | AIR | AIR | | | | | | | | | CL | CU-D | G | 0.75 0.37 | 52 | N/A | 0.50 | N/A | N/A | 0.52 | N/A | |
| | 22 | 2mm Comfort E-PS | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | AIR | AIR | | | 0.148 | | | | | | OT | CU-D | G | 0.75 0.33 | 55 | N/A | 0.43 | N/A | N/A | 0.48 | N/A | |
| | 23 | 2mm Comfort E-PS | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.148 | | | | | | OT | CU-D | G | 0.75 0.29 | 58 | N/A | 0.43 | N/A | N/A | 0.48 | N/A | |
| | 24 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.034 | | | | | | CL | CU-D | G | 0.75 0.28 | 59 | N/A | 0.24 | N/A | N/A | 0.43 | N/A | |
| | 25 | 2.5mm CARD-366 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.022 | | | | | | CL | CU-D | G | 0.75 0.28 | 59 | N/A | 0.18 | N/A | N/A | 0.41 | N/A | |
| | 26 | 2.5mm CARD-270 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | ARG | ARG | 95 | 95 | 0.037 | | | | | | CL | CU-D | G | 0.75 0.28 | 59 | N/A | 0.24 | N/A | N/A | 0.44 | N/A | |
| | 27 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.309 | 0.309 | AR3 | AR3 | 50/40 | 50/40 | 0.034 | | | 0.034 | | | CL | CU-D | N | 0.21 | 64 | 0.24 | N/A | N/A | 0.40 | N/A | N/A | |
| | 28 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.309 | 0.309 | AR3 | AR3 | 68/22 | 68/22 | 0.034 | | | 0.034 | | | CL | CU-D | N | 0.22 | 63 | 0.24 | N/A | N/A | 0.40 | N/A | N/A | |
| | 29 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.321 | 0.321 | AR3 | AR3 | 68/22 | 68/22 | 0.034 | | | 0.034 | | | CL | CU-D | N | 0.21 | 63 | 0.24 | N/A | N/A | 0.40 | N/A | N/A | |
| | 30 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.309 | 0.309 | AR3 | AR3 | 50/40 | 50/40 | 0.034 | | | 0.034 | | | CL | CU-D | G | 0.75 0.24 | 64 | N/A | 0.22 | N/A | N/A | 0.35 | N/A | |
| | 31 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.309 | 0.309 | AR3 | AR3 | 68/22 | 68/22 | 0.034 | | | 0.034 | | | CL | CU-D | G | 0.75 0.22 | 63 | N/A | 0.22 | N/A | N/A | 0.35 | N/A | |
| | 32 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm TIAC36 | 0.087 | 0.086 | 0.087 | 0.321 | 0.321 | AR3 | AR3 | 68/22 | 68/22 | 0.034 | | | 0.034 | | | CL | CU-D | G | 0.75 0.22 | 63 | N/A | 0.22 | N/A | N/A | 0.35 | N/A | |
| | 0 | 2.5mm TIAC36 | 2.5mm CLEAR | 2.5mm CLEAR | 0.087 | 0.086 | 0.086 | 0.309 | 0.309 | AR3 | AR3 | 68/22 | 68/22 | 0.034 | | | | | | CL | CU-D | N | 0.26 | 60 | 0.26 | N/A | N/A | 0.48 | N/A | N/A | |

A baseline product test in accordance with the "NFRC 102: Test Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems" is required in order to validate the "Model Size Matrix of U-Values" as previously indicated. Per Section 1.4.3 of NFRC 100-2010, "the baseline product is the individual product selected for validation testing". **The individual product selected as the baseline product shall be the lowest simulated individual product or an individual product having a simulated U-factor within 0.60 W/(m²*K) (0.10 BTU/HR/ft²/°F) or 20% of the listed lowest simulated U-factor.**

Note:

1. For lowest U-factor listings where multiple individual products are shown, validation testing can be conducted on any of the configurations listed.
2. Actual simulated individual products are required for product line validation testing.
3. All individual products in the product line were simulated using the approved NFRC THERM program.

For the purposes of validation testing, production line units and sizes shall be used to represent the baseline product. Per the client, the model size is manufactured as part of their product line; therefore the previously listed model size can be used for baseline product validation testing.

Copies of this report and the detailed product drawings will be retained by NCTL for a period of four (4) years. This report may not be reproduced, except in full, without the approval of NCTL. The results only to the fenestration product simulated. The attached diskette(s) contain(s) all required NFRC data and software files.

NATIONAL CERTIFIED TESTING LABORATORIES


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Simulator


DIGITAL SIGNATURE

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NFRC Accredited Simulator
Simulator-In-Responsible-Charge

Attachments

Report Log

Product Line: *Remodelers Supply Center 2000 Vinyl Horizontal Slider*

Date:
03/16/11 - *Original Report issued to Company and Inspection Agency*

ATTACHMENT A

Product Drawings