PLANNING AND DEVELOPMENT
200 Third Street North
Fargo, North Dakota 58102
Phone: (701) 241-1474
Fax: (701) 241-1526
E-Mail: planning@cityoffargo.com
www.cityoffargo.com

MEMORANDUM

TO: Historic Preservation Commission

FROM: Dawn Mayo, Assistant Planner, Community Development

DATE: February 16, 2017

RE: Historic Preservation Commission Meeting

The next meeting of the Historic Preservation Commission will be held on Tuesday, February 21 at 8:00 a.m. in the City Commission Room at Fargo City Hall. If you are not able to attend, please contact staff at 241-1474 or planning@cityoffargo.com. Thank you.

HISTORIC PRESERVATION COMMISSION
Tuesday, February 21, 2017, 8:00 a.m.
City Commission Room
AGENDA

1. Approval of Minutes
2. 389 8th Ave S – HOD Review (Island Park Addition)
3. Metro Drug – Storefront Grant Review
4. 2017 Certified Local Government Grant Application
5. Other Business
6. Liaison Reports
   - Planning Commission – Christine Kloubec
   - Board of Adjustment – Matthew Boreen
   - House Moving Board – Paul Gleye
   - Housing Rehab – Heather Fischer
   - Renaissance Zone Authority – Mike Hahn
7. Next Meeting – March 21, 2017

Historic Preservation Commission meetings are broadcast live on cable channel TV Fargo 56 and can be seen live by video stream on www.cityoffargo.com/streaming. They are rebroadcast each Thursday at 8:00 a.m., Friday at 3:00 p.m. and Saturday at 3:00 p.m.

People with disabilities who plan to attend the meeting and need special accommodations should contact the Planning Office at 241-1474 or TDD at 241-8258. Please contact us at least 48 hours before the meeting to give our staff adequate time to make arrangements.

Minutes are available on the City of Fargo Web site at www.cityoffargo.com/historicpreservationcommission.

BOARD OF HISTORIC PRESERVATION COMMISSIONERS
MINUTES

Regular Meeting: Tuesday: January 17, 2017:

The Regular Meeting of the Board of Historic Preservation Commissioners of the City of Fargo, North Dakota, was held in the City Commission Room at City Hall at 8:00 o'clock a.m., Tuesday, January 17, 2017.

The Historic Preservation Commissioners present or absent were as follows:

Present: Andrew Nielsen, Michael Burns, Mike Hahn, Christine Kloubec, Heather Fischer, Dirk Ockhardt, Paul Gleye

Absent:

Also Present: John Strand (City Commission Liaison)

Chair Burns called the meeting to order and welcomed Members to the meeting.

Item 1: Minutes: Regular Meeting of September 20, 2016

Mr. Gleye moved the minutes of the September 20, 2016 Historic Preservation Commission meeting be approved. Second by Ms. Kloubec. All Members present voted aye and the motion was declared carried.

Item 2: Review of 1458 South River Road: APPROVED

Assistant Planner Dawn Mayo introduced the proposed home preservation project noting the City of Fargo is proposing to acquire and demolish this property for construction of an earthen levee to protect the water treatment plant. She stated the homeowners are proposing the City look at alternative methods of flood protection that would preserve the house, which is eligible for individual listing to the National Register of Historic Places. She added the home was designed by Elizabeth Wright Ingraham, who is the granddaughter of Frank Lloyd Wright, and her husband Gordon Ingraham, who was a student of Frank Lloyd Wright. In addition, she stated this house is the last one in the Fargo-Moorhead area with ties to Frank Lloyd Wright.

John Stern, property owner of 1458 South River Road South, spoke on behalf of the project.

Jody Bertrand, Division Engineer/Storm Sewer, spoke on behalf of the City of Fargo Engineering Department regarding the proposed flood protection.

Discussion was held regarding costs related to the floodwall project, including alignment options and additional costs that may incur through the design process.

Glen Krogman, HDR Engineering, addressed inquiries of the Board in relation to the cost of sheet piling for the proposed flood protection project.

Mr. Gleye moved the Historic Preservation Commission determine that John and Sherri Stern's house is historically significant, primarily on three grounds: 1) the architects being a descendent and a student of Frank Lloyd Wright, 2) the house being an outstanding example of a mid-century descendent of Usonian-Style architecture, and 3) its outstanding relationship to the landscape. Second by Mr. Hahn. All Members present voted aye and the motion was declared carried.

Item 3: 2017 Certified Local Government Grant Application

Ms. Mayo provided a brief update on the Certified Local Government (CLG) Grant for 2017, noting if Board Members have suggestions or ideas on a project that could be submitted for this grant, the application must be received by the State Historical Society of North Dakota by Friday, February 24, 2017.

Board Members discussed various suggestions for the 2017 CLG grant application including oral histories; research/digitization of historic properties, including neighborhood historic surveys and neighborhood plans; and re-documentation of all originally-surveyed historic properties that would provide more up-to-date, accessible information from what is already existing.

Item 4: Other Business

No other business was presented.

Item 5: Liaison Reports

Ms. Fischer gave an update on items from the September, October, November, and December 2016 Board of Adjustment meetings.

Discussion was held regarding liaison assignments, the following changes were made:

1) Matthew Boreen will be the liaison for Board of Adjustment
2) Heather Fischer will be the liaison for Housing Rehab
3) Mike Hahn will be the liaison for Renaissance Zone Authority

Item 6: Next Meeting – February 21, 2017

The time at adjournment was 9:14 a.m.

HISTORIC OVERLAY DISTRICT
APPLICATION & REVIEW FORM

Property address 389 8 Ave. S

Legal description of property Lot 22, Block 3, Island Park Addition

Historic Overlay District where property is located Island Park Addition

Name of Owner Ginger Development LLC **Telephone** 701-478-4600

Address (if different) 2534 University Drive South #3 Fargo, ND 58103

Application is hereby made by the above-named owner of the subject property for a Certificate of Appropriateness (by the process set forth in §20-0305 and §20-0912 of the Land Development Code).

This form will be reviewed by City of Fargo staff if the proposed work involves **exterior renovation** of a structure which requires a building permit. Photos and plans must accompany this application. If the proposed work is determined to comply with Historic Overlay design standards, a Certificate of Appropriateness will be issued, and a building permit may then be granted. If the proposed work does not obviously conform to the design standards published in the LDC, the Fargo Historic Preservation Commission (HPC) will review the application and make the determination. **Projects that involve demolition or new construction must be reviewed by the HPC.** The HPC meets monthly at 8:00 am on the third Tuesday of the month, in the City Commission Room, City Hall, 200 3rd Street N. Applicants (or their contractor) must be present at the meeting. More information on design standards is available at: www.cityoffargo.com/HistoricOverlayDistricts.

Check each of the following which applies to your project:

- ☐ Exterior remodel
- ☐ Window replacement
- ☐ New dormer
- ☐ New/replacement chimney
- ☐ Skylight
- ☐ Overhead garage door replacement
- ☐ New addition
- ☐ New garage
- ☐ New accessory structure (not garage)
- ☐ New porch
- ☐ Front yard paving
- ☐ Demolition
- ☒ Other

New Condo Project (3 units)

Briefly describe the proposed work:
Property to be developed to include 3 condos facing 4th St. S. Attached 2-stall garages, additional 3 parking spots, and 3 detached storage units w/ dumpster location to be included on property.

Signature of Owner

2.13.17
Date

Return application to: Fargo Planning and Development Department, 200 North 3rd Street, Fargo, ND 58102
Telephone: (701) 241-1474, Fax: (701) 241-1526

Office use only: Staff Contact Person_____
Staff Recommendation_____
Date_____

4TH ST. HOUSING

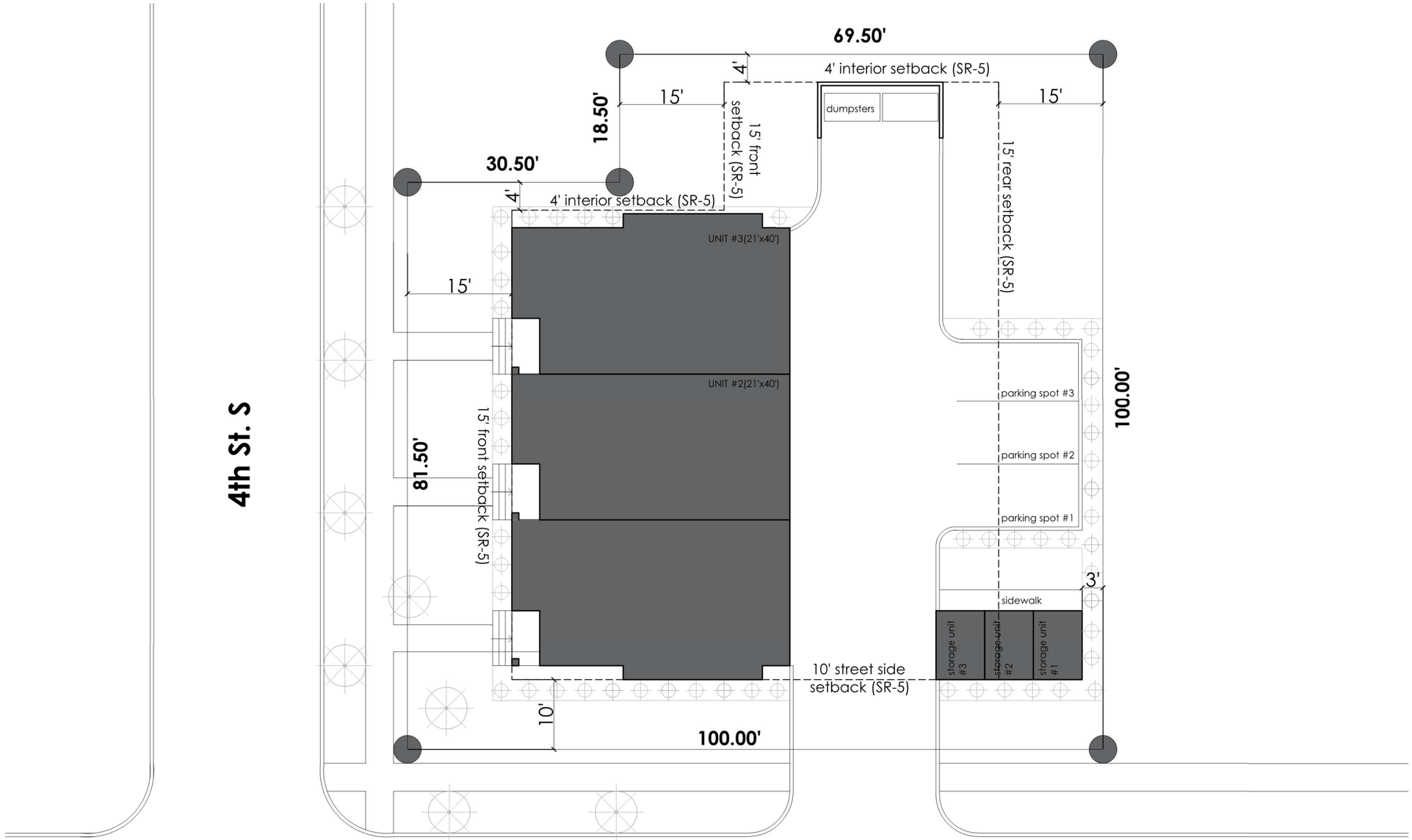
LOT 22, BLOCK 3 ISLAND PARK ADDITION

CHRISHAWLEY ARCHITECTS

4TH ST. HOUSING

LOT 22, BLOCK 3 ISLAND PARK ADDITION

CHRISHAWLEY ARCHITECTS

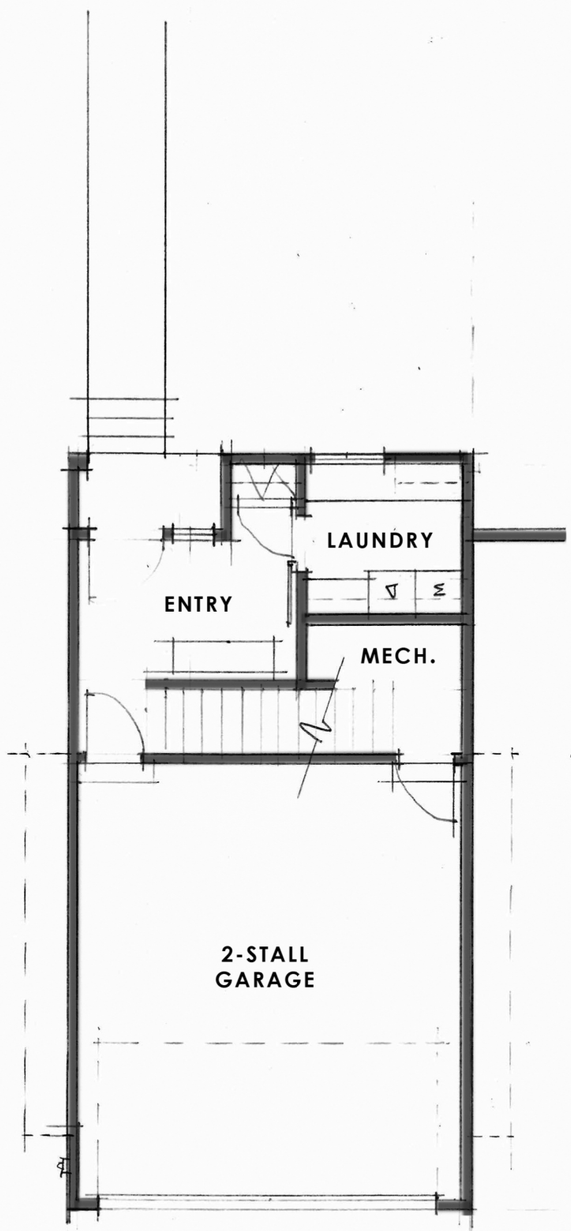


SITE PLAN

SCALE: 1/16" = 1'-0"

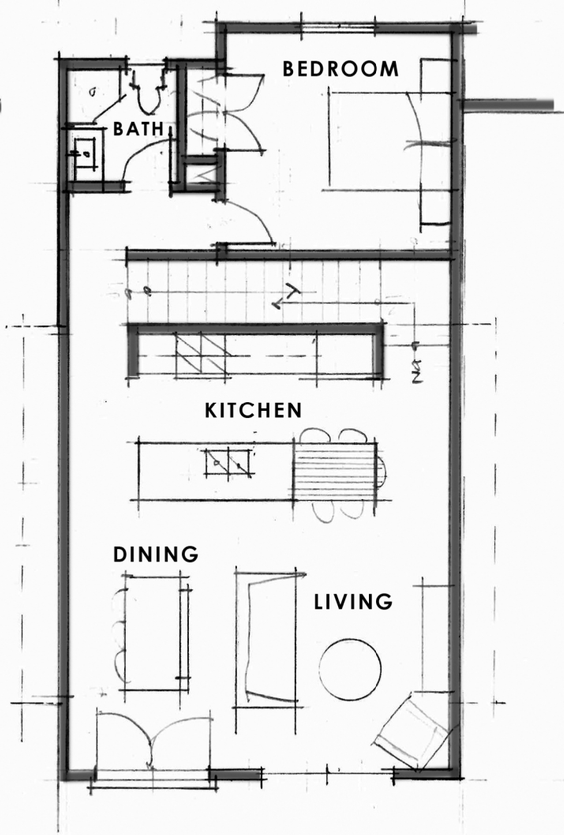
PROJECT NAME
4TH ST. HOUSING
PROJECT #
1680
DATE
2.7.2017

SITE PLAN



MAIN FLOOR

1/8" = 1'-0"



SECOND FLOOR

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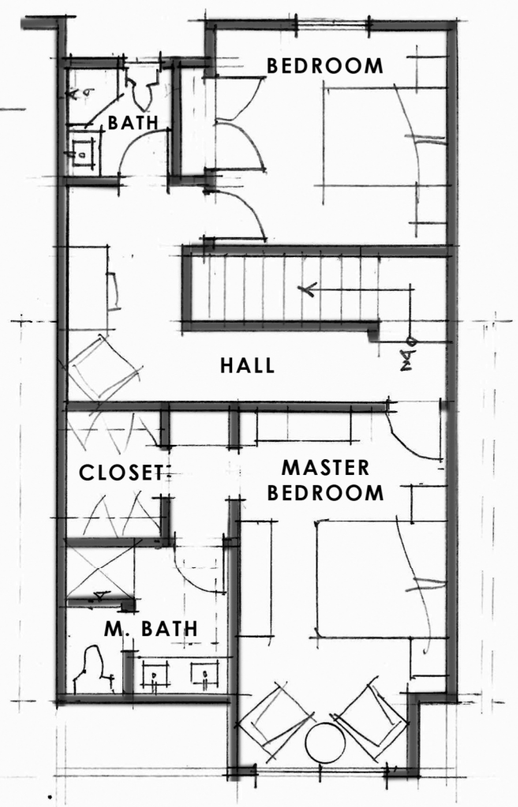


THIRD FLOOR

1/8" = 1'-0"

4TH ST. HOUSING

PLAN 1/8" = 1'-0"

CHRISHAWLEY ARCHITECTS

1. BRICK: THIN VENEER
2. LAP SIDING: CEMENT BOARD
3. BOARD & BATTEN: CEMENT BOARD
4. WINDOWS W/ GRID
5. COLUMN WRAPPED W/ CEMENT BOARD

FRONT ELEVATION - 4th St. Condo

SCALE: 1/8" = 1'-0"

ELEVATION-NEIGHBORING HOUSE

SCALE: 1/8" = 1'-0"

PROJECT NAME
4TH ST. HOUSING
PROJECT #
1680
DATE
2.7.2017

ELEVATIONS

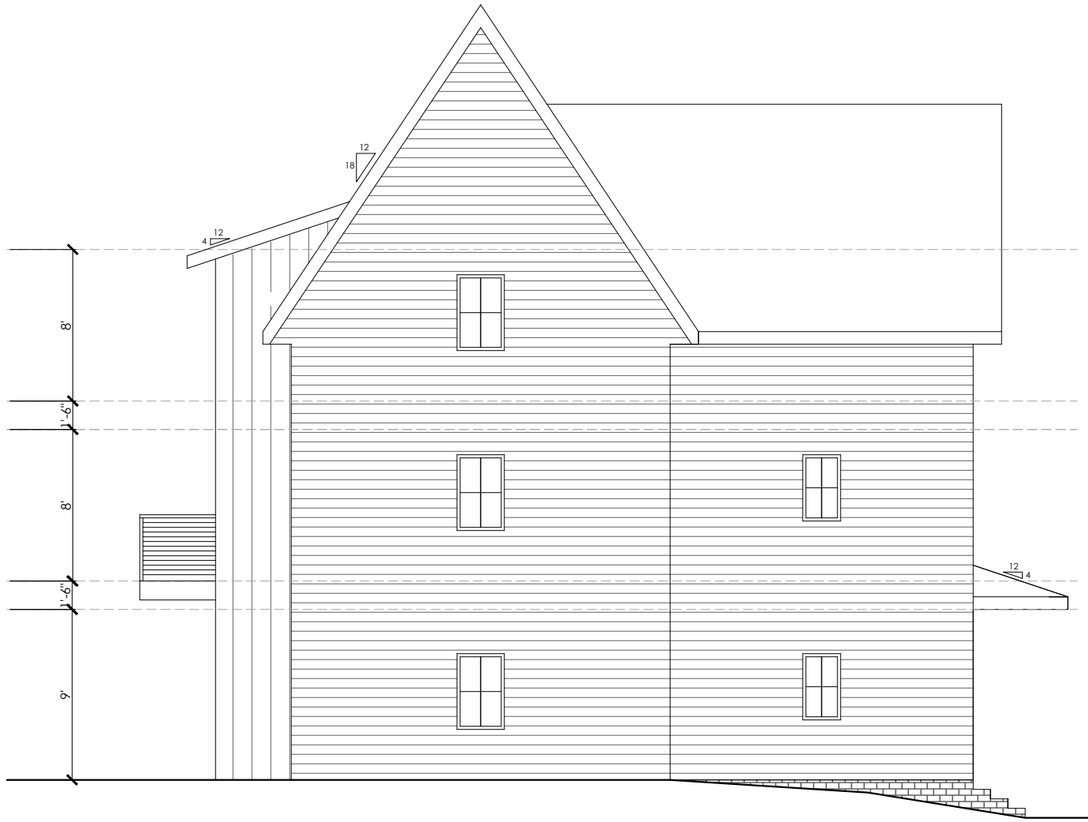
REAR ELEVATION - EAST

SCALE: 1/8" = 1'-0"

CHRISHAWLEY ARCHITECTS

PROJECT NAME
4TH ST. HOUSING
PROJECT #
1680
DATE
2.7.2017

ELEVATIONS



SIDE ELEVATION - NORTH

SCALE: 1/8" = 1'-0"

SIDE ELEVATION - SOUTH

SCALE: 1/8" = 1'-0"

CHRISHAWLEY ARCHITECTS

PROJECT NAME
4TH ST. HOUSING
PROJECT #
1680
DATE
2.7.2017

ELEVATIONS

T14000 SERIES STOREFRONT

For optimal strength and thermal performance, use Tubelite's 14000 Series Storefront, a flush glazed system for use on storefront and low-rise applications. Framing is available in standard thermally-improved members with 2" x 4-1/2" profiles, and a 1/2" bite for use with glass or panels up to 1" thick. Extra-heavy intermediate verticals are available for high performance against strong windloads.

Reduce project labor costs with the flexibility of inside or outside glazing. Members can be assembled using screw spline or clip joinery, and framing is compatible with Tubelite Narrow, Medium and Wide Stile Doors.

Our 14000 Series Storefront products are subjected to thorough testing by an independent laboratory, ensuring that you get the highest quality storefront framing products that the industry has to offer.

14000 Series Storefront, Bronze Anodized; Project: Downtown Parking Garage, Traverse City, MI; General Contractor: Christman Co.; Tubelite Dealer: Northern Michigan Glass

14000 Series Storefront, 1P White Painted Finish; Owner: Gates Rubber Inc., Jefferson City, NC; Architect: Fisher Architects, PA; Tubelite Dealer: Keller Glasco

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More recycled content, eco-efficient finishes

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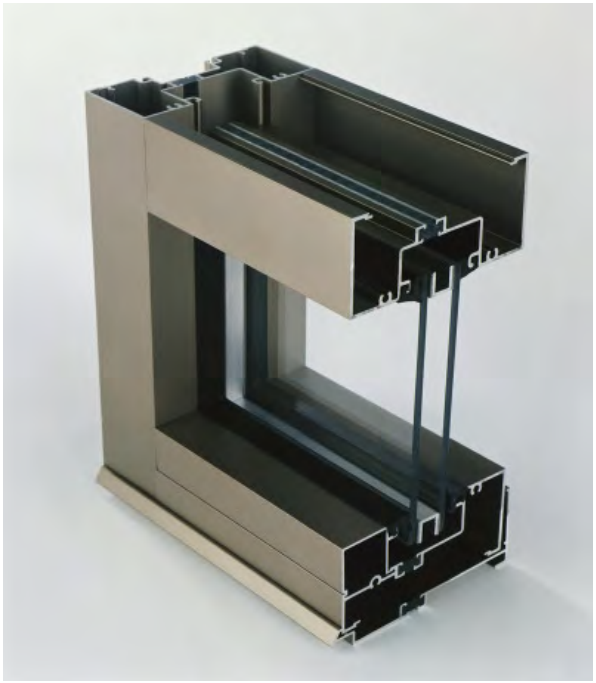
3056 Walker Ridge Dr. NW, Ste. G, Walker, Michigan 49544 | Ph: 800-866-2227 | www.Tubeliteinc.com

14.01
14000 Series Flush Glaze
Description

Description

Tubelite T14000 Series Framing is a 2" x 4 1/2" deep flush glazed storefront system for use on first floor applications. This dry glazed internally drained framing can be glazed with 1" insulated glass or panels positioned in the center of the frame. Glass pocket reducers can be used to glaze infill thicknesses of 1/4" to 1/2"

A poured and de-bridged thermal break provides industry standard Condensation Resistance and limits thermal conduction. The thermal pocket also employs the Azon Lance for prevention of dry shrink of the polyurethane barrier.



14.02
14000 Series Flush Glaze
Guide Specifications
General

Description

Furnish all necessary materials, labor and equipment for the complete installation of aluminum framing as shown on the drawings and specified herein.

Fixed window framing shall be 14000 Series Flush Glaze (2" x 4 1/2") as manufactured by Tubelite Inc., Walker, Michigan. Whenever substitute products are to be considered, supporting technical literature, samples drawings and performance data must be submitted ten (10) days prior to bid in order to make a valid comparison of the products involved.

Test reports certified by an independent laboratory must be made available upon request.

Performance Requirements

Air infiltration shall not exceed .06 CFM/Ft^2 when tested in accordance with ASTM E-283 at a test pressure of 6.24 PSF.

There shall be no uncontrolled water entry when tested in accordance with ASTM E-331 "Water Penetration of Exterior Windows, Curtainwalls and Doors by Uniform Static Air Pressure Difference" at a test pressure of 15 PSF.

There shall be no uncontrolled water entry when tested in accordance with AAMA 501.1-94 at a dynamic pressure equivalent of 15 PSF.

Structural performance per ASTM E330 shall be based on a maximum allowable deflection of L/175 of the span or 3/4" maximum. The system shall perform to those criteria under a wind load of (architect specify) _____ PSF.

There shall be no buckling, stress on glass, edge seal failure, excess stress on curtainwall structure, anchors and fasteners or reduction in performance when tested in accordance with AAMA 501.5-98 at a temperature range of 0^0 to 180^0 F.

There shall be no "Life/Safety" type failures (glass breakage, anchor failures, or structural damage) when tested in accordance with AAMA 501.4, seismic test (lateral cycling.)

Thermal transmittance due to conduction (U_c) shall not be greater than .60 - poured & debridged only (or .63 - slotted only) BTU/Hr/Ft^2/F degree when tested in accordance with AAMA 1503-98. Condensation Resistance Factor (CRF) shall not be less than 56 - poured & debridged only (or 53 - slotted only) when tested in accordance with AAMA 1503-98.

The system shall have a Sound Transmission Class (STC) rating of 32 and an Outdoor-Indoor Transmission Class (OITC) rating of 26 when tested in accordance with ASTM E90-97, ASTM E413-87 (reapproved 1994) and ASTM E1332-90.

Products

Materials

Extrusions shall be of aluminum alloy 6063-T5 extruded within commercial tolerance and free from defects impairing strength and/or durability. Main framing sections to be of .075 inch minimum wall thickness and glazing stop moldings of .060 inch thickness.

Screws, bolts and all other accessories to be compatible with the aluminum under normal service conditions.

Glazing shall be by means of an exterior and interior roll-in wedge of high quality extruded elastomeric material.

Optional: Thermal barrier shall be a two part chemically curing, unfilled polyurethane casting resin poured in place for perimeter members. Intermediate vertical members shall be slotted for efficient thermal performance.

Finish

All exposed framing surfaces shall be free of scratches and other serious blemishes.

Finish to be: (architect select)

Etched and clear anodized

(AAM10C21A31)

Clear - Class 2 (C2)

(AAM10C21A41)

Clear - Class 1 (C1)

Electrolytically deposited color

(AAM10C21A44) Class 1

Champagne	(CH)
Light Amber	(MB)
Amber	(DB)
Statuary Bronze	(EB)
Black	(BL)

Fluoropolymer (70%) painted color _____.

Execution

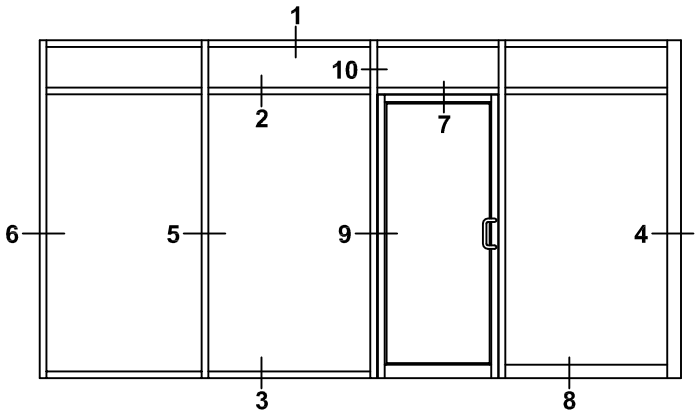
Installation

Shall be in accordance with the manufacturer's installation instructions and the approved shop drawings.

Note:

In keeping with Tubelite's policy of continuing product improvements, all specifications are subject to change without written notice by the manufacturer.

14.03
E14000 Series Flush Glaze
Elevation & 1/4 Size Details



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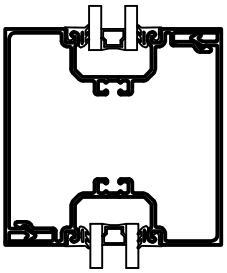

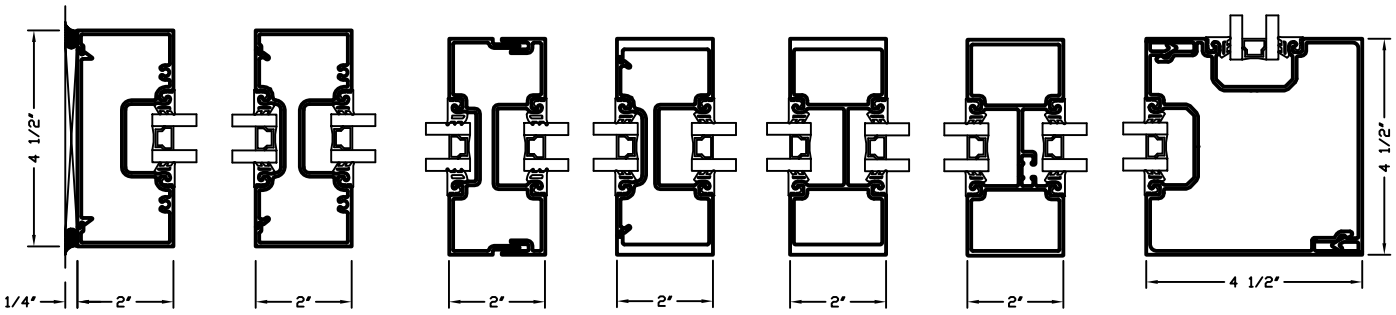

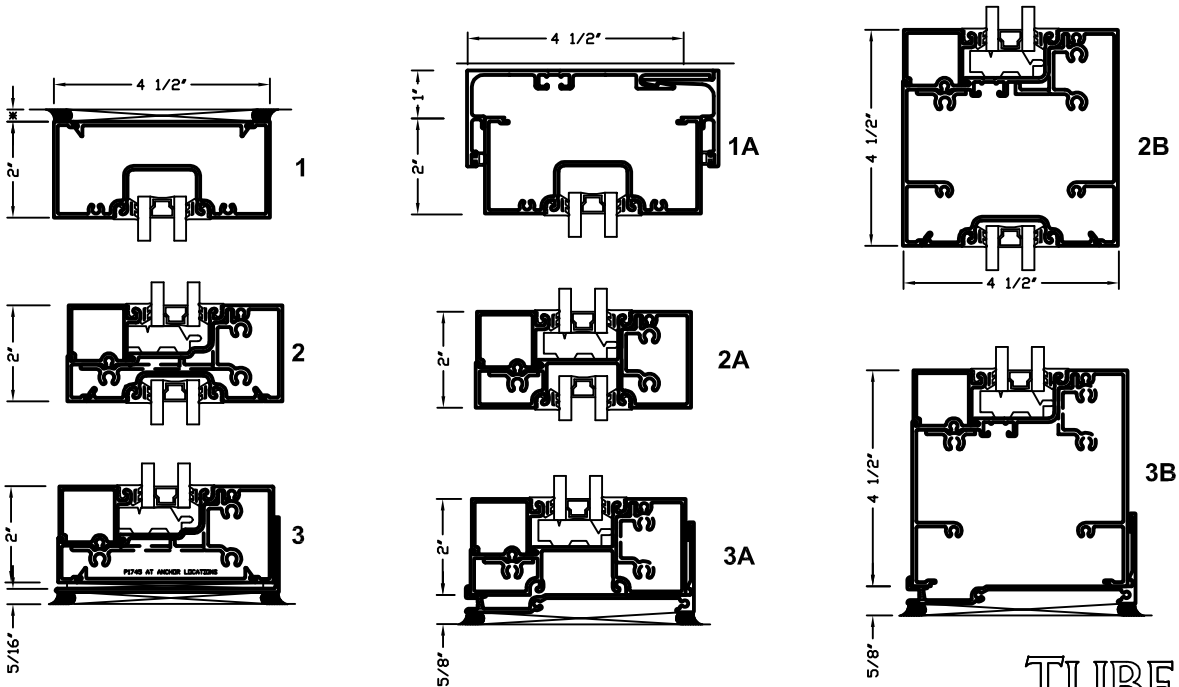

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2013

14.04
E14000 Series Flush Glaze
1/4 Size Details

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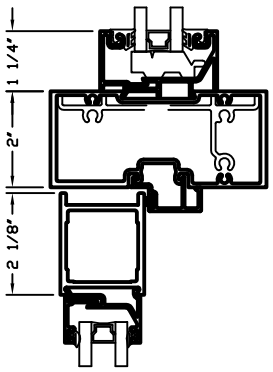

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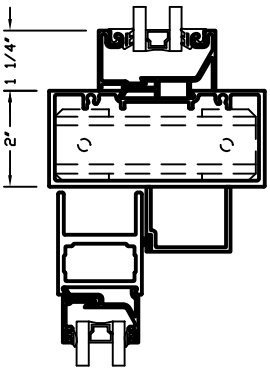
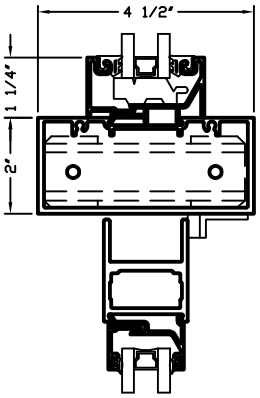


7A



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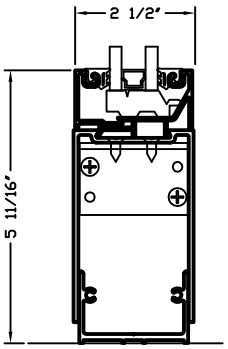

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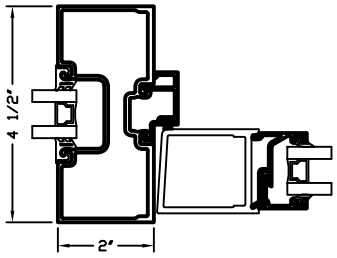

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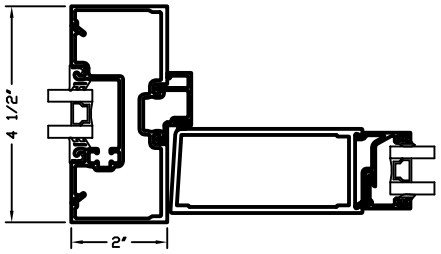

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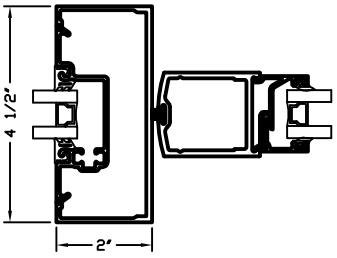

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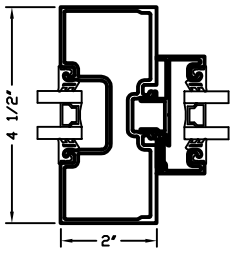

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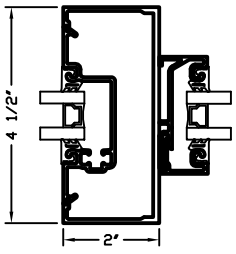

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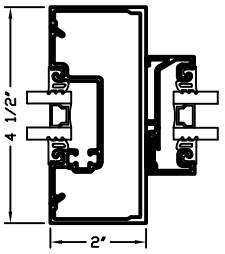

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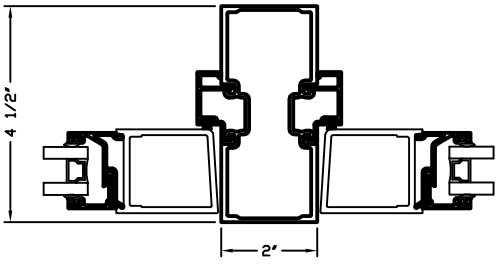

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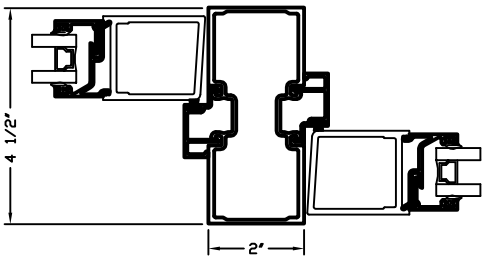

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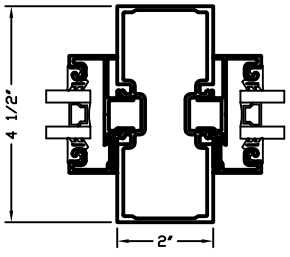

10C

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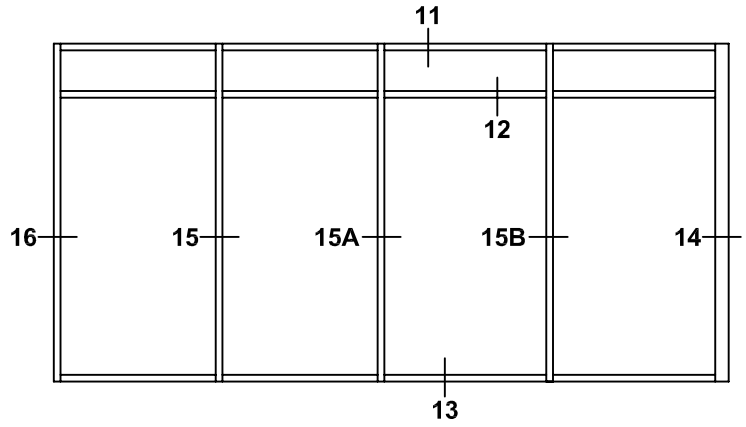
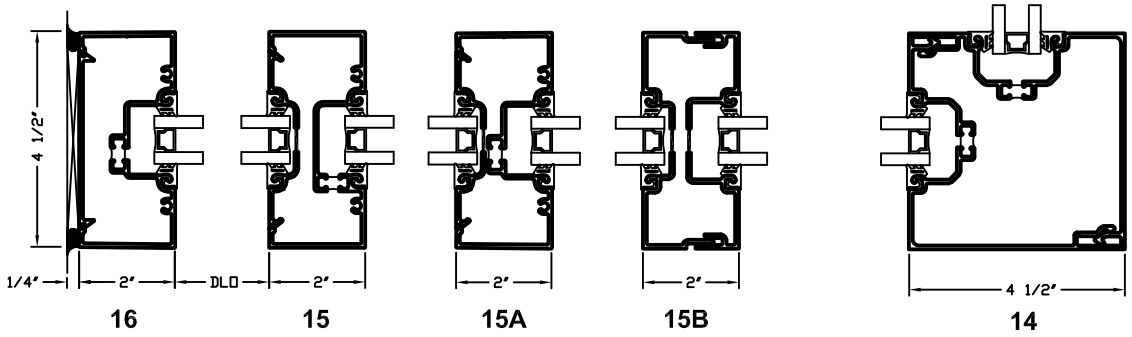
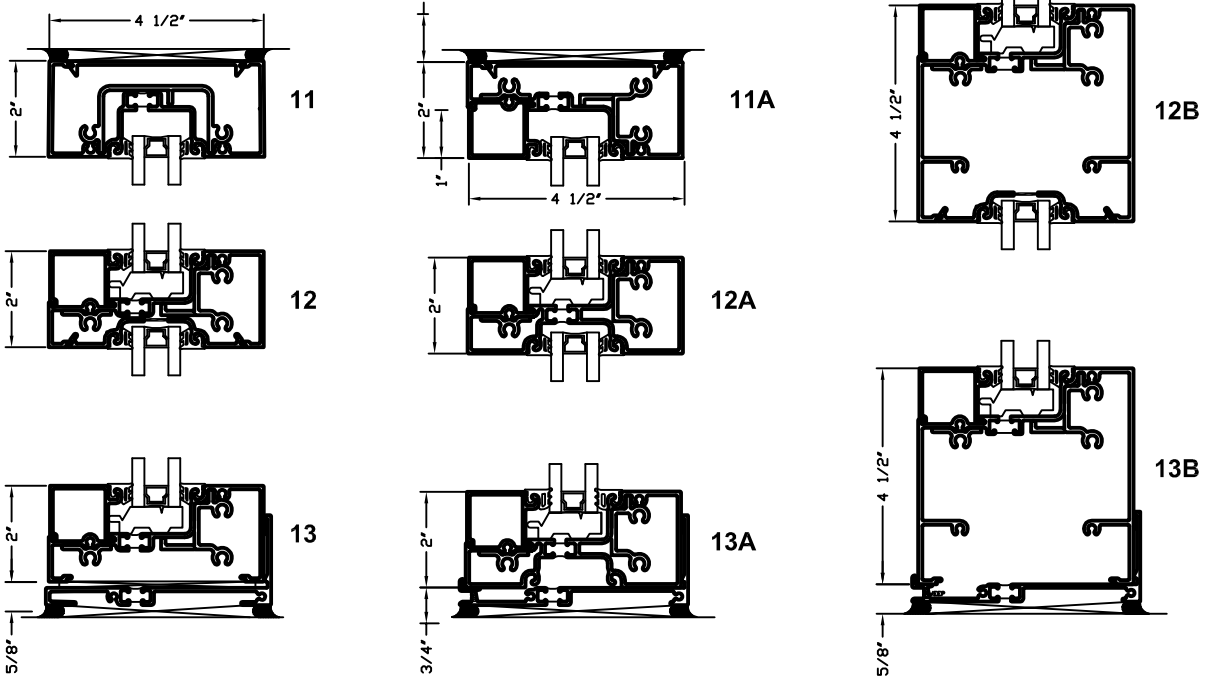
14.05
T14000 Series Flush Glaze
Elevation & 1/4 Size Details



CAD DETAIL FILE NO.
180ELEVB





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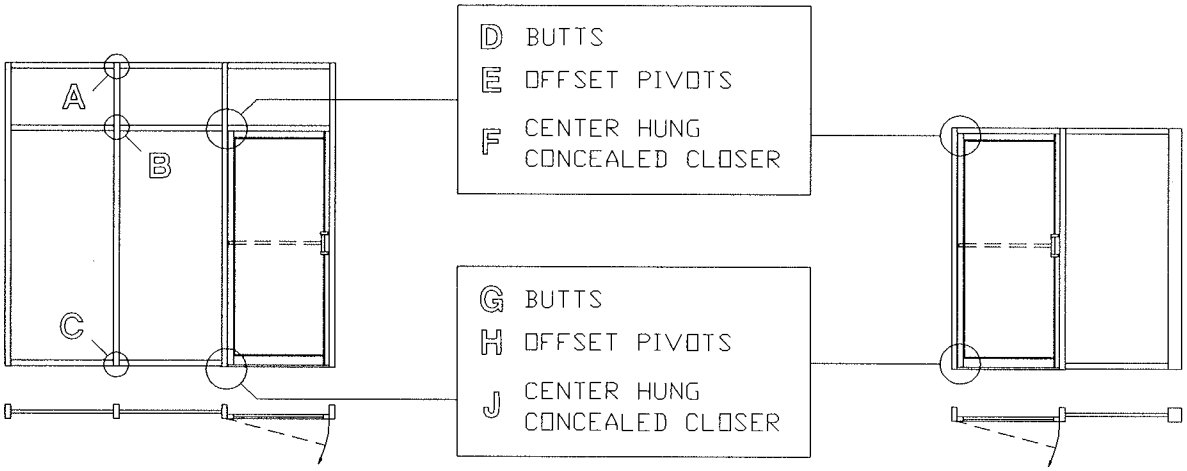
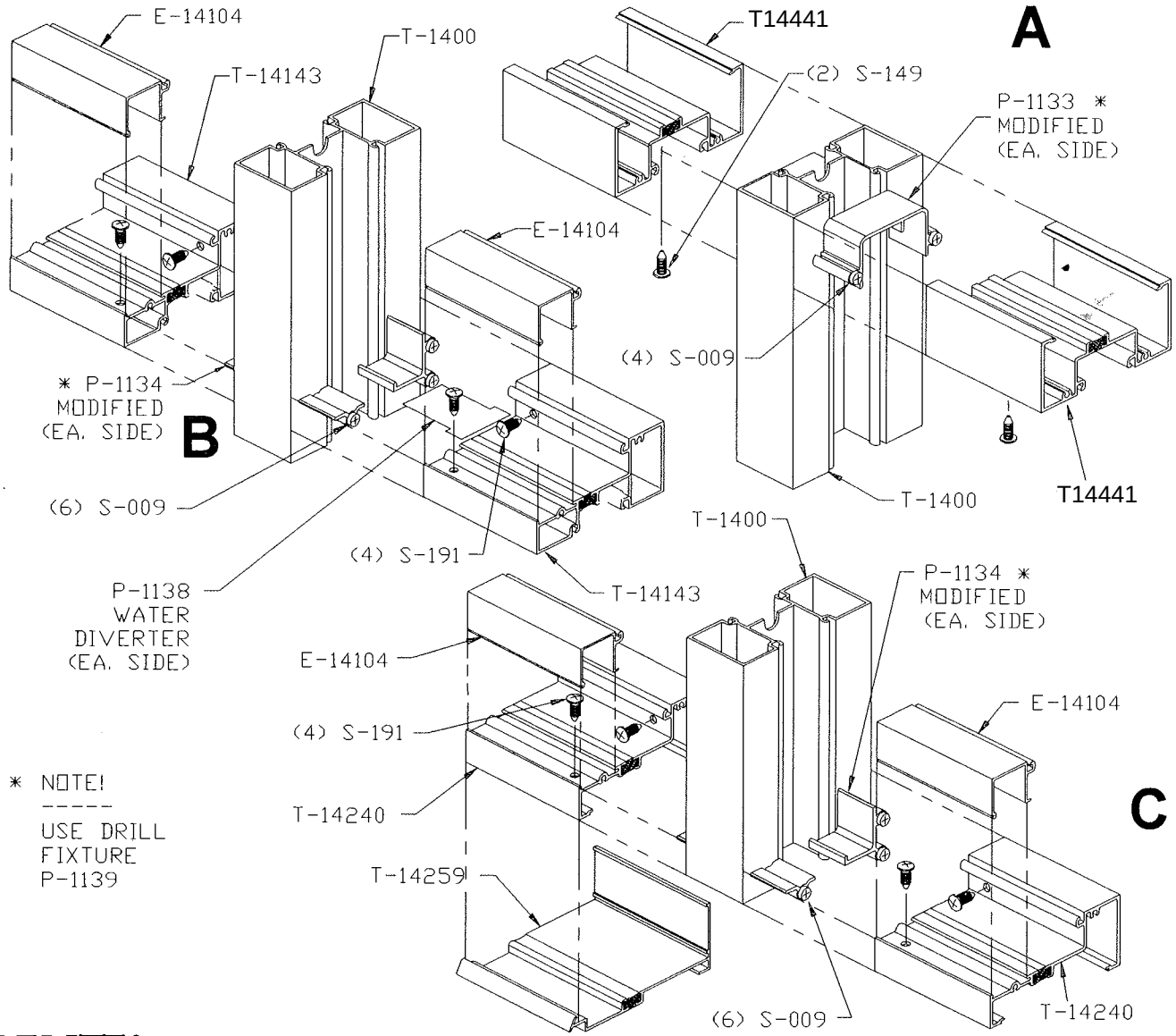
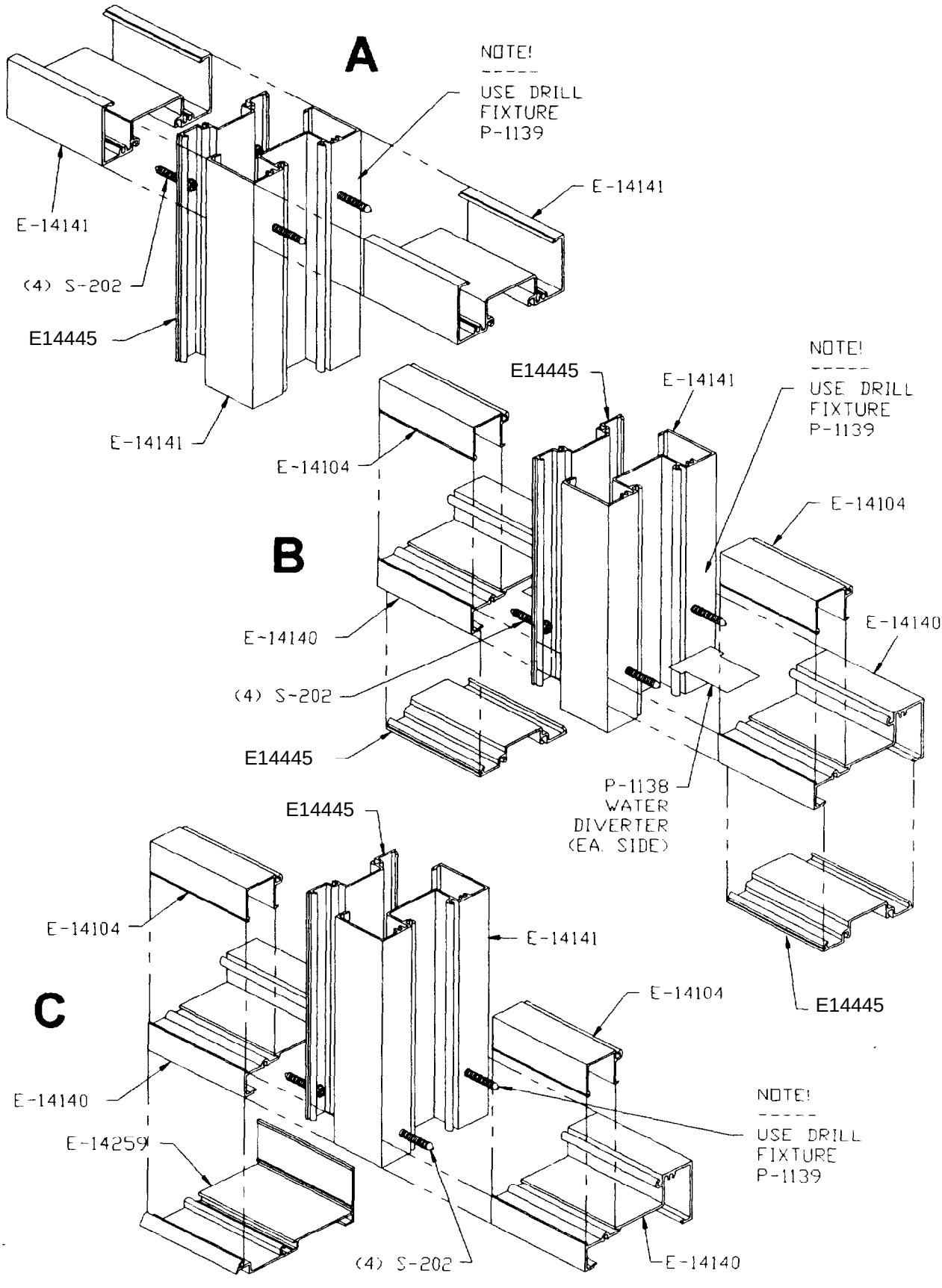
14.06
14000 Series Flush Glaze
Isometric Assembly Details



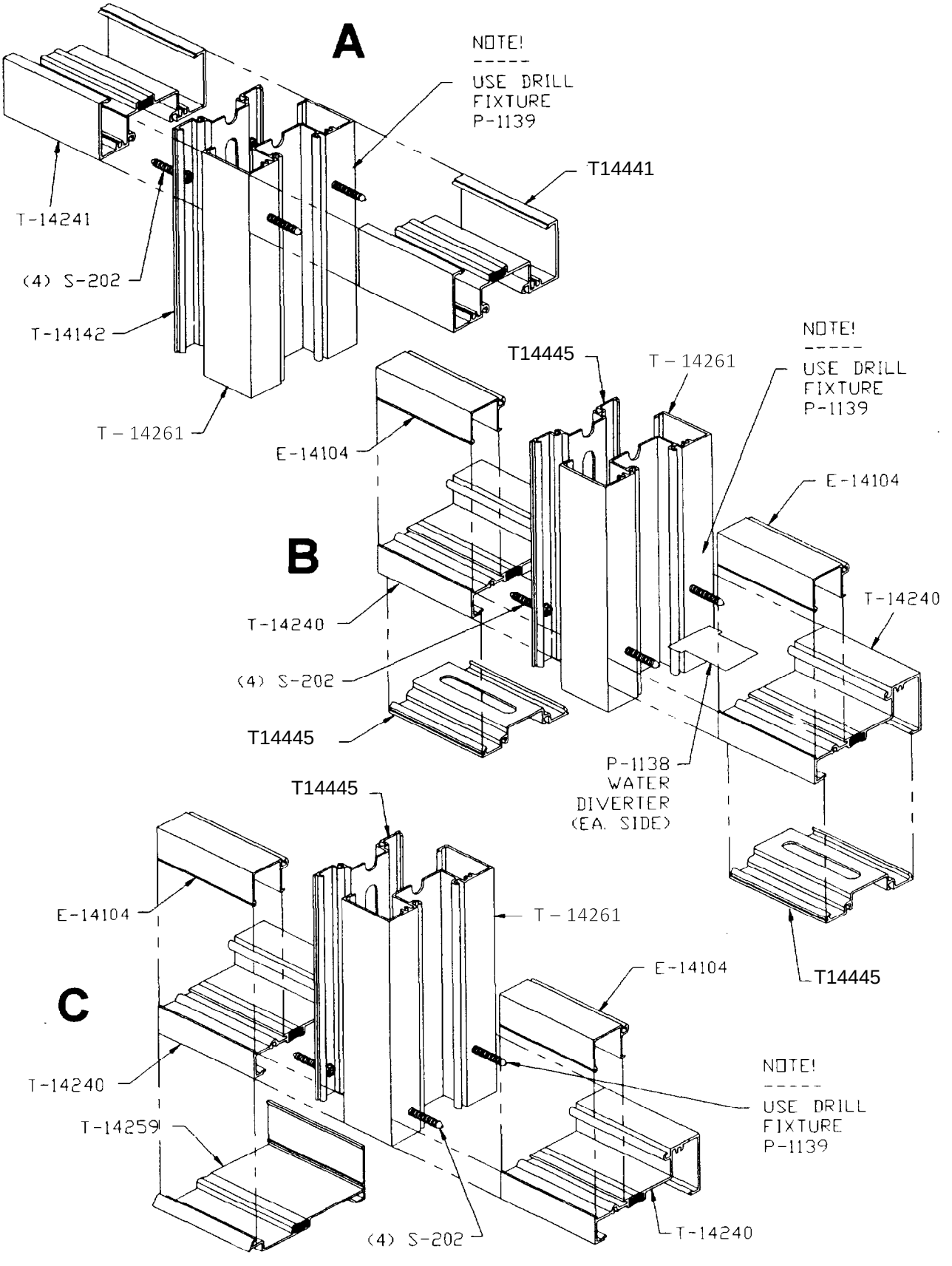


TUBELITE
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

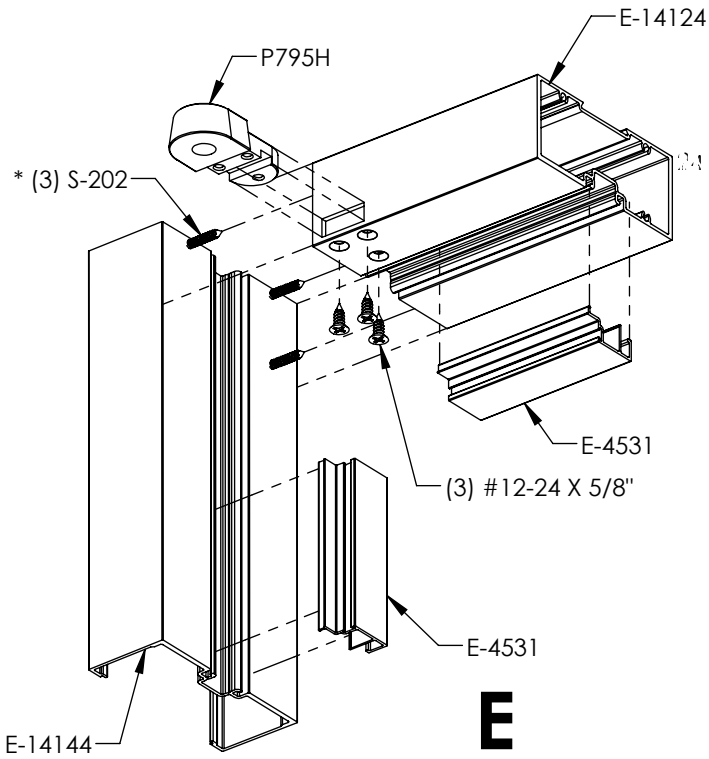
14.07
14000 Series Flush Glaze
Isometric Assembly Details



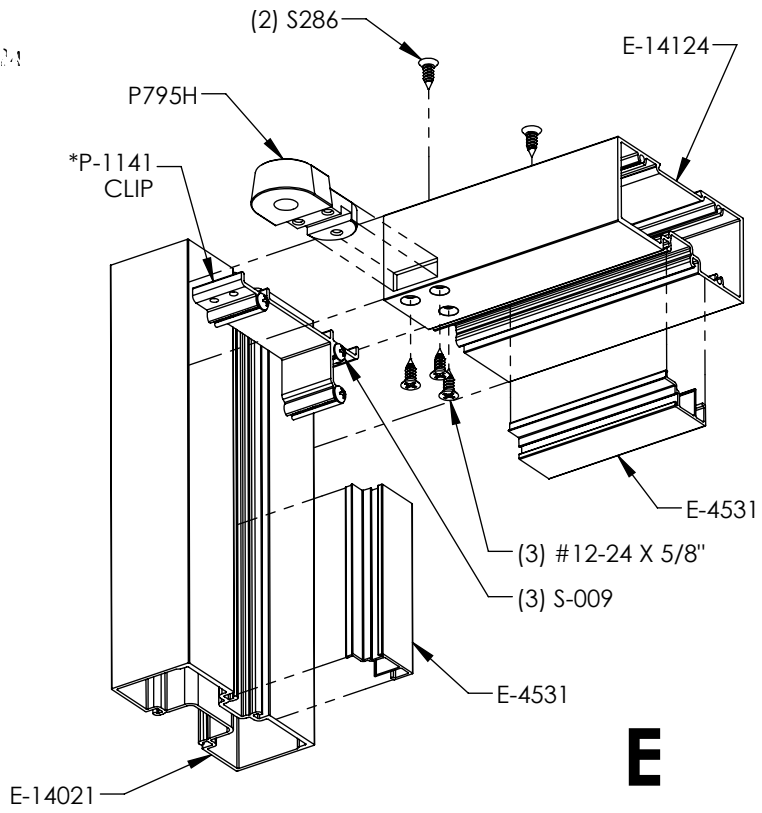
14.08
14000 Series Flush Glaze
Isometric Assembly Details



14.09
14000 Series Flush Glaze
Isometric Assembly Details



E



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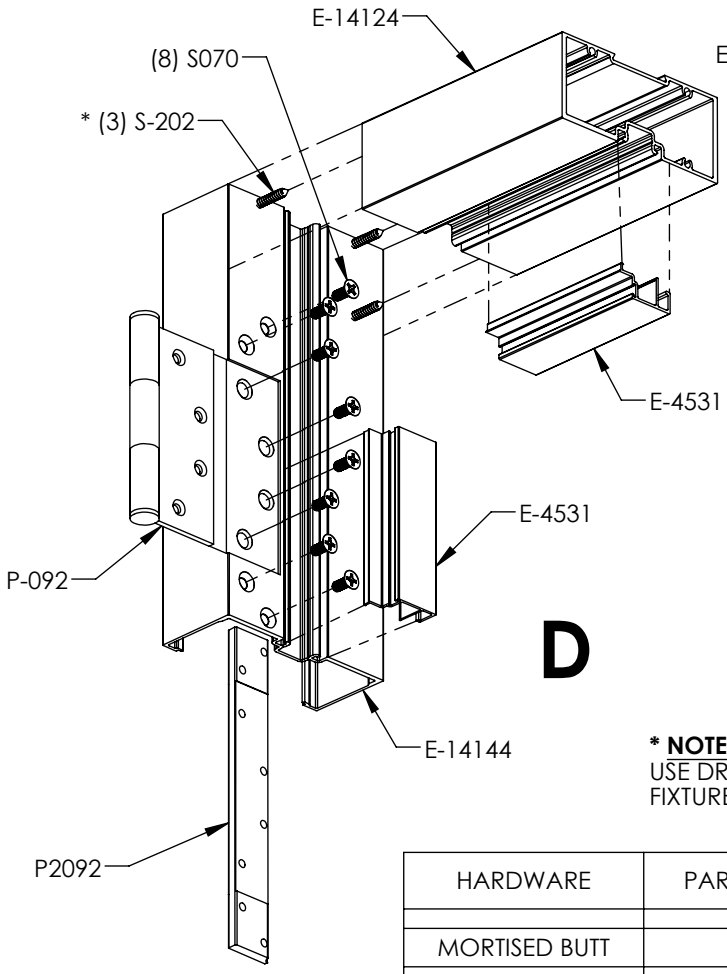

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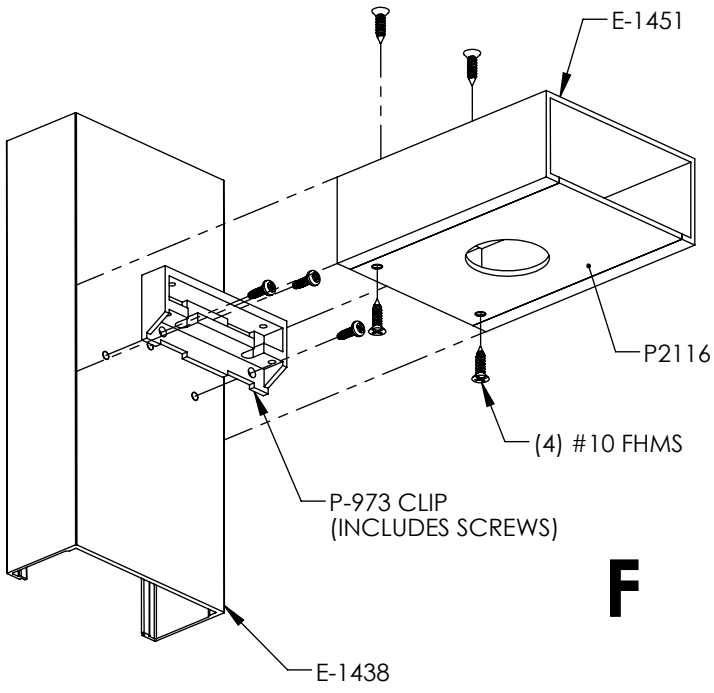
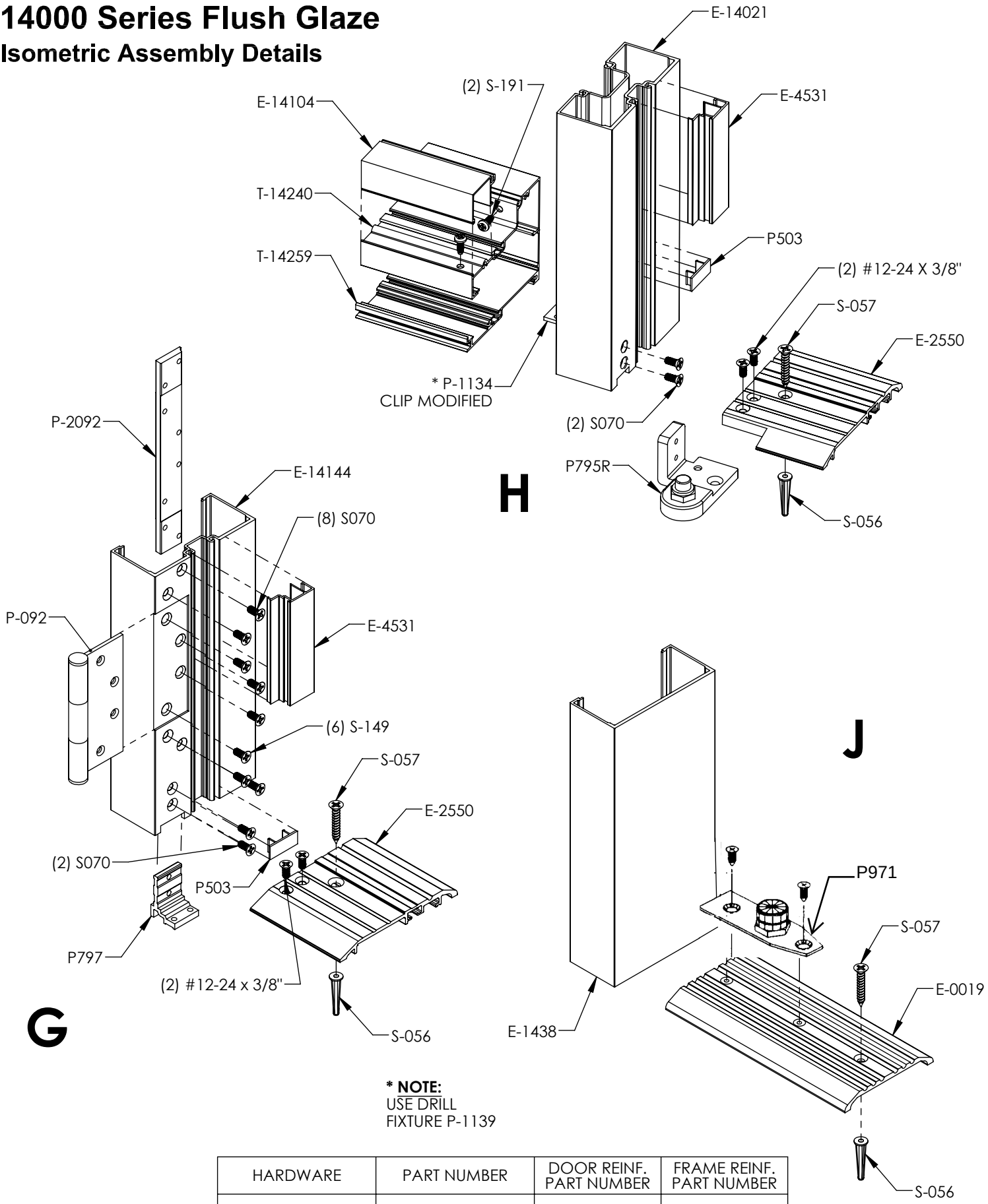


F

*** NOTE:**
USE DRILL
FIXTURE P-1139

HARDWARE	PART NUMBER	DOOR REINF. PART NUMBER	FRAME REINF. PART NUMBER
MORTISED BUTT	P-092	P2092	P2092
INTERMEDIATE OFFSET PIVOT	P795IL / P795IR	P-360	P-360

14.10
14000 Series Flush Glaze
Isometric Assembly Details



*** NOTE:**
USE DRILL
FIXTURE P-1139

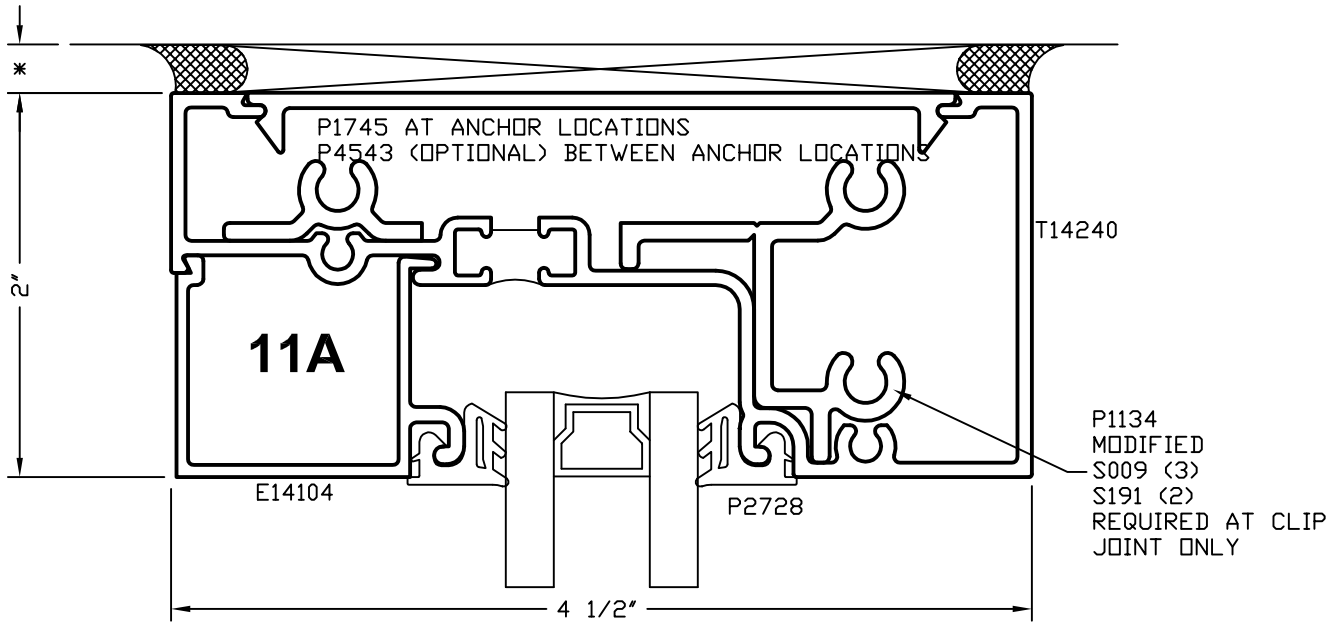
HARDWARE	PART NUMBER	DOOR REINF. PART NUMBER	FRAME REINF. PART NUMBER
MORTISED BUTT	P-092	P2092	P2092
INTERMEDIATE OFFSET PIVOT	P795IL / P795IR	P-360	P-360

TUBELITE
STOREFRONTS & ENTRANCES

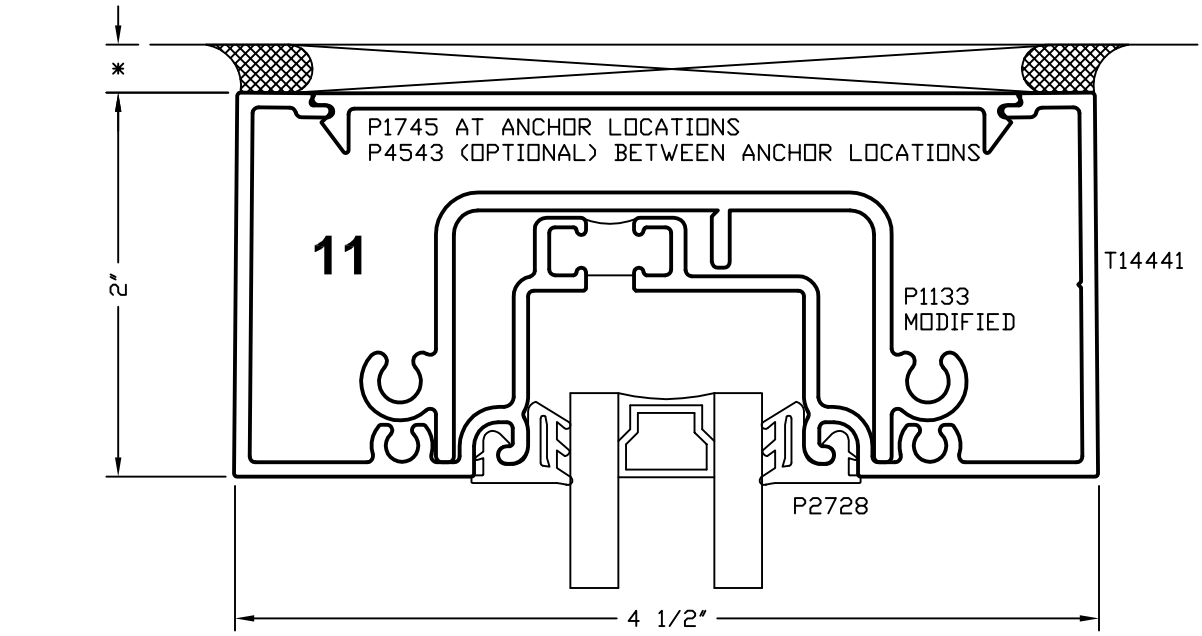
14.38
T14000 Series Flush Glaze
Standard and Alternate Head Members

* 1/2" WHEN USING E-14259 FLASHING
* 1/4" WHEN USING E-45159 FLASHING

CAD DETAIL FILE NO.
180HEAD2



CAD DETAIL FILE NO.
180HEAD5

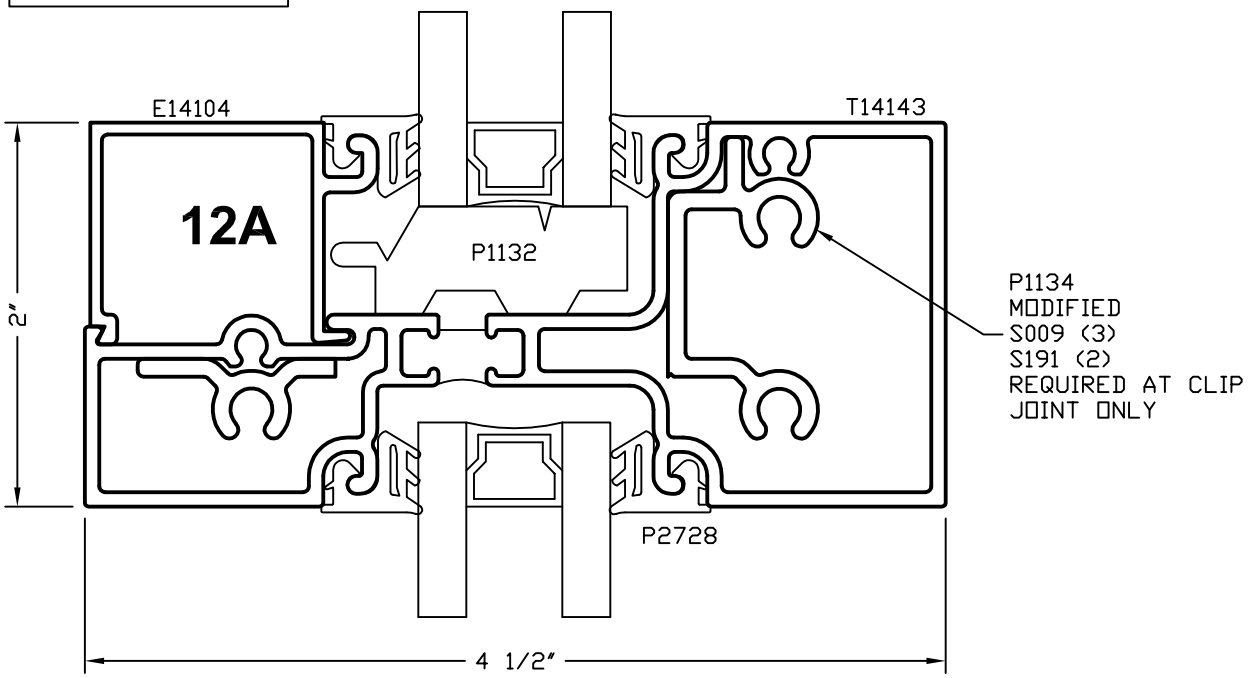


TUBELITE
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
2013

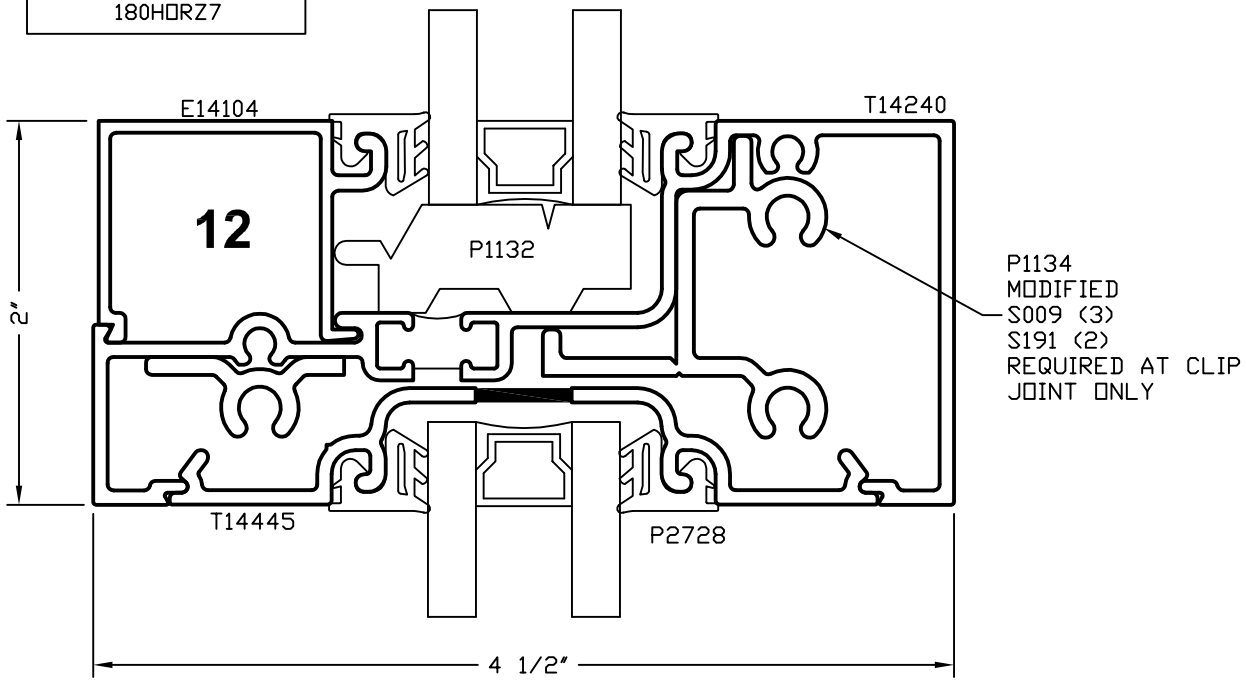
*SEALANT, ROD, & ANCHORS NOT BY TUBELITE

14.40
T14000 Series Flush Glaze
Intermediate Horizontals

CAD DETAIL FILE NO.
180HORZ6



CAD DETAIL FILE NO.
180HORZ7



TUBELITE
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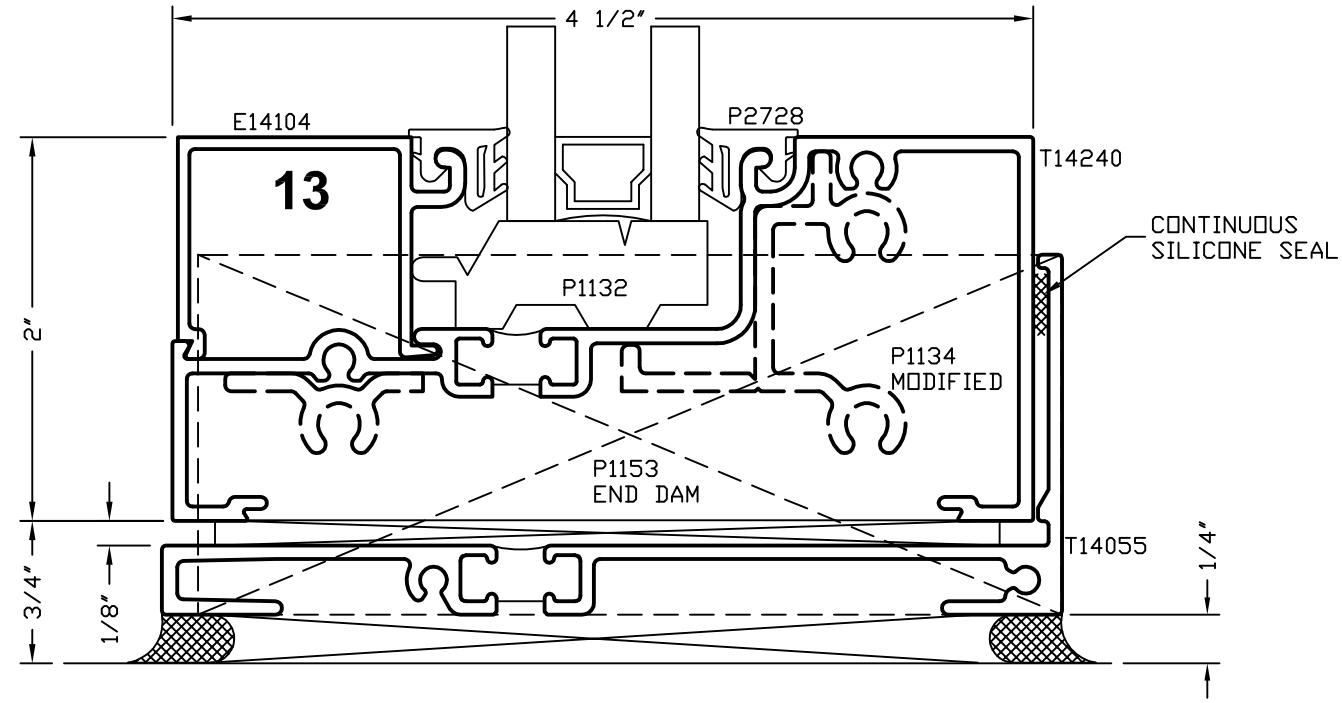
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
2013

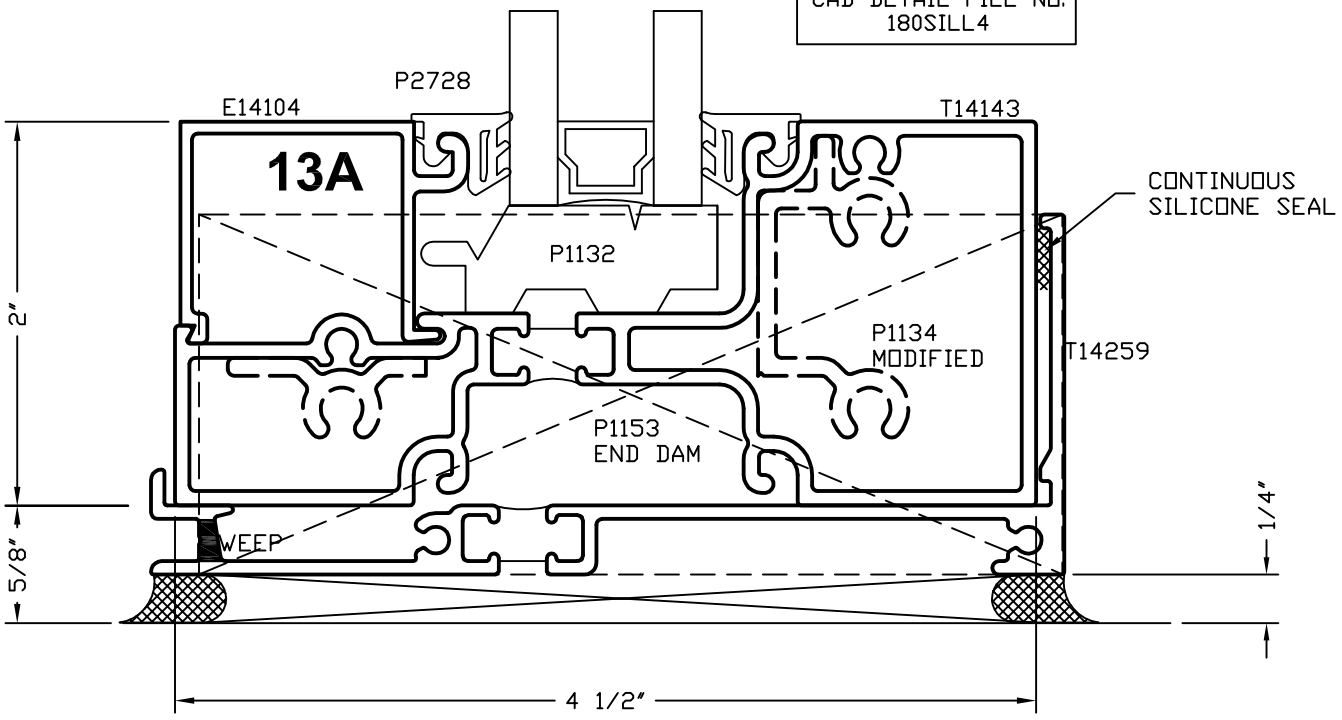
*SEALANT, ROD, & ANCHORS NOT BY TUBELITE

14.42
T14000 Series Flush Glaze
Standard and Alternate Sills

CAD DETAIL FILE NO.
180SILL3



CAD DETAIL FILE NO.
180SILL4



TUBELITE
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LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
2014

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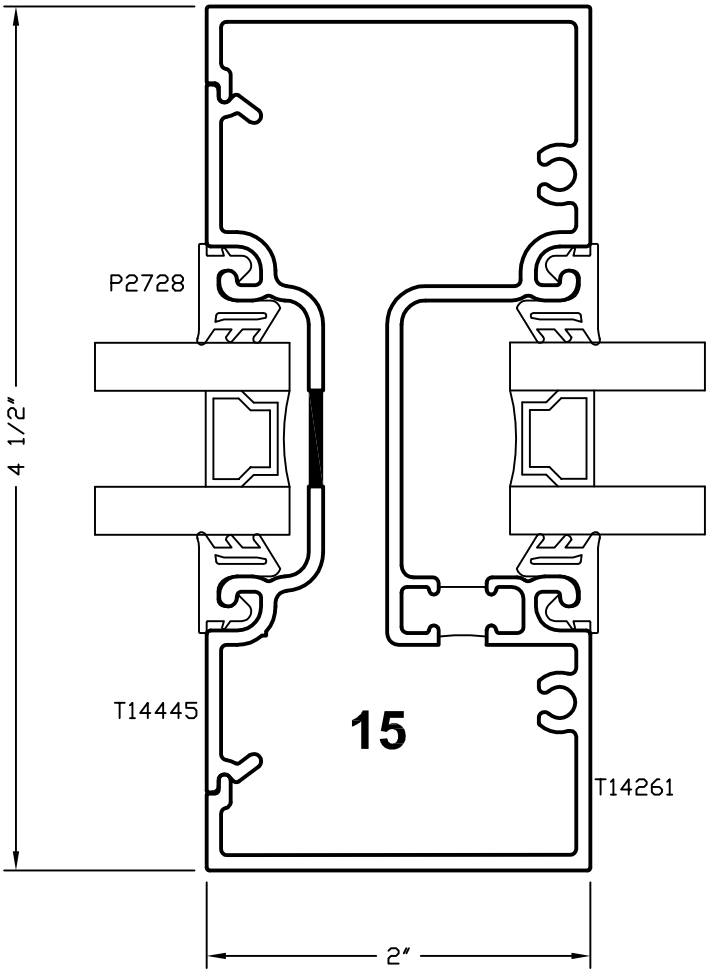
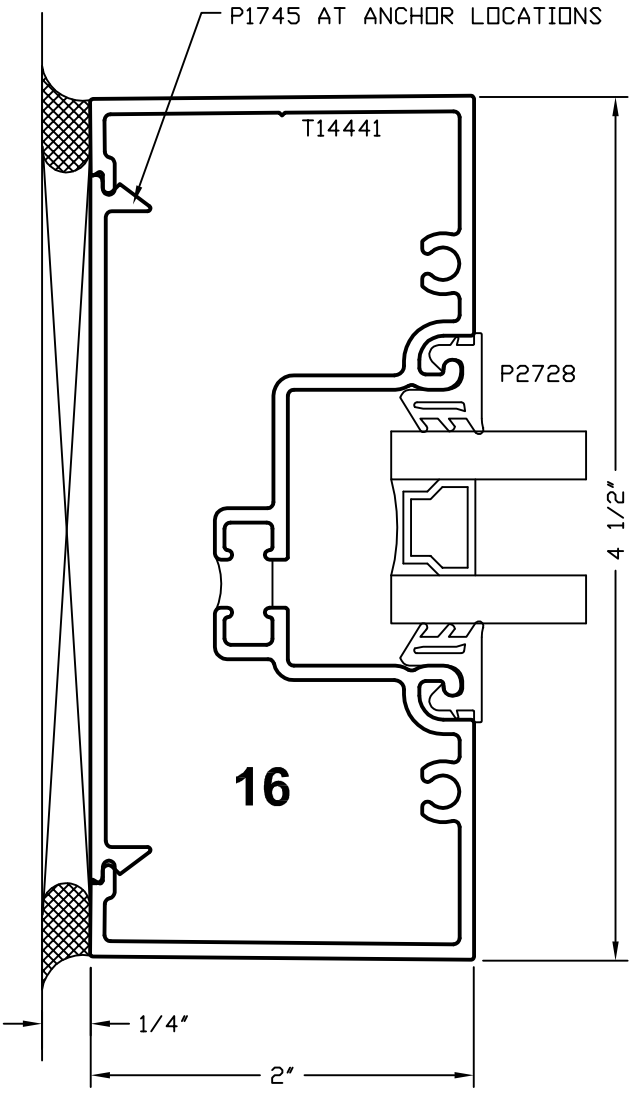
14.44
T14000 Series Flush Glaze
Jamb & Intermediate Vertical

CAD DETAIL FILE NO.
180VERT4



CAD DETAIL FILE NO.
180JAMB1



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2013

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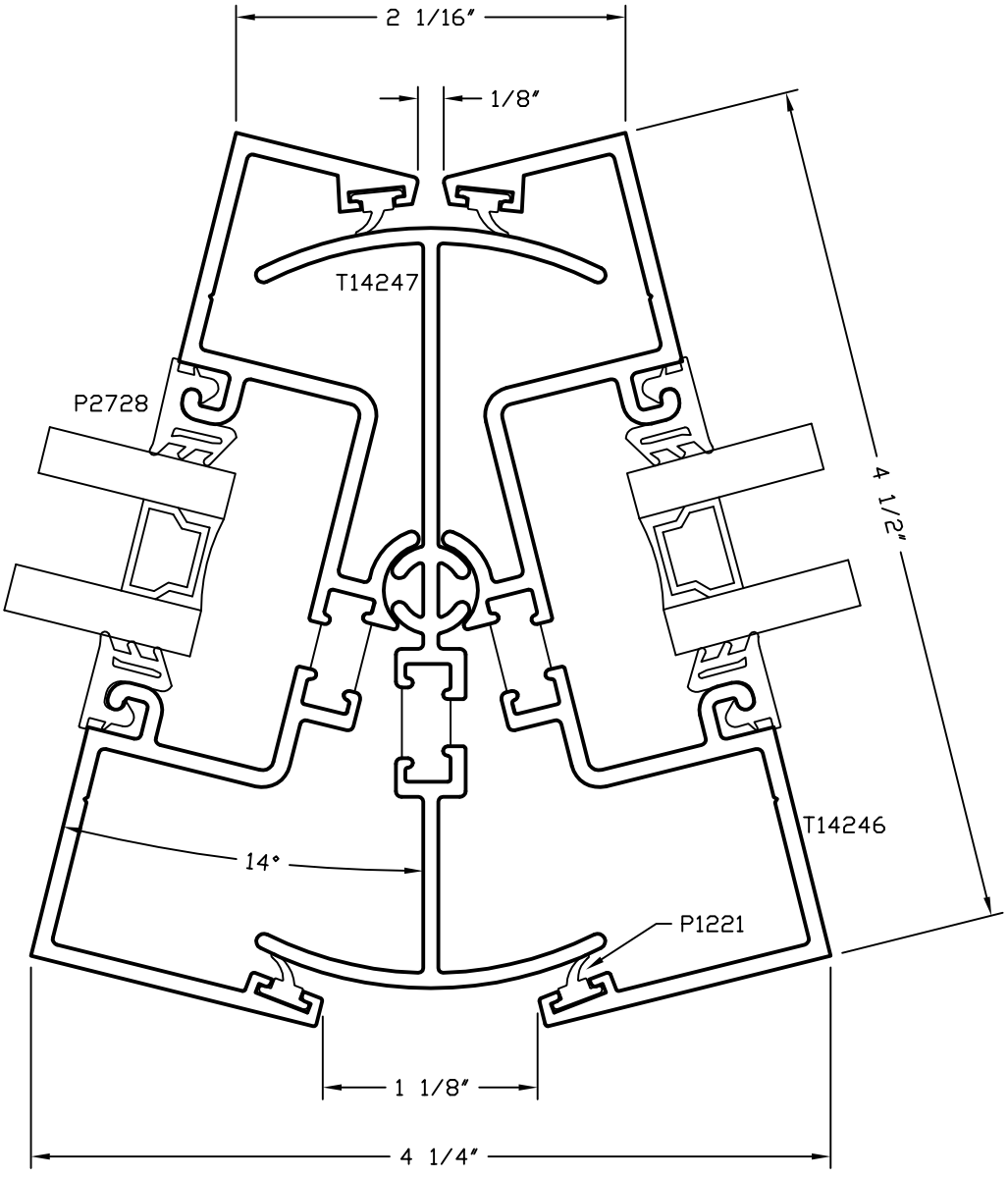
14.52
T14000 Series Flush Glaze
Rotational Mullion

CAD DETAIL FILE NO.
180CORN5



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2013

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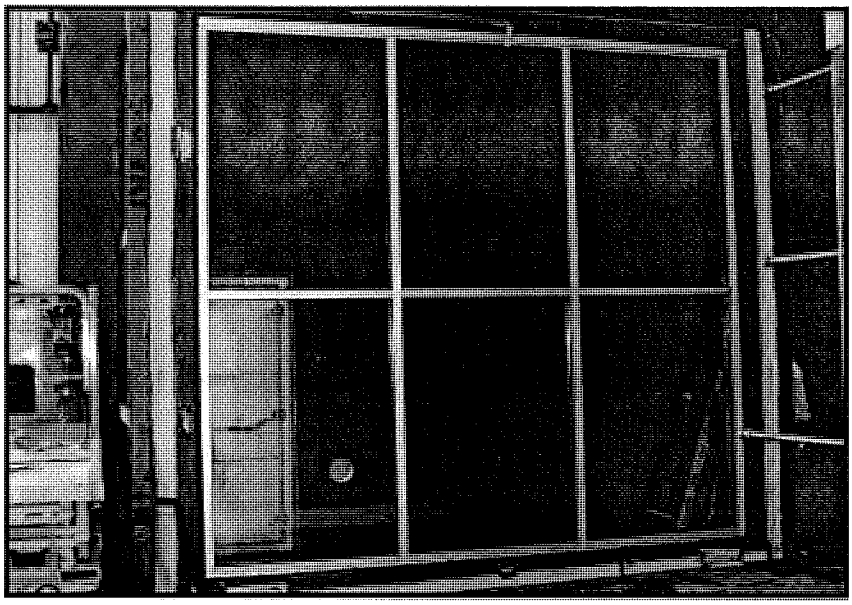
Architectural Testing

MOCK-UP TEST REPORT

Rendered to:

TUBELITE, INC.

PROJECT: 14000 Series Storefront Mock-Up



Report No: 85303.01-120-32
Test Completion Date: 10/08/08
Report Date: 10/30/08
Record Retention End Date: 10/08/12

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

Architectural Testing

MOCK-UP TEST REPORT

Rendered to:

TUBELITE, INC.
3056 Walker Ridge Drive NW, Suite G
Walker, Michigan 49544

Report No:	85303.01-120-32
Test Completion Date:	10/08/08
Report Date:	10/30/08
Record Retention End Date:	10/08/12

Project: 14000 Series Storefront Mock-Up

Project Summary: Architectural Testing, Inc. was contracted by Tubelite, Inc. to conduct performance testing on a mock-up for the referenced project. All testing was performed in accordance with the attached "Curtain Wall Mock-Up Test Procedure" dated September 16, 2008 and revised October 8, 2008. This report includes comprehensive written and photographic documentation of testing performed and a copy of "As-Built" mock-up drawings.

Drawing Reference: Reference Tubelite Architectural Systems 14000 Series Installation instructions Pages 1 through 27. Also reference Tubelite As-built drawings T-190-1 through T-190-5, dated 10-28-08. Copies attached to this report.

General Mock-up Description:

Project Type: The mock-up was comprised of a series of "stick-built" aluminum framing members and glass configured as shown on the referenced drawings. Reference should be made to the attached set of "As-Built" drawings for complete assembly, anchorage, and sealant details.

Mock-up Size: 12' 1-1/2" wide by 12' 2" high

Glazing: The mock-up was exterior glazed using a reglet system. The glazed reglet is used to capture the glass units to the framing members (*refer to the attached drawings and installation instructions for locations).*

Drainage: The storefront mock-up is designed to drain from the horizontal into the verticals and weep out through holes in the sub-sill at 1/4 points of each light.

Sealant: All critical seals and frame joinery were of Dow Corning 795.

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General Mock-up Description: (Continued)

Anchorage: Flashing at the sill and head were anchored to the adjacent substrate. The vertical jambs were anchored to the adjacent substrate, (*refer to the attached drawings and installation instructions for locations).*

Installation: The mock-up was erected into a steel test rig. The sill simulation was designed to move horizontally for use in evaluating the system for inter-story and seismic movements. The perimeter seals were designed to allow for the movement and remain air and water tight.

Test Methods:

Air Infiltration: ASTM E 283-04, *Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.* Testing was conducted at 6.24 psf positive static air pressure difference.

Static Pressure Water Resistance: ASTM E 331-00, *Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.* Testing was conducted at 12.0 psf positive static air pressure difference for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/ft^2/hr.

Dynamic Pressure Water Resistance: AAMA 501.1-05, *Standard Test Method for Exterior Windows, Curtain Walls, and Doors for Water Penetration Using Dynamic Pressure.* Testing was conducted with a dynamic pressure equivalent of 12.0 psf for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/ft^2/hr.

Structural Performance: ASTM E 330-02, *Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.* Testing was conducted at positive and negative loads as described in the test procedure and listed in the test results.

Interstory Differential Horizontal Movement: AAMA 501.4-01, *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts.* Three complete cycles shall be performed in the horizontal and direction at the floor simulation. Testing was conducted at design displacement as described in the test procedure and listed in the test results.

Seismic Movement: AAMA 501.4-01, *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts.* Testing was conducted as described in the test procedure and listed in the test results.

Test Witnesses: The following representatives witnessed all or part of the testing:

Nancy Kennedy	Tubelite, Inc.
Gerard Schoeb	Tubelite, Inc.
Robin Awerst	Hutt's Glass Co.
Rick Smith	Hutt's Glass Co.
Shane Haring	Architectural Testing, Inc.
Joe Enriquez	Architectural Testing, Inc.

FINAL TEST RESULTS
October 6, 2008

***General Note**: Unless otherwise stated, all comments relative to location are viewed from the interior.*

Title of Test	Measured	Allowed
Preload @ +15.0 psf	---	---
Static Pressure Air Infiltration @ 6.24 psf	PASSED ≤0.01 cfm/ft^2	0.06 cfm/ft^2 max
Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled Leakage	No uncontrolled leakage
Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Uniform Load Deflection @ +17.50 psf (Preload) @ +35.0 psf (Design Load) @ -17.50 psf (Preload) @ -35.0 psf (Design Load)	PASSED See Table #1 and Sketch #1	See Table #1 and Sketch #1
Repeat Static Pressure Air Infiltration @ 6.24 psf	PASSED ≤0.01 cfm/ft^2	0.06 cfm/ft^2 max

FINAL TEST RESULTS

October 6, 2008

(Continued)

Title of Test	Measured	Allowed
Repeat Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Repeat Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage

October 8, 2008

Interstory Horizontal Displacement @ 0.75" x 3 cycles	PASSED No visible damage	No visible damage
Repeat Static Pressure Air Infiltration @ 6.24 psf	PASSED $\leq$0.01 cfm/ft^2	0.06 cfm/ft^2 max
Repeat Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Repeat Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Uniform Structural Overloads @ +22.50 psf (Preload) @ +45.0 psf (Overload) @ -22.50 psf (Preload) @ -45.0 psf (Overload)	PASSED See Table #2 and Sketch #1	See Table #2 and Sketch #1

FINAL TEST RESULTS
October 8, 2008
(Continued)

Title of Test	Measured	Allowed
Horizontal Seismic Displacement	PASSED	
@ 1.00" x 3 cycles	No visible damage	No visible damage
@ 1.25" x 3 cycles		
@ 1.50" x 3 cycles		
@ 1.75" x 3 cycles		
@ 2.00" x 3 cycles		
@ 2.25" x 3 cycles		
@ 2.50" x 3 cycles		
@ 2.75" x 3 cycles		
@ 2.88" x 3 cycles		
@ 3.00" x 3 cycles		

END OF TESTING

"As-Built" Mock-up drawings, data sheets, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report by Architectural Testing, Inc. will expire. Results obtained are tested 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

Digitally Signed by: Joe Enriquez

Joe Enriquez
Technician

Digitally Signed by: Joseph W. Wise

Joseph W. Wise
Director - Project/Curtain Wall Testing

JE:jld

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Test Procedure (4)
- Appendix-B: Sketch (1)
- Appendix-C: Tables (1)
- Appendix-D: Photographs (2)
- Appendix-E: Drawings (32)

Architectural Testing

AAMA 507-03 THERMAL PERFORMANCE REPORT

Rendered to:

TUBELITE, INC.

SERIES/MODEL: 14000 Center
TYPE: Glazed Wall System

Report No: 65916.01-116-45
Report Date: 06/23/06

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York, PA 17402-9405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

Architectural Testing

AAMA 507-03 THERMAL PERFORMANCE REPORT

Rendered to:

TUBELITE, INC.
4878 Mackinaw Trail
Reed City, Michigan 49677

Report No: 65916.01-116-45
Report Date: 06/23/06

Project Summary:

Architectural Testing, Inc. (ATI) was contracted by Tubelite, Inc. to provide U-Factor and Solar Heat Gain Coefficient thermal performance ratings on the 14000 Center Glazed Wall System. The thermal performance ratings were determined in accordance with AAMA 507-03, *Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Building.*

Reference Documents:

AAMA 507-03, *Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings*

NFRC 100-2001, *Procedure for Determining Fenestration Product U-Factors*

NFRC 200-2001, *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*

NFRC Technical Interpretation TI-2003-12, *Curtain Wall Simulation*

Simulation Specimen Description:

Series/Model:	14000 Center
Type:	Glazed Wall System
Frame Material:	Thermally Broken Aluminum Framing System
Specimen Size:	2000mm wide by 2000mm high (78-3/4" by 78-3/4")
Configuration:	Two vision lites separated by one intermediate vertical
Drawing Reference:	Tubelite Drawing 14000 Center

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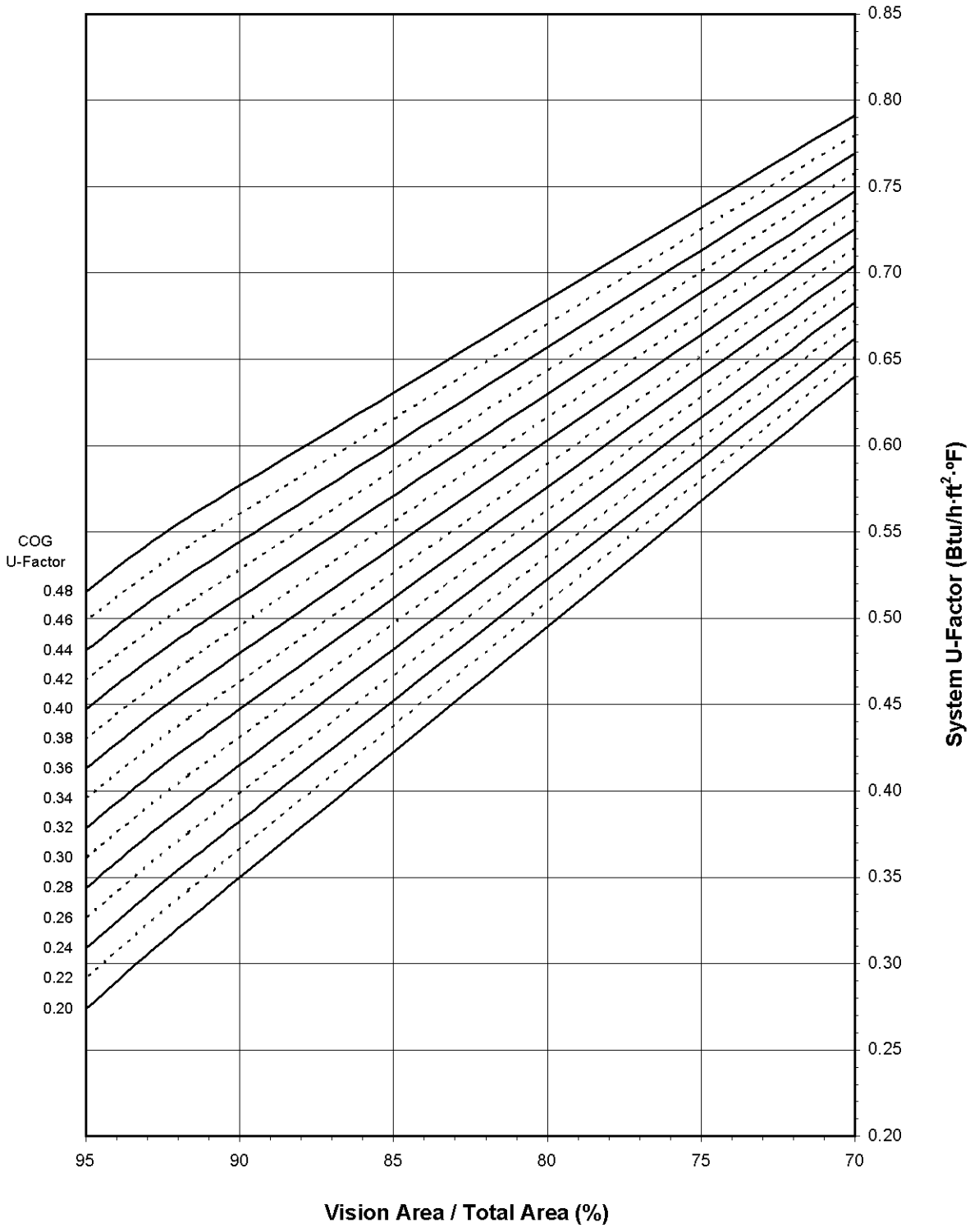
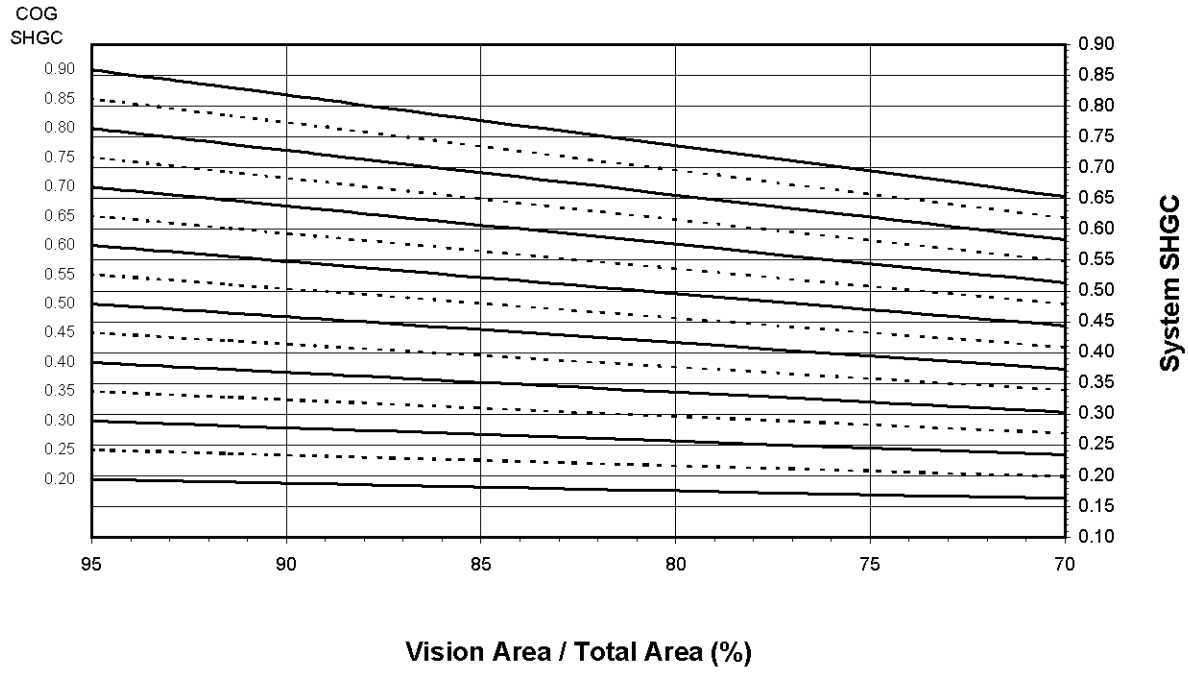
Tubelite, Inc.
14000 Center Glazed Wall System

System U-Factor vs. Percentage of Vision Area

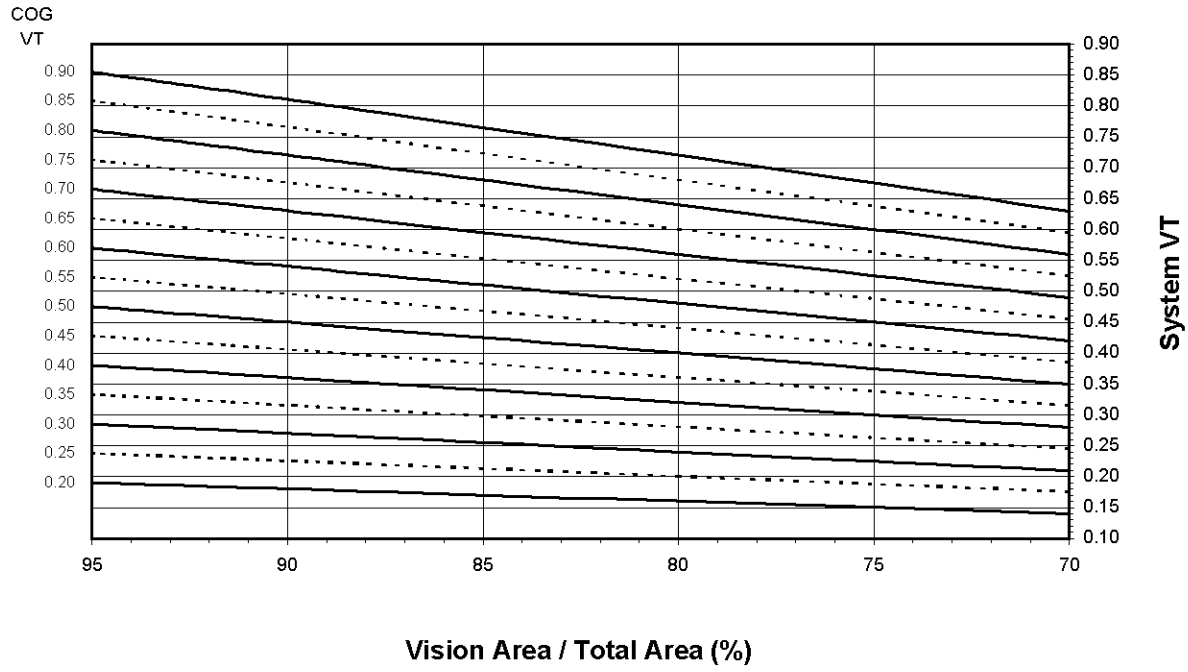


Tubelite, Inc.
14000 Center Glazed Wall System

System SHGC vs. Percentage of Vision Area



System VT vs. Percentage of Vision Area



Tubelite, Inc.
14000 Center Glazed Wall System

Size Specific U-Factor Matrix*

Glazing Option	Center of Glass U-Factor	Overall U-Factor
1	0.48	0.56
2	0.46	0.54
3	0.44	0.53
4	0.42	0.51
5	0.40	0.49
6	0.38	0.48
7	0.36	0.46
8	0.34	0.44
9	0.32	0.43
10	0.30	0.41
11	0.28	0.39
12	0.26	0.38
13	0.24	0.36
14	0.22	0.34
15	0.20	0.33

Size Specific SHGC Matrix*

Center of Glass SHGC	Overall SHGC
0.90	0.83
0.85	0.79
0.80	0.74
0.75	0.69
0.70	0.65
0.65	0.60
0.60	0.56
0.55	0.51
0.50	0.46
0.45	0.42
0.40	0.37
0.35	0.33
0.30	0.28
0.25	0.24
0.20	0.19

Size Specific VT Matrix*

Center of Glass VT	Overall VT
0.90	0.82
0.85	0.78
0.80	0.73
0.75	0.69
0.70	0.64
0.65	0.60
0.60	0.55
0.55	0.50
0.50	0.46
0.45	0.41
0.40	0.37
0.35	0.32
0.30	0.27
0.25	0.23
0.20	0.18

*Size Specific U-Factor, SHGC, and VT Matrices are based on the standard Glazed Wall System specimen size of 2000mm wide by 2000mm high (78-3/4" by 78-3/4"). This represents 91.6% Vision Area / Total Area.

Vision Area Data

Option No.	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70% Vision Area	*NFRC 100-2001*	*95% Vision Area*
							20.73" by 20.73"	*78.74" by 78.74"*	*132.64" by 132.64"*
1	0.48	43.7	Head	1.1190	1.1599	0.4945	0.7916	0.5586	0.5153
			Vertical	2.2333	1.6023	0.5232			
			Sill	1.1167	1.1613	0.4994			
2	0.46	44.8	Head	1.1190	1.1575	0.4805	0.7803	0.5419	0.4982
			Vertical	2.2333	1.6020	0.5098			
			Sill	1.1167	1.1588	0.4854			
3	0.44	45.8	Head	1.1190	1.1561	0.4666	0.7693	0.5253	0.4811
			Vertical	2.2333	1.6023	0.4965			
			Sill	1.1167	1.1575	0.4715			
4	0.42	46.8	Head	1.1190	1.1548	0.4529	0.7584	0.5089	0.4642
			Vertical	2.2333	1.6026	0.4833			
			Sill	1.1167	1.1562	0.4579			
5	0.40	47.9	Head	1.1190	1.1536	0.4391	0.7475	0.4923	0.4471
			Vertical	2.2333	1.6030	0.4700			
			Sill	1.1167	1.1550	0.4441			
6	0.38	48.9	Head	1.1190	1.1524	0.4255	0.7367	0.4757	0.4300
			Vertical	2.2333	1.6034	0.4569			
			Sill	1.1167	1.1538	0.4306			
7	0.36	50.0	Head	1.1190	1.1513	0.4120	0.7259	0.4591	0.4128
			Vertical	2.2333	1.6038	0.4438			
			Sill	1.1167	1.1527	0.4170			
8	0.34	51.0	Head	1.1190	1.1502	0.3984	0.7151	0.4425	0.3955
			Vertical	2.2333	1.6043	0.4308			
			Sill	1.1167	1.1515	0.4034			
9	0.32	52.0	Head	1.1190	1.1492	0.3850	0.7046	0.4259	0.3782
			Vertical	2.2333	1.6047	0.4179			
			Sill	1.1167	1.1505	0.3902			
10	0.30	53.6	Head	1.1190	1.1482	0.3717	0.6940	0.4093	0.3609
			Vertical	2.2333	1.6054	0.4051			
			Sill	1.1167	1.1495	0.3769			
11	0.28	54.1	Head	1.1190	1.1473	0.3584	0.6834	0.3926	0.3435
			Vertical	2.2333	1.6059	0.3923			
			Sill	1.1167	1.1486	0.3636			
12	0.26	55.2	Head	1.1190	1.1464	0.3452	0.6729	0.3759	0.3260
			Vertical	2.2333	1.6065	0.3795			
			Sill	1.1167	1.1477	0.3504			
13	0.24	56.3	Head	1.1190	1.1456	0.3320	0.6624	0.3593	0.3087
			Vertical	2.2333	1.6069	0.3667			
			Sill	1.1167	1.1469	0.3373			
14	0.22	57.3	Head	1.1190	1.1449	0.3188	0.6519	0.3426	0.2912
			Vertical	2.2333	1.6076	0.3540			
			Sill	1.1167	1.1462	0.3242			
15	0.20	58.4	Head	1.1190	1.1442	0.3057	0.6405	0.3257	0.2735
			Vertical	2.2333	1.6045	0.3407			
			Sill	1.1167	1.1454	0.3111			

Detailed drawings, simulation data disks, and a copy of this report will be retained by ATI for a period of four years. The above results are the exclusive property of the client so named herein and are applicable to the sample simulated. This report does not constitute an opinion or endorsement by this laboratory. This report may not be reproduced except in full without the approval of ATI.

For ARCHITECTURAL TESTING, INC.:

SIMULATED BY:

Digitally Signed by: Kevin Louder

Kevin S. Louder
Project Engineer

REVIEWED BY:

Digitally Signed by: Michael J. Thoman

Michael J. Thoman
Director - Simulations and Thermal Testing
Simulator In Responsible Charge

KSL:ksl
65916.01-116-45

Attachments (pages):

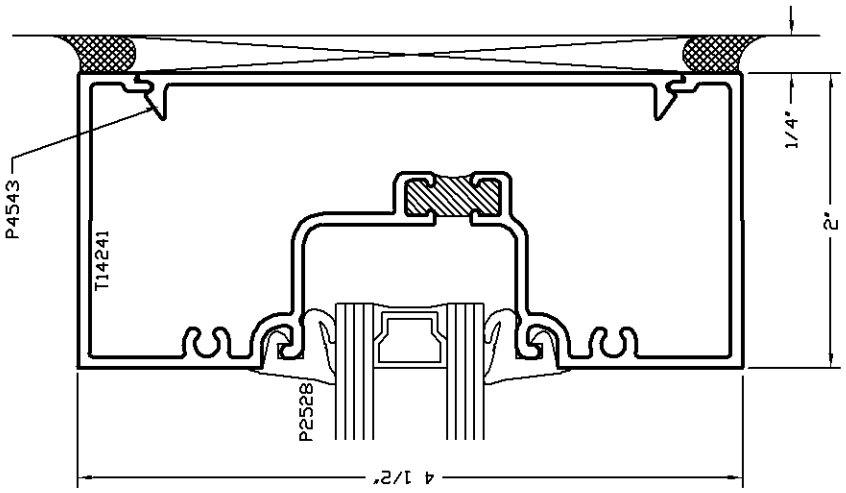
Appendix A: Drawings and Bills of Material (1)

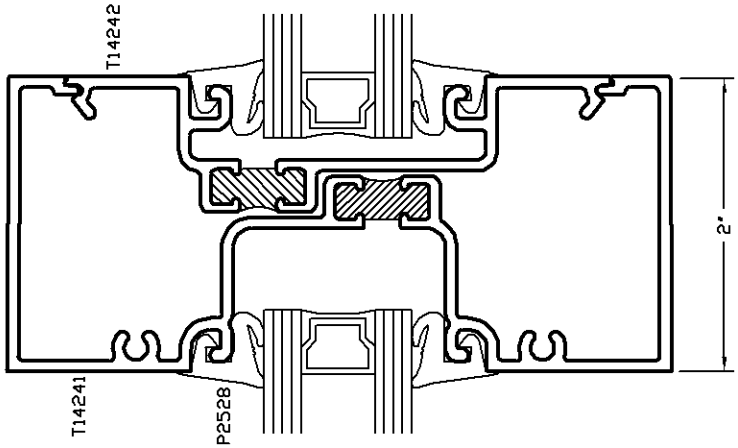
Revision Log

Rev. #	Date	Page(s)	Revision(s)
.01 R0	6/23/2006	All	Original Report Issue

All drawings and Bills of Material used in simulating this product are enclosed in this Appendix.

Appendix A



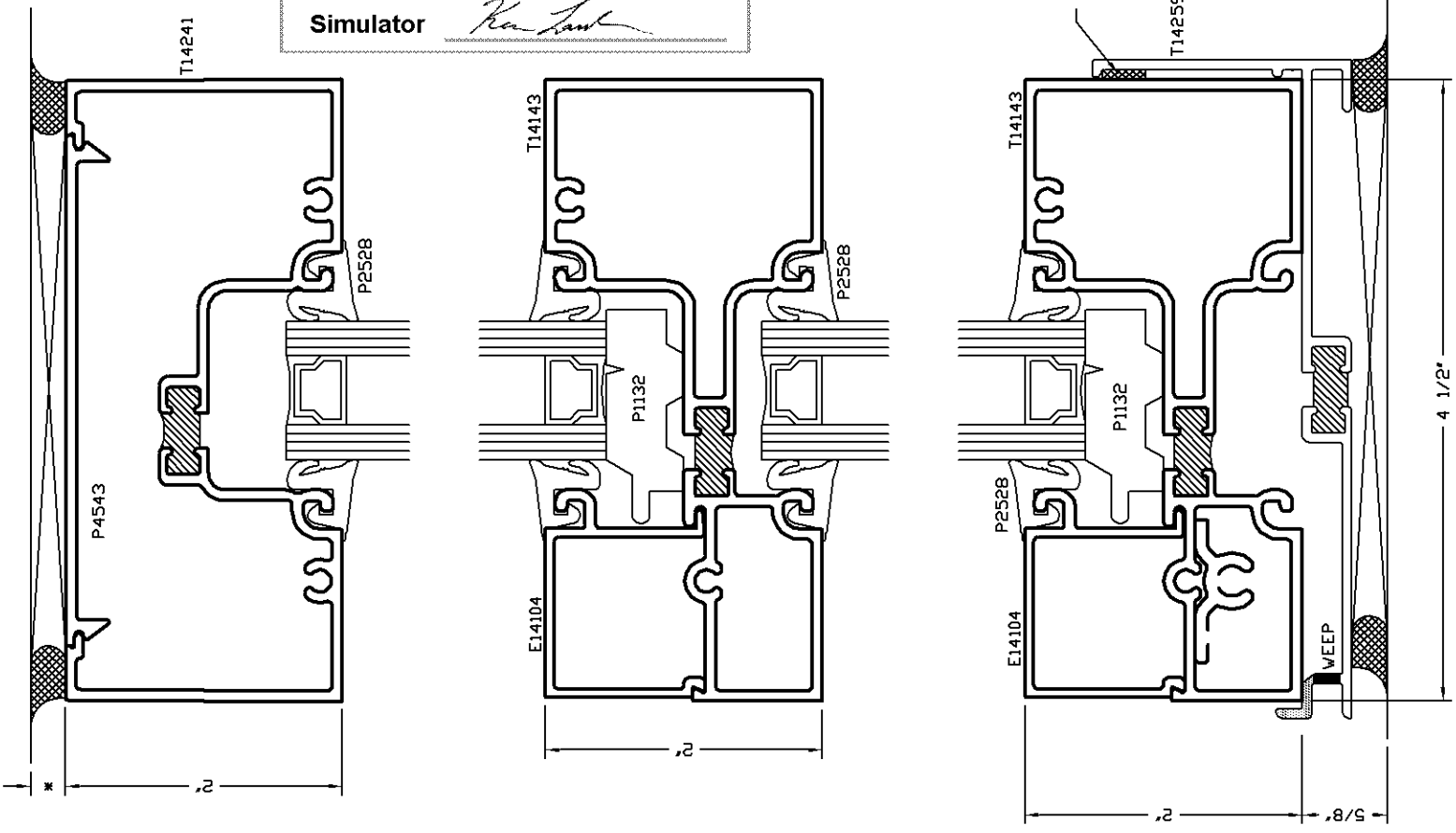


ATI

Report # 65916

Date 6/23/06

Simulator



Architectural Testing

MOCK-UP TEST REPORT

Rendered to:

TUBELITE, INC.

PROJECT: 14000 Series Storefront Mock-Up

Report No: **85303.01-120-32**
Test Completion Date: **10/08/08**
Report Date: **10/30/08**
Record Retention End Date: **10/08/12**

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

Architectural Testing

MOCK-UP TEST REPORT

Rendered to:

TUBELITE, INC.
3056 Walker Ridge Drive NW, Suite G
Walker, Michigan 49544

Report No:	85303.01-120-32
Test Completion Date:	10/08/08
Report Date:	10/30/08
Record Retention End Date:	10/08/12

Project: 14000 Series Storefront Mock-Up

Project Summary: Architectural Testing, Inc. was contracted by Tubelite, Inc. to conduct performance testing on a mock-up for the referenced project. All testing was performed in accordance with the attached "Curtain Wall Mock-Up Test Procedure" dated September 16, 2008 and revised October 8, 2008. This report includes comprehensive written and photographic documentation of testing performed and a copy of "As-Built" mock-up drawings.

Drawing Reference: Reference Tubelite Architectural Systems 14000 Series Installation instructions Pages 1 through 27. Also reference Tubelite As-built drawings T-190-1 through T-190-5, dated 10-28-08. Copies attached to this report.

General Mock-up Description:

Project Type: The mock-up was comprised of a series of "stick-built" aluminum framing members and glass configured as shown on the referenced drawings. Reference should be made to the attached set of "As-Built" drawings for complete assembly, anchorage, and sealant details.

Mock-up Size: 12' 1-1/2" wide by 12' 2" high

Glazing: The mock-up was exterior glazed using a reglet system. The glazed reglet is used to capture the glass units to the framing members (*refer to the attached drawings and installation instructions for locations).*

Drainage: The storefront mock-up is designed to drain from the horizontal into the verticals and weep out through holes in the sub-sill at 1/4 points of each light.

Sealant: All critical seals and frame joinery were of Dow Corning 795.

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General Mock-up Description: (Continued)

Anchorage: Flashing at the sill and head were anchored to the adjacent substrate. The vertical jambs were anchored to the adjacent substrate, (*refer to the attached drawings and installation instructions for locations).*

Installation: The mock-up was erected into a steel test rig. The sill simulation was designed to move horizontally for use in evaluating the system for inter-story and seismic movements. The perimeter seals were designed to allow for the movement and remain air and water tight.

Test Methods:

Air Infiltration: ASTM E 283-04, *Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*. Testing was conducted at 6.24 psf positive static air pressure difference.

Static Pressure Water Resistance: ASTM E 331-00, *Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference*. Testing was conducted at 12.0 psf positive static air pressure difference for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/ft^2/hr.

Dynamic Pressure Water Resistance: AAMA 501.1-05, *Standard Test Method for Exterior Windows, Curtain Walls, and Doors for Water Penetration Using Dynamic Pressure*. Testing was conducted with a dynamic pressure equivalent of 12.0 psf for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/ft^2/hr.

Structural Performance: ASTM E 330-02, *Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference*. Testing was conducted at positive and negative loads as described in the test procedure and listed in the test results.

Interstory Differential Horizontal Movement: AAMA 501.4-01, *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts.* Three complete cycles shall be performed in the horizontal and direction at the floor simulation. Testing was conducted at design displacement as described in the test procedure and listed in the test results.

Seismic Movement: AAMA 501.4-01, *Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts.* Testing was conducted as described in the test procedure and listed in the test results.

Test Witnesses: The following representatives witnessed all or part of the testing:

Nancy Kennedy	Tubelite, Inc.
Gerard Schoeb	Tubelite, Inc.
Robin Awerst	Hutt's Glass Co.
Rick Smith	Hutt's Glass Co.
Shane Haring	Architectural Testing, Inc.
Joe Enriquez	Architectural Testing, Inc.

FINAL TEST RESULTS
October 6, 2008

***General Note**: Unless otherwise stated, all comments relative to location are viewed from the interior.*

Title of Test	Measured	Allowed
Preload @ +15.0 psf	---	---
Static Pressure Air Infiltration @ 6.24 psf	PASSED ≤0.01 cfm/ft^2	0.06 cfm/ft^2 max
Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled Leakage	No uncontrolled leakage
Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Uniform Load Deflection @ +17.50 psf (Preload) @ +35.0 psf (Design Load) @ -17.50 psf (Preload) @ -35.0 psf (Design Load)	PASSED See Table #1 and Sketch #1	See Table #1 and Sketch #1
Repeat Static Pressure Air Infiltration @ 6.24 psf	PASSED ≤0.01 cfm/ft^2	0.06 cfm/ft^2 max

FINAL TEST RESULTS
October 6, 2008
(Continued)

Title of Test	Measured	Allowed
Repeat Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Repeat Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage

October 8, 2008

Interstory Horizontal Displacement @ 0.75" x 3 cycles	PASSED No visible damage	No visible damage
Repeat Static Pressure Air Infiltration @ 6.24 psf	PASSED $\leq$0.01 cfm/ft^2	0.06 cfm/ft^2 max
Repeat Static Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Repeat Dynamic Pressure Water Resistance @ 10.0 psf	PASSED No uncontrolled leakage	No uncontrolled leakage
Uniform Structural Overloads @ +22.50 psf (Preload) @ +45.0 psf (Overload) @ -22.50 psf (Preload) @ -45.0 psf (Overload)	PASSED See Table #2 and Sketch #1	See Table #2 and Sketch #1

FINAL TEST RESULTS
October 8, 2008
(Continued)

Title of Test	Measured	Allowed
Horizontal Seismic Displacement	PASSED	
@ 1.00" x 3 cycles	No visible damage	No visible damage
@ 1.25" x 3 cycles		
@ 1.50" x 3 cycles		
@ 1.75" x 3 cycles		
@ 2.00" x 3 cycles		
@ 2.25" x 3 cycles		
@ 2.50" x 3 cycles		
@ 2.75" x 3 cycles		
@ 2.88" x 3 cycles		
@ 3.00" x 3 cycles		

END OF TESTING

"As-Built" Mock-up drawings, data sheets, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report by Architectural Testing, Inc. will expire. Results obtained are tested 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

Digitally Signed by: Joe Enriquez

Digitally Signed by: Joseph W. Wise

Joe Enriquez
Technician

Joseph W. Wise
Director - Project/Curtain Wall Testing

JE:jld

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Test Procedure (4)
- Appendix-B: Sketch (1)
- Appendix-C: Tables (1)
- Appendix-D: Photographs (2)
- Appendix-E: Drawings (32)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	10/30/08	N/A	Original report issue

Appendix A

Test Procedure

Architectural Testing

September 16, 2008
Revised October 8, 2008

Mock-Up Test Procedure

Rendered to:
Tubelite, Inc.

Project: 14000 Series Storefront Mock-up

Mock-up testing for *14000 Series Storefront Project* shall be performed in accordance with referenced test methods as specified in the bid documents. Mock-up testing shall be observed by the Engineer and/or the Owner, Architect and their consultants during construction and testing. No pretesting shall be conducted without the architect or consultant present.

The final test procedure shall be as follows:

1. **PRELOAD (ASTM E330)**

   To set the specimen for testing, a positive differential (inward acting) of **15.0 psf** (50% design load), will be applied to the specimen and held for a minimum of ten (10) seconds, then released. The wall and anchoring will be inspected for any failure.

   Allowable

   No visible signs of failure shall be allowed.

2. **STATIC AIR INFILTRATION TEST (ASTM E283)**

   The mock-up exterior face will be covered with polyethylene (plastic sheeting). The mock-up will then be subjected to a positive static pressure differential of **6.24 psf**. The air infiltration required to maintain the air pressure differential is measured. This air infiltration reading represents the chamber tare. The polyethylene will be removed and the mock-up specimen will again be subjected to a positive static pressure differential of **6.24 psf**. Air infiltration will be measured. This total air infiltration reading represents the amount of air through the specimen and the chamber tare. Subtracting the chamber tare from the latter total reading yields the net amount of air infiltration through the mock-up. Dividing the mock-up air leakage by the mock-up area yields the air infiltration rate.

   Allowable

   Air infiltration shall not exceed **0.06 cfm** per square foot of fixed wall area.

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3. STATIC WATER PENETRATION TEST (ASTM E331)

A fifteen (15) minute water penetration test will be conducted on the wall system with a water application rate of 5 gal/hr/ft^2 at a pressure differential of **10.0 psf**. No uncontrolled water penetration is allowed.

Allowable

No uncontrolled water leakage.

4. DYNAMIC WATER PENETRATION (AAMA 501.1)

A fifteen (15) minute water penetration test will be conducted on the system with a water application rate of 5 gal/hr/ft^2 and dynamic air stream equivalent to static pressure of **10.0 psf**.

Allowable

No uncontrolled water leakage.

5. UNIFORM STRUCTURAL DESIGN LOAD TEST (ASTM E330)

Deflection of the system shall be measured and recorded at design pressure when held for sixty (60) seconds and evaluated using the following allowable criteria:

Each load shall be held as follows:

+**15.0 psf** - 50% Positive Design Load
+**30.0 psf** - 100% Positive Design Load
-**15.0 psf** - 50% Negative Design Load
-**30.0 psf** - 100% Negative Design Load

Allowable Criteria

Deflection of framing member's perpendicular to the plane of the wall shall not exceed L/175 for clear spans up to 13' 6".

6. REPEAT STATIC AIR INFILTRATION TEST (ASTM E283)

Repeat Test No. 2 as stated above.

7. REPEAT STATIC WATER PENETRATION TEST (ASTM E331)

Repeat Test No. 3 as stated above.

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8. **REPEAT DYNAMIC WATER PENETRATION (AAMA 501.1)**

Repeat Test No. 4 as stated above.

9. **INTERSTORY DIFFERENTIAL HORIZONTAL MOVEMENT TEST (AAMA 501.4)**:

Three (3) complete cycles shall be performed in the horizontal direction at the mid-height floor simulation. Horizontal movement will be .750" to the left, then back to zero, .750" to the right, and then back to zero (one cycle).

Allowable

There shall be no failure or gross permanent distortion of anchors, frame, glass, or panels. Structural silicone shall not experience adhesive or cohesive failure along any glass, frame or panel edge. Glazing gaskets may not disengage and weather seals may not fail.

10. **REPEAT STATIC AIR INFILTRATION TEST (ASTM E283)**

Repeat Test No. 2 as stated above.

11. **REPEAT STATIC WATER PENETRATION TEST (ASTM E331)**

Repeat Test No. 3 as stated above.

12. **REPEAT DYNAMIC WATER PENETRATION (AAMA 501.1)**

Repeat Test No. 4 as stated above.

13. **UNIFORM STRUCTURAL OVER LOAD TEST (ASTM E330)**

Permanent deformation of the system shall be measured and recorded at 1.5 x design pressure when held for ten (10) seconds and evaluated using the following allowable criteria:

Each load shall be held as follows:

+**22.50 psf** - 75% Positive Design Load
+**45.0 psf** - 150% Positive Design Load
-**22.50 psf** - 75% Negative Design Load
-**45.0 psf** - 150% Negative Design Load

Allowable

The net permanent set shall not exceed 0.2% of the clear span.

14. SEISMIC MOVEMENT @ 1.5 X DESIGN DISPLACEMENT TEST (AAMA 501.4)

Three (3) complete cycles shall be performed in the horizontal direction parallel to the plane of the wall. Parallel horizontal movement will be 3.00" left, back to zero, 3.00" right and back to zero (one cycle).

Allowable

At the conclusion of this test there shall be no glass breakage, permanent damage to frame members, or anchors.

END OF TESTING

This Test Procedure dated September 16th, 2008 and revised October 8, 2008 for the *14000 Series Storefront Project* is approved as written.

For: Tubelite, Inc

Nancy A. Kennedy
Signature

Nancy T. Kennedy
Name (please print)

A signed copy of this Test Procedure must be returned prior to initiation of testing.

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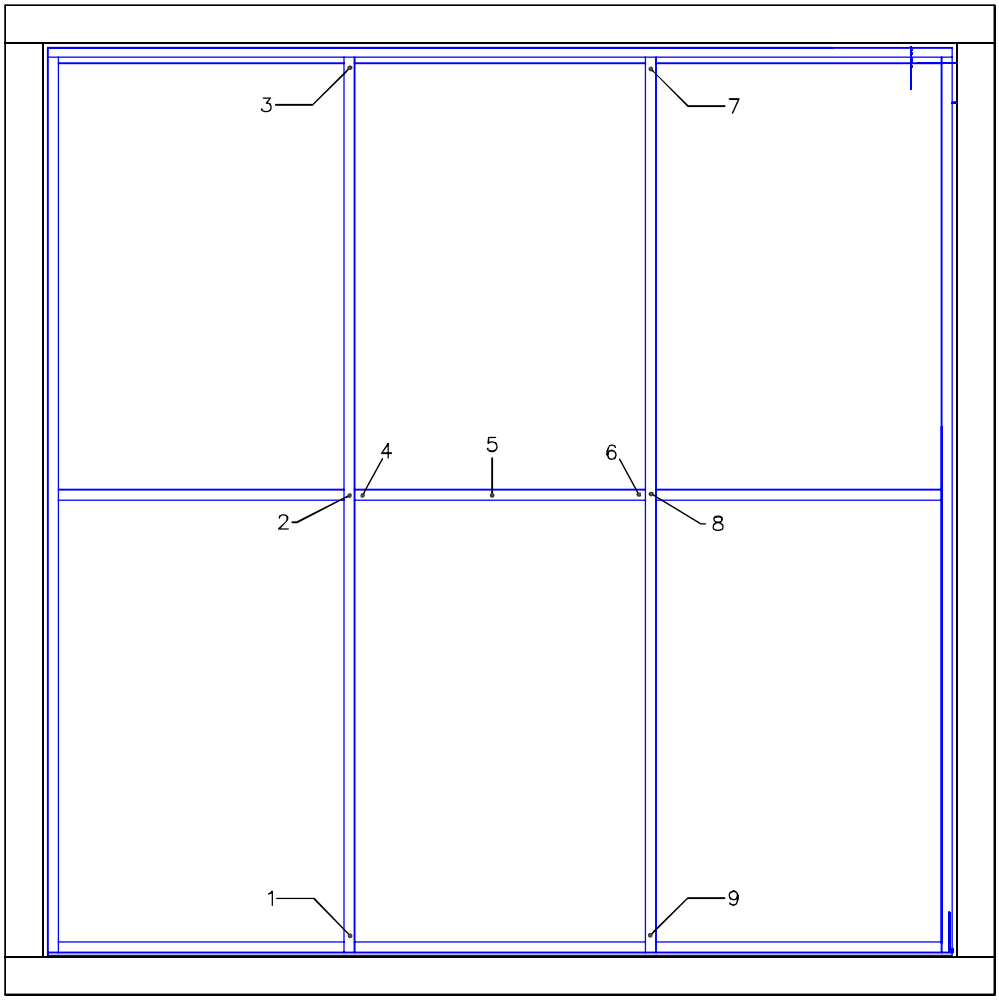
Appendix B

Sketch

INTERIOR VIEW

REV:	DATE:	DESCRIPTION:	BY:
X	X/XX/XX	XXXXX	XXX



PROJECT NO.	PROJECT NAME:		DRAWING:	DRAWING BY:	SHEET
85303.01 −120−32	SERIES 1400 STOREFRONT CLIENT: TUBELITE	Architectural Testing	SKETCH #1 Indicator Sketch	MDH DATE: 10/03/08	1 OF 1

Appendix C

Tables

TABLE #1
Uniform Load Deflection
(Deflection in inches)

Indicator Location	Positive 30.0 psf	Net Deflection	Negative 30.0 psf	Net Deflection	Allowed*
1	0.120	---	0.160	---	---
2	0.770	0.665	0.780	0.645	0.800
3	0.090	---	0.110	---	---
4	0.830	---	0.820	---	---
5	0.820	0.030	0.860	0.035	0.260
6	0.750	---	0.830	---	---
7	0.140	---	0.180	---	---
8	0.800	0.690	0.830	0.680	0.800
9	0.080	---	0.120	---	---

***General Note**: Refer to Sketch #1 for dial indicator locations and to the test procedure for information regarding allowable deflections.*

TABLE #2
Uniform Structural Overloads
(Permanent Set in inches)

Indicator Location	Positive 45.0 psf	Net Perm. Set	Negative 45.0 psf	Net Perm. Set	Allowed*
1	0.010	---	0.010	---	---
2	0.035	0.025	0.055	0.035	0.280
3	0.010	---	0.030	---	---
4	0.035	---	0.060	---	---
5	0.040	0.000	0.060	0.008	0.091
6	0.045	---	0.045	---	---
7	0.030	---	0.050	---	---
8	0.050	0.030	0.030	0.005	0.280
9	0.010	---	0.020	---	---

***General Note**: Allowable amounts are based on 0.2% of clear span. Refer to Sketch #1 for dial indicator locations and to the test procedure for additional information regarding allowable deflections.*

Appendix D

Photographs

Photo No. 1
Static Pressure Water Resistance Test

Photo No. 2
Exterior View during Air Infiltration Test

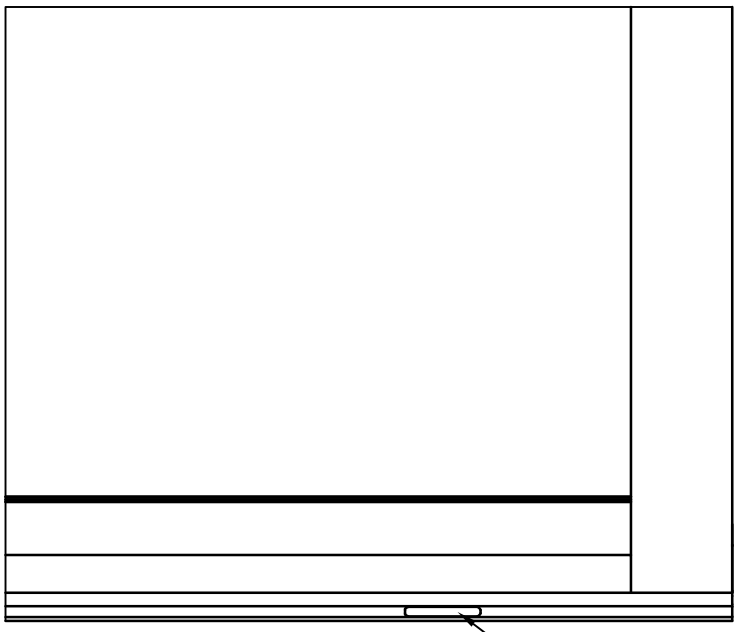
Photo No. 3
Exterior View during Dynamic Water Resistance Test

Photo No. 4
Interior View of Hydraulic Equipment for Interstory and Seismic Movement Test at the Sill

Appendix E

Drawings

T-190-1



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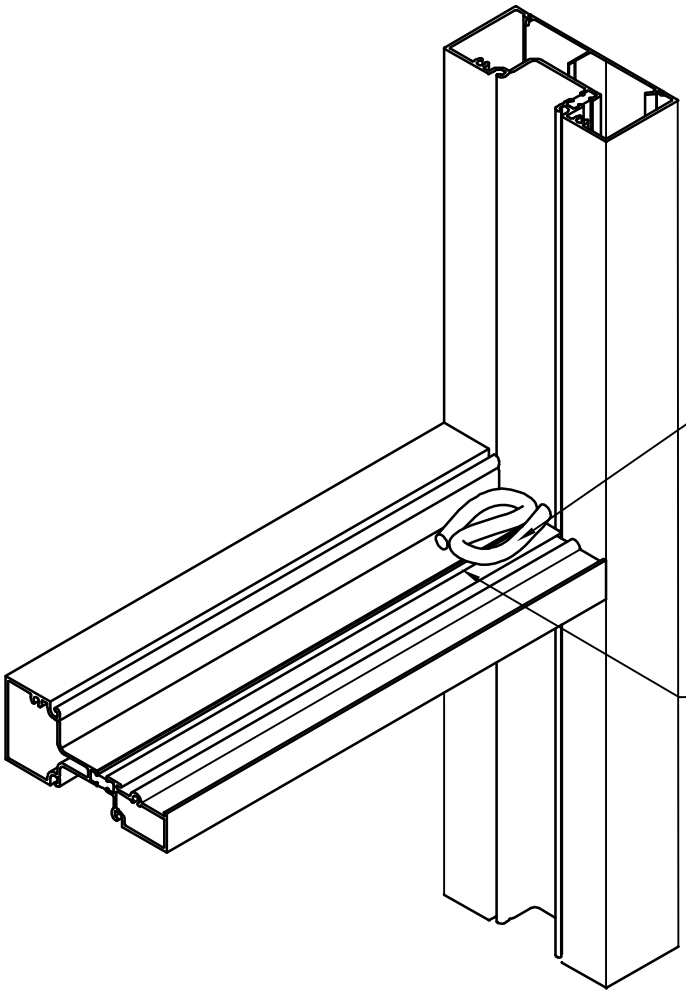
SILL WEEP
T14000 2008
xxxxx

DRAWN BY: NIK	DRWG DATE: 10-28-08	APPV,D BY:	DATE APPV'D:
DRWG SCALE: 1:4	PRODUCT CODE: 190	T-190-1	REV:

T-190-2



PLACE BED OF SEALANT WHERE THE WATER DIVERTER WILL NEST ON INTERMEDIATE HORIZONTAL

MAKE SURE THERMAL BREAK IS FILLED WITH SEALANT

TUBELITE®

STOREFRONT, CURTAINWALL & ENTRANCES

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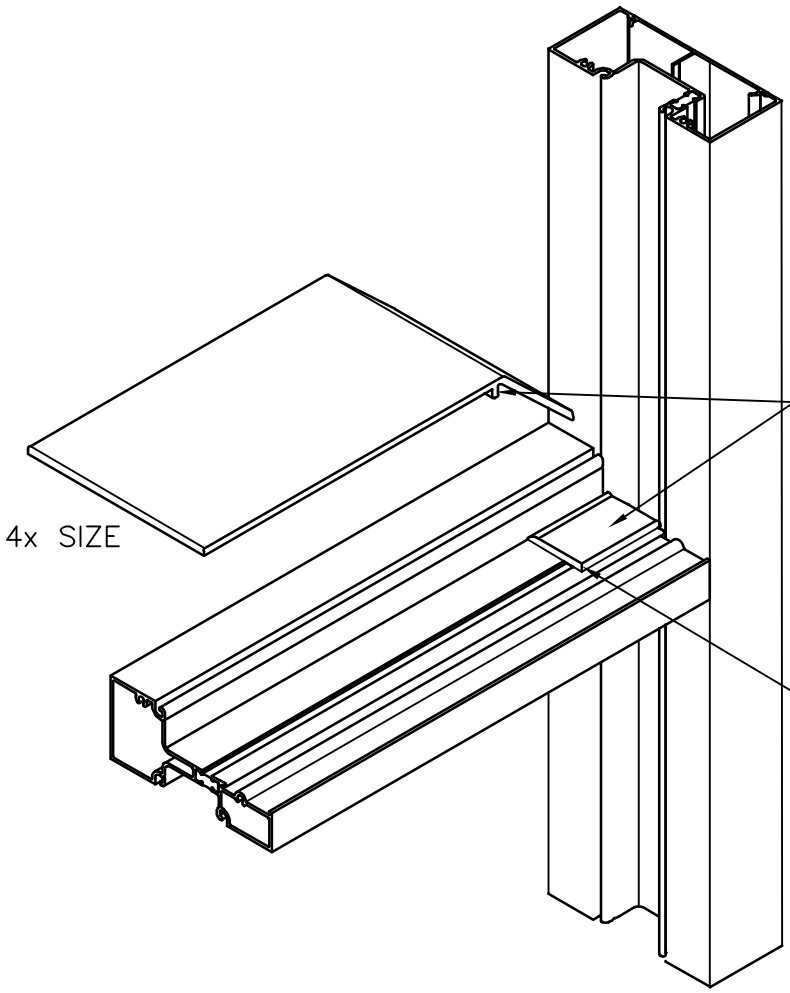
DIVERTER SILICONE BED

T14000 2008

XXXXX

DRAWN BY: NIK	DRWG DATE: 10-28-08	APPV,D BY:	DATE APPV'D:
DRWG SCALE: 1:4	PRODUCT CODE: 190	T-190-2	REV:

T-190-3



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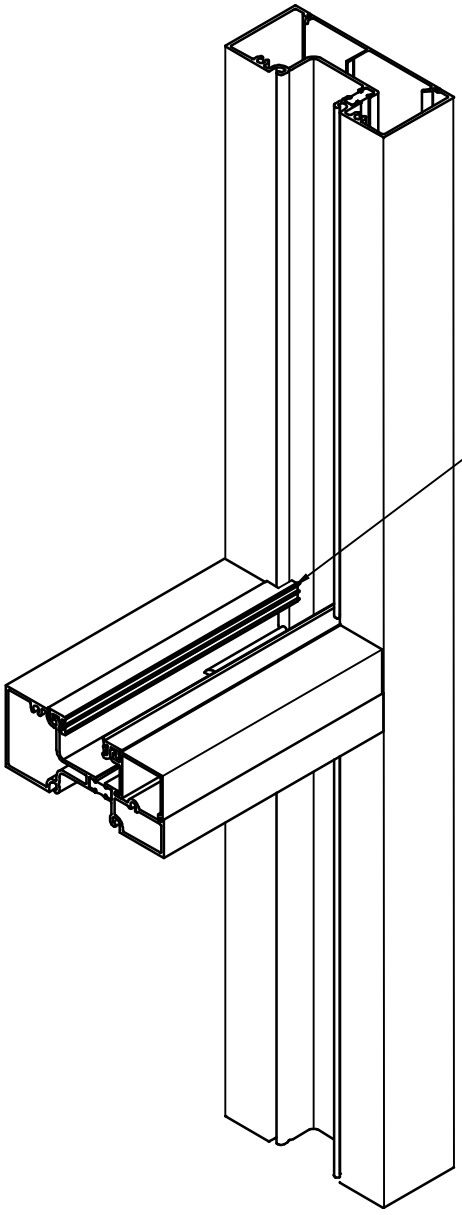
WATER DIVERTER PLACEMENT

T14000 2008

xxxxx

DRAWN BY: NIK	DRWG DATE: 10-28-08	APPV,D BY:	DATE APPV'D:
DRWG SCALE: 1:4	PRODUCT CODE: 190	T-190-3	REV:

T-190-4



RUN HORIZONTAL GASKET A MINIMUM OF 3/8" INTO VERTICAL
(GLASS REMOVED FOR CLARIFICATION)

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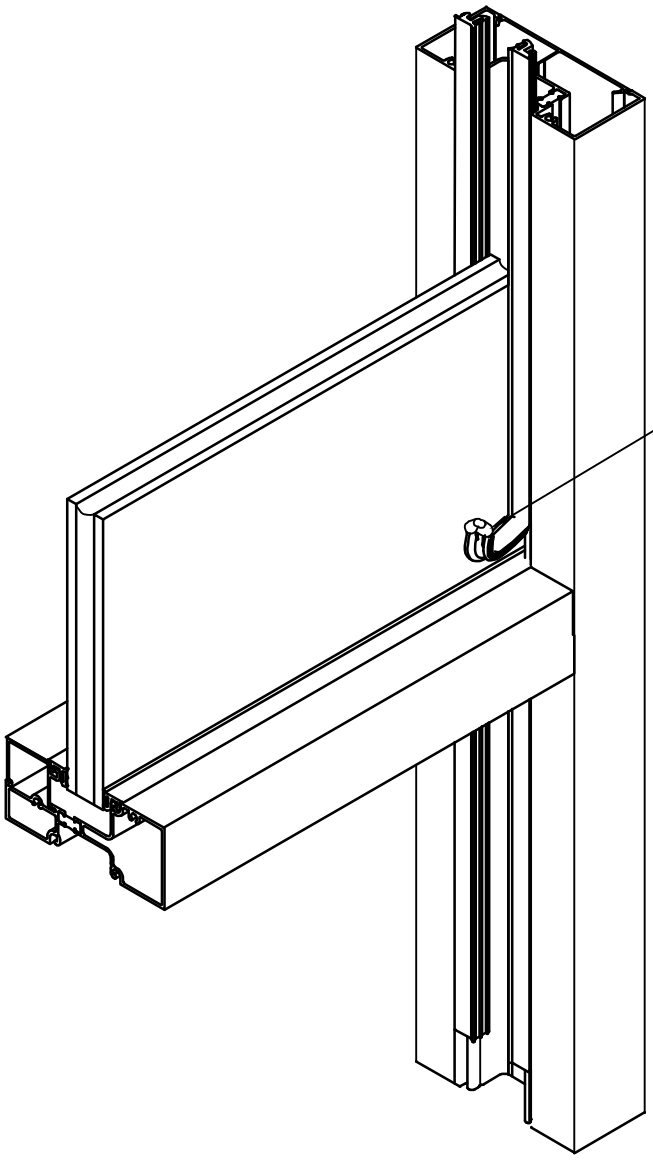
HORIZONTAL GASKET
T14000 2008
XXXXX

DRAWN BY: NIK	DRWG DATE: 10-28-08	APPV,D BY:	DATE APPV'D:
DRWG SCALE: 1:4	PRODUCT CODE: 190	T-190-4	REV:

T-190-5



PLACE SEALANT ON END OF INTERIOR VERTICAL GASKET AND PUSH DOWN ONTO THE HORIZONTAL GASKET (WORK GASKET INTO PLACE FROM ENDS TO CENTER OF LITE BY PUSH IT INTO THE RACE)

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DEPENDABLE

VERTICAL GASKET

T14000 2008

XXXXX

DRAWN BY: NIK	DRWG DATE: 10-28-08	APPV,D BY:	DATE APPV'D:
DRWG SCALE: 1:4	PRODUCT CODE: 190	T-190-5	REV:

Architectural Testing

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

TUBELITE, INC.

SERIES/MODEL: T14000 Storefront (Standard)
TYPE: Glazed Wall Systems (Site-built)

Summary of Results	
Thermal Transmittance (U-Factor)	0.46
Condensation Resistance Factor - Frame (CRF_f)	54
Condensation Resistance Factor - Glass (CRF_g)	61
Unit Size	78-3/4" x 78-3/4" (2000 mm x 2000 mm)
Layer 1	1/4" Clear Tempered
Gap 1	0.53" Gap, Azon Warm-Light® Spacer (A2-D), Air-Filled*
Layer 2	1/4" PPG Sungate 500 (e=0.215*, #3) Tempered

Reference must be made to Report No. B6913.02-116-46, dated 06/19/12 for complete test specimen description and data.

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Architectural Testing

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

TUBELITE, INC.
4878 Mackinaw Trail
Reed City , Michigan 49677

Report Number:	B6913.02-116-46
Test Date:	04/30/12
Report Date:	06/19/12
Test Record Retention Date:	04/30/16

Test Sample Identification:

Series/Model: T14000 Storefront (Standard)

Type: Glazed Wall Systems (Site-built)

Test Sample Submitted by: Client

Test Procedure: The condensation resistance factor (CRF) and thermal transmittance (U) were determined in accordance with AAMA 1503-09, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*

1. Average warm side ambient temperature 69.80 F
2. Average cold side ambient temperature -0.41 F
3. 15 mph dynamic wind applied to test specimen exterior.
4. 0.0" $\pm$0.04" static pressure drop across specimen.

Test Results Summary:

1. Condensation resistance factor - Frame (CRF_f) 54
   Condensation resistance factor - Glass (CRF_g) 61
2. Thermal transmittance due to conduction (U) 0.46
   (U-factors expressed in Btu/hr·ft^2·F)

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Test Sample Description:

CONSTRUCTION	Frame
Size (in.)	78-3/4" x 78-3/4"
Daylight Opening (in.)	36-3/8" x 74-3/8" (x2)
CORNERS	Butted
Fasteners	Screws
Sealant	Yes
MATERIAL	AP (0.23")*
Color Exterior	Gray
Finish Exterior	Anodized
Color Interior	Gray
Finish Interior	Anodized
GLAZING METHOD	Exterior

*Snap in filler was slotted with 5-1/2" slot and a 1/2" skip

Glazing Information:

Layer 1	1/4" Clear Tempered
Gap 1	0.53" Gap, Azon Warm-Light® Spacer (A2-D), Air-Filled*
Layer 2	1/4" PPG Sungate 500 (e=0.215*, #3) Tempered
Gas Fill Method	N/A*
Desiccant	Yes

**Stated per Client/Manufacturer*
NA Non-Applicable
See Description Table Abbreviations

Test Sample Description: (Continued)

COMPONENTS		
Type	**Quantity**	**Location**
WEATHERSTRIP		
EPDM glazing gasket	1 row	Interior and exterior glazing perimeter
HARDWARE		
Aluminum glass stops	2	Exterior sill
AT (0.25") sill flashing	1	Sill
(0.63" x 3.50") Wood Block	2	Jambs
AT (0.26") closer plate	2	Head
DRAINAGE		
No visible weeps		

Test Duration:

1. The environmental systems were started at 06:34 hours, 04/29/12.

2. The thermal performance test results were derived from 11:43 hours, 04/30/12 to 15:43 hours, 04/30/12.

Condensation Resistance Factor (CRF):

The following information, condensed from the test data, was used to determine the condensation resistance factor:

T_h	=	Warm side ambient air temperature	69.80 F
T_c	=	Cold side ambient air temperature	-0.41 F
FT_p	=	Average of pre-specified frame temperatures (14)	39.91 F
FT_r	=	Average of roving thermocouples (4)	27.33 F
W	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))] \times 0.40$	0.166
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	37.82 F
GT	=	Glass Temperature	42.35 F
CRF_g	=	Condensation resistance factor – Glass	61
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	54
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 54 (on the size as reported). When reviewing this test data, it should be noted that the frame temperature (FT) was colder than the glass temperature (GT) therefore controlling the CRF number. Refer to the 'CRF Report' page and the 'Thermocouple Location Diagram' page of this report.

Thermal Transmittance (U_c):

T_h	=	Average warm side ambient temperature	69.80 F
T_c	=	Average cold side ambient temperature	-0.41 F
P	=	Static pressure difference across test specimen 15 mph dynamic perpendicular wind at exterior	0.00 psf
Nominal sample area			43.07 ft^2
Total measured input to calorimeter			1450.32 Btu/hr
Calorimeter correction			73.38 Btu/hr
Net specimen heat loss			1376.94 Btu/hr
U	=	Thermal Transmittance	0.46 $Btu/hr \cdot ft^2 \cdot F$

Glazing Deflection (in.):

	Left Glazing	Right Glazing
Edge Gap Width	0.53	0.53
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.53	0.53
Center gap width at laboratory ambient conditions on day of testing	0.53	0.53
Center gap width at test conditions	0.44	0.41

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

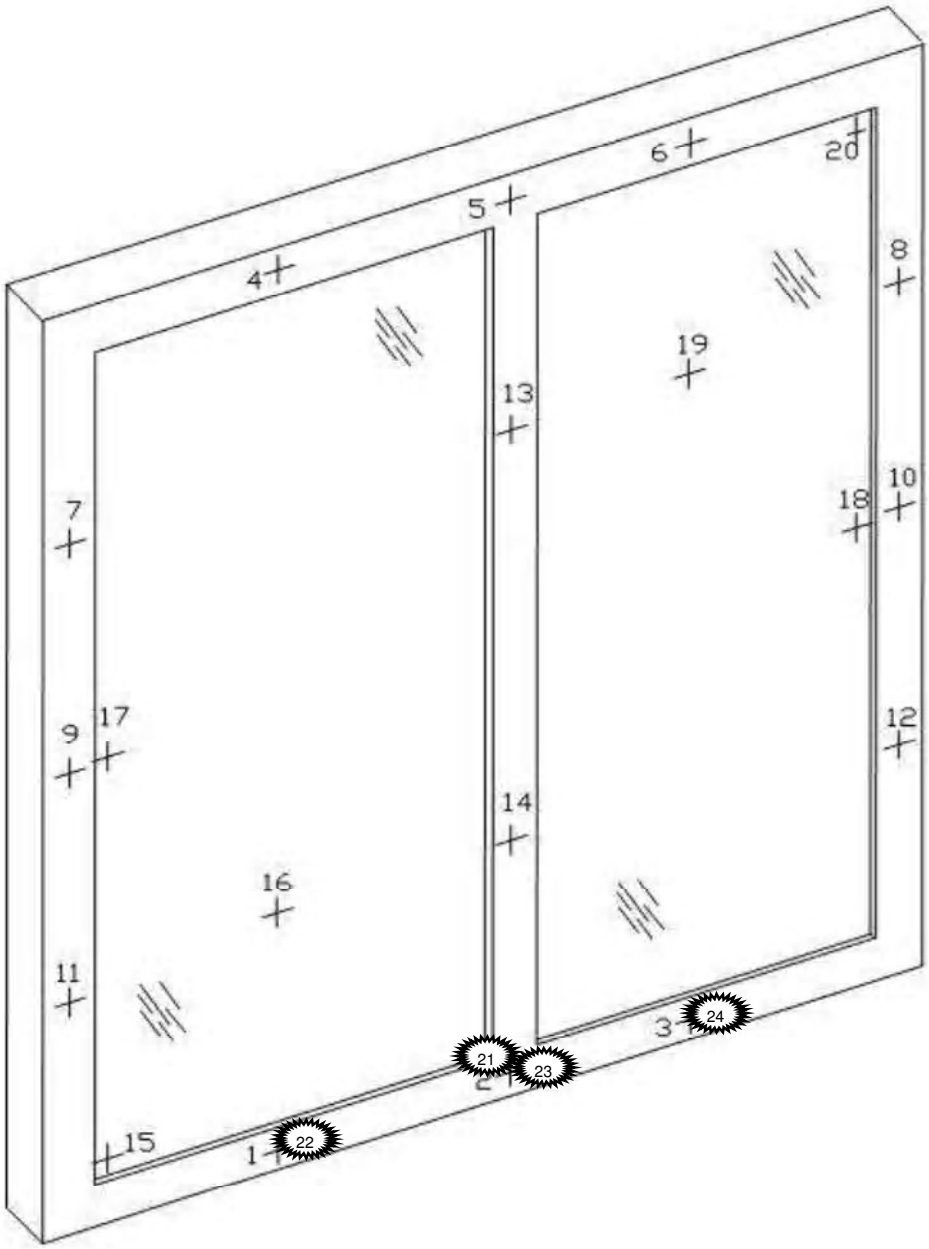
A calibration of the Architectural Testing Inc. 'thermal test chamber' (ICN 000001) in York, Pennsylvania was conducted in May 2011 in accordance with Architectural Testing Inc. calibration procedure.

Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

CRF Report

Time:	13:43	14:13	14:43	15:13	15:43	AVERAGE
Pre-specified Thermocouples - Frame						
1	27.26	27.26	27.20	27.23	27.16	27.22
2	29.25	29.31	29.25	29.24	29.26	29.26
3	27.21	27.39	27.37	27.22	27.26	27.29
4	45.72	45.78	45.86	45.79	45.71	45.77
5	41.66	41.73	41.74	41.77	41.75	41.73
6	47.21	47.20	47.22	47.25	47.19	47.21
7	47.55	47.58	47.53	47.61	47.59	47.57
8	48.79	48.85	48.79	48.87	48.76	48.81
9	46.14	46.14	46.13	46.16	46.14	46.14
10	45.46	45.44	45.45	45.46	45.42	45.45
11	40.98	40.94	41.00	40.97	40.96	40.97
12	39.94	39.93	39.92	39.92	39.92	39.93
13	39.90	40.01	39.97	40.00	39.90	39.96
14	31.44	31.44	31.45	31.37	31.49	31.44
FT_P	39.89	39.93	39.92	39.92	39.89	39.91
Pre-specified Thermocouples - Glass						
15	30.51	30.53	30.53	30.51	30.53	30.52
16	50.03	50.07	50.03	50.06	50.03	50.04
17	41.75	41.79	41.77	41.80	41.82	41.79
18	41.22	41.24	41.20	41.16	41.18	41.20
19	51.46	51.44	51.44	51.48	51.42	51.45
20	39.11	39.11	39.07	39.08	39.10	39.09
GT	42.34	42.36	42.34	42.35	42.35	42.35
Cold Point (Roving) Thermocouples						
21	25.50	25.50	25.50	25.50	25.50	25.50
22	27.20	27.20	27.20	27.20	27.20	27.20
23	27.30	27.30	27.30	27.30	27.30	27.30
24	29.30	29.30	29.30	29.30	29.30	29.30
FT_R	27.33	27.33	27.33	27.33	27.33	27.33
W	0.17	0.17	0.17	0.17	0.17	0.17
FT	37.81	37.84	37.83	37.82	37.81	37.82
Warm Side - Room Ambient Air Temperature						
	69.82	69.80	69.81	69.80	69.78	69.80
Cold Side - Room Ambient Air Temperature						
	-0.40	-0.42	-0.44	-0.39	-0.41	-0.41
CRF_f	54	54	54	54	54	54
CRF_g	61	61	61	61	61	61

Thermocouple Location Diagram



Cold Point Locations

21. 25.50
22. 27.20
23. 27.30
24. 29.30

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. Results obtained are tested 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 specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Digitally Signed by: Ryan P. Moser

Ryan P. Moser
Technician

Digitally Signed by: Shon W. Einsig

Shon W. Einsig
Senior Technician
Individual-In-Responsible-Charge

RPM:amg
B6913.02-116-46

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix-A: Description Table Abbreviations (1)
Appendix-B: Drawings (10)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.02R0	06/19/12	All	Original Report Issue. Work requested by Steve Wilkening of Tubelite, Inc.

Appendix A: Description Table Abbreviations

CODE	Frame / Sash Types
AI	Aluminum w/ Vinyl Inserts (Caps)
AL	Aluminum
AP	Aluminum w/ Thermal Breaks - Partial
AS	Aluminum w/ Steel Reinforcement
AT	Aluminum w/ Thermal Breaks - All Members (≥ 0.21")
AU	Aluminum Thermally Improved - All Members (0.062" - 0.209")
AV	Aluminum / Vinyl Composite
AW	Aluminum-clad Wood
FG	Fiberglass
PA	ABS Plastic w/ All Members Reinforced
PC	ABS Plastic-clad Aluminum
PF	ABS Plastic w/ Foam-filled Insulation
PH	ABS Plastic w/ Horizontal Members Reinforced
PI	ABS Plastic w/ Reinforcement - Interlock
PL	ABS Plastic
PP	ABS Plastic w/ Reinforcement - Partial
PV	ABS Plastic w/ Vertical Members Reinforced
PW	ABS Plastic-clad Wood
ST	Steel
VA	Vinyl w/ All Members Reinforced
VC	Vinyl-clad Aluminum
VF	Vinyl w/ Foam-filled Insulation
VH	Vinyl w/ Horizontal Members Reinforced
VI	Vinyl w/ Reinforcement - Interlock
VP	Vinyl w/ Reinforcement - Partial
VV	Vinyl w/ Vertical Members Reinforced
VW	Vinyl-clad Wood
VY	Vinyl
WA	Aluminum / Wood composite
WD	Wood
WV	Vinyl / Wood composite
WF	Fiberglass/Wood Combination
WC	Composite/Wood Composite (Shaped vinyl/wood composite members)
CW	Copper Clad Wood
CO	Vinyl/Wood Composite Material

CODE	Spacer Types (See sealant)
A1	Aluminum
A2	Aluminum (Thermally-broken)
A3	Aluminum-reinforced Polymer
A4	Aluminum / Wood
A5	Aluminum-reinforced Butyl (Swiggle)
A6	Aluminum / Foam / Aluminum
A7	Aluminum U-shaped
A8	Aluminum-Butyl (Corrugated) (Duraseal)
ER	EPDM Reinforced Butyl
FG	Fiberglass
GL	Glass
OF	Organic Foam
P1	Duralite
PU	Polyurethane Foam
SU	Stainless Steel, U-shaped
CU	Coated Steel, U-shaped (Intercept)
S2	Steel (Thermally-broken)
S3	Steel / Foam / Steel
S5	Steel-reinforced Butyl
S6	Steel U-channel w/ Thermal Cap
SS	Stainless Steel
CS	Coated Steel
TP	Thermo-plastic
WD	Wood
ZE	Elastomeric Silicone Foam
ZF	Silicone Foam
ZS	Silicone / Steel
N	Not Applicable
TS	Thermo-plastic w/ stainless steel substrate

CODE	Tint Codes
AZ	Azurlite
BL	Blue
BZ	Bronze
CL	Clear
EV	Evergreen
GD	Gold
GR	Green
GY	Gray
LE	Low 'e' Coating
OT	Other (use comment field)
RC	Solar or Reflective Coating
RG	Roller Shades between glazing
RS	Silver (reflective coating)
SF	Suspended Polyester Film
SR	Silver
BG	Blinds between the Glazing
DV	Dynamic Glazing-Variable
DY	Dynamic Glazing-NonVariable

CODE	Gap Fill Codes
AIR	Air
AR2	Argon/Krypton Mixture
AR3	Argon / Krypton / Air
ARG	Argon/Air
CO2	Carbon Dioxide
KRY	Krypton/Air
SF6	Sulfur Hexaflouride
XE2	Xenon/Krypton/Air
XE3	Xenon/Argon/Air
XEN	Xenon/Air
N	Not Applicable

DOOR DETAILS	
N	Not Applicable

CODE	Door Type
EM	Embossed
FL	Flush
LF	Full Lite
LH	1/2 - Lite
LQ	1/4 - Lite
LT	3/4 - Lite
RP	Raised Panel

CODE	Skin
AL	Aluminum
FG	Fiberglass
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl

CODE	Panel
FG	Fiberglass
PL	Plastic
WP	Wood - Plywood
WS	Wood - Solid

CODE	Sub-Structure
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl

CODE	Core Fill
CH	Cellular - Honeycomb
EP	Expanded Polystyrene
PI	Polyisocyanurate
PU	Polyurethane
WP	Wood - Plywood
WS	Wood - Solid
XP	Extruded Polystyrene

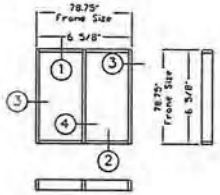
CODE	Spacer Sealant
D	Dual Seal Spacer System
S	Single Seal Spacer System

CODE	Grid Description
N	No Muntins
G	Grids between glass
S	Simulated Divided Lites
T	True Muntins

CODE	Grid Size Codes
	Blank for no grids
0.75	Grids < 1"
1.5	Grids >= 1"

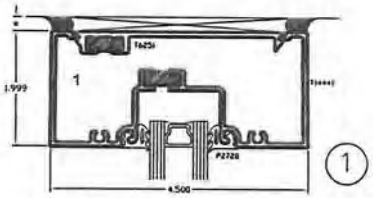
CODE	Thermal Breaks
F	Foam
U	Urethane
V	Vinyl
FB	Fiberglass
O	Other
AB	ABS
NE	Neoprene
AI	Air
N	Not Applicable
P	Polyamide

Appendix B: Drawings



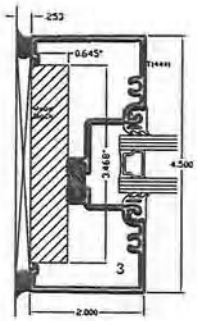
T-14000: Flush Glaze Series Thermal Mock Up #1

T-14000 Flush glaze Series Mock Up
SCALE: 1/4" = 1'-0"



1

180HEAD5 (DIFF CAP)



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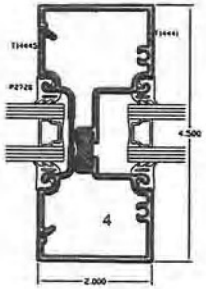
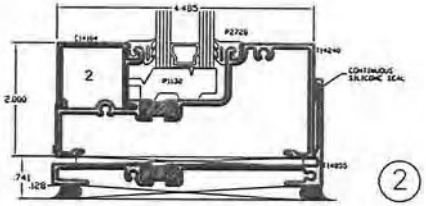


4

180VERT



2

180SILL3

02/06/12

TUBELITE

Architectural Testing

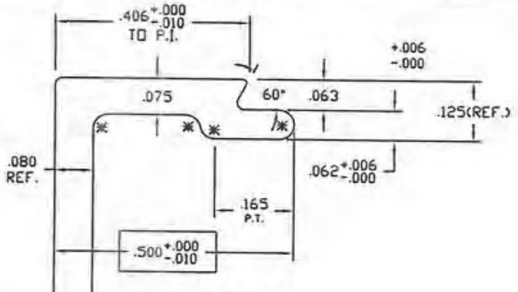
Test sample complies with these details.
Deviations are noted.

Report# 06913

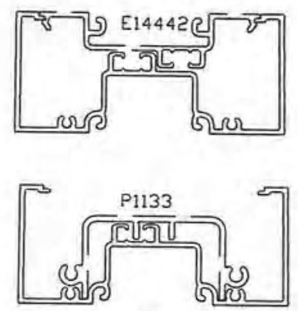
Date 4/30/12 Tech CM

E14441

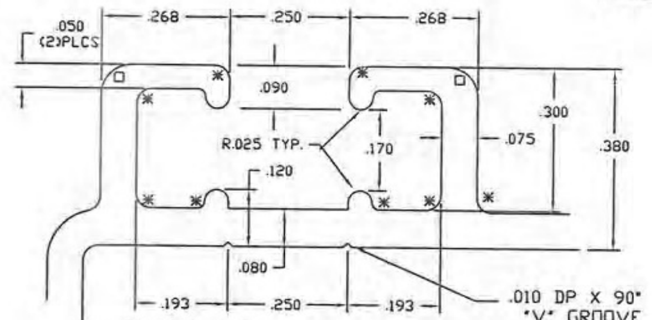
Debridged 0.23



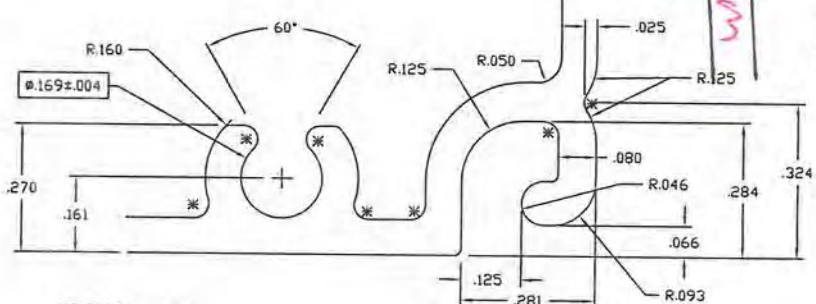
DETAIL 'A'
FOUR TIMES SIZE



HALF SIZE ASSEMBLY



DETAIL 'B'
FOUR TIMES SIZE



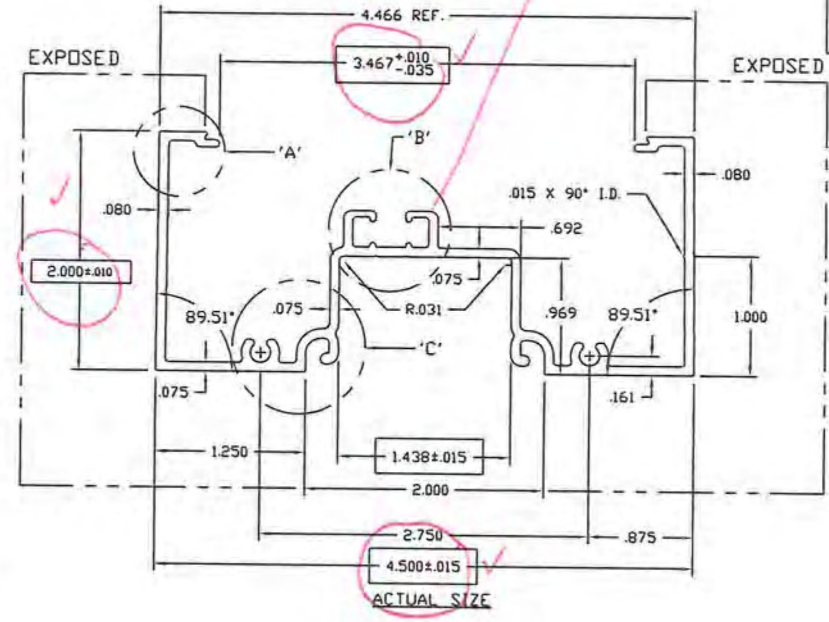
DETAIL 'C'
FOUR TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6913

Date 4/30/12 Tech EPM



MATES WITH E14442, E14445 AND P1133 CLIP

□ INDICATES .062 RADIUS

▭ INDICATES CRITICAL DIMENSION

LANCED AND FULLY DEBRIDGE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED CORNERS .015R

✱ INDICATES .031 RADIUS

TUBELITE DEPENDABLE

4878 MACKINAW TRAIL
REED CITY, MICHIGAN 49677

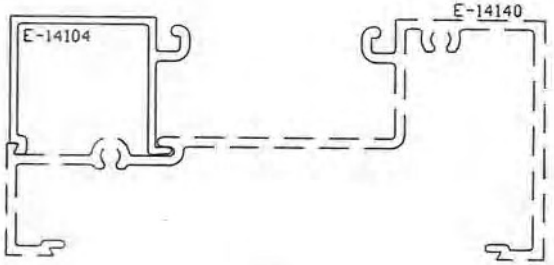
REV	DATE	DESCRIPTION	INTL

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 54:1
PERIMETER OUT (TOTAL) 26.406		AREA 1.029	WGT/FT 1.210
FACTOR 22	CIRCLE SIZE 4.913		INFILL VOLUME .164
RXX 1.583	SXX 1.136	IXX 2.579	CXX 2.271
RYY .621	SYY .315	IYY .397	CYY 1.258

THERM. HEAD/JAMB/VERTICAL 2" X 4 1/2"
T14000 THERMAL STOREFRONT

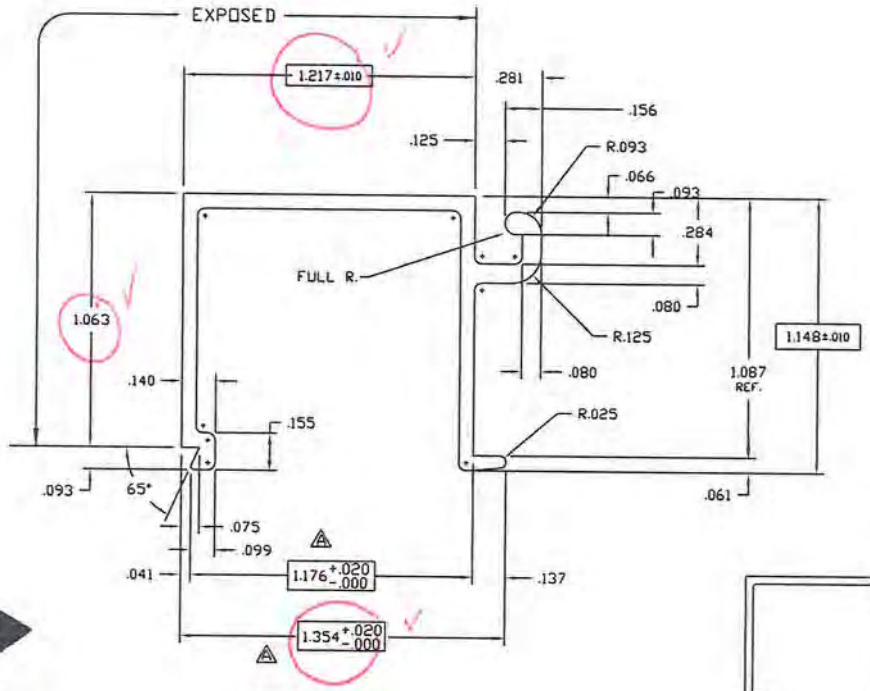
DRAWN BY CRH	DRWG DATE 10/25/10	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 180	E14441	REV

E14104 B



ASSEMBLY

NOTE : MATES WITH E-14140 AND E-14103



TWO TIMES SCALE

SCALE: FULL

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6913

Date 7/30/10 Tech [illegible]

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE

LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

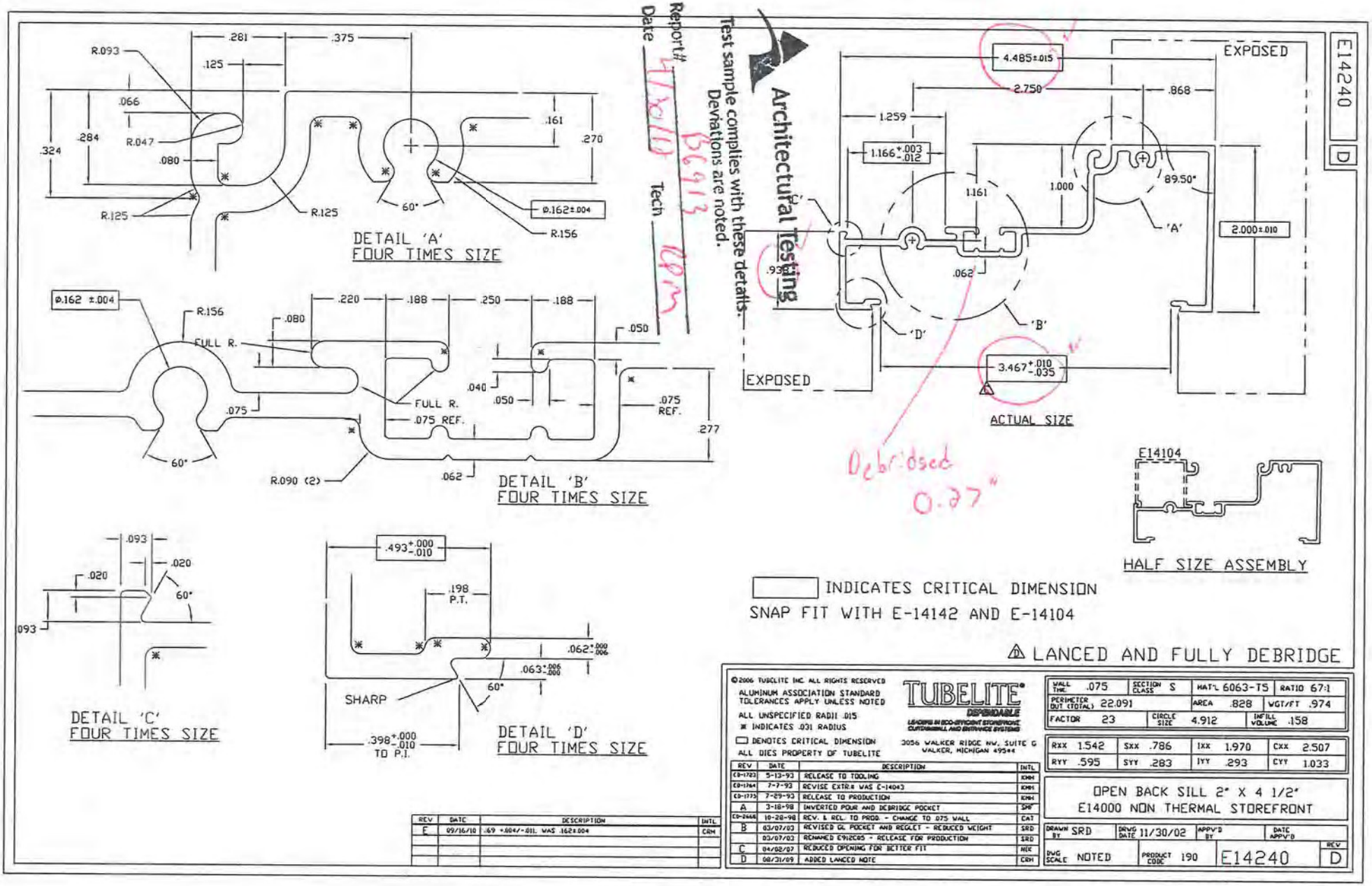
REV	DATE	DESCRIPTION	INTL
	4/1/93	RELEASE TO TOOLING	KMH
	5/18/93	RELEASE TO PRODUCTION	KMH
	7/7/93	REVISE EXTR. # WAS E-14003	KMH
A	12/2/97	REVISE TOLERANCES	KMH
B	3/18/98	REV. & REL. TO PROD./TOL. CHANGE NOTED AS	SHF

WALL THK. .060	SECTION CLASS S	MAT'L 6063-T5	RATIO 70
PERIMETER OUT (TOTAL) 8.270		AREA .264	WGT/FT .310
FACTOR 27	CIRCLE SIZE 1.784		INFILL VOLUME N/A

RXX .550	SXX .106	IXX .080	CXX .757
RYY .374	SYY .049	IYY .037	CYY .749

GLASS STOP FOR 1" GLASS
E14000 NON THERMAL STOREFRONT

DRAWN BY KMH	DRVG DATE 03/11/93	APPV'D BY	DATE APPV'D	
DVG SCALE NOTED	PRODUCT CODE 190	E14104		REV B



E14240 D

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
CD-1723	5-13-93	RELEASE TO TOOLING	KMH
CD-1764	7-7-93	REVISE EXTR.# WAS E-14043	KMH
CD-1775	7-29-93	RELEASE TO PRODUCTION	KMH
A	3-18-98	INVERTED POUR AND DEBRIDGE POCKET	SHP
CD-2668	10-28-98	REV. & REL. TO PROD. - CHANGE TO .075 WALL	CAT
B	03/07/03	REVISED GL POCKET AND REGLET - REDUCED WEIGHT	SRD
	03/07/03	RENAMED E912C05 - RELEASE FOR PRODUCTION	SRD
C	04/02/07	REDUCED OPENING FOR BETTER FIT	MJE
D	08/31/09	ADDED LANCED NOTE	CRM

REV	DATE	DESCRIPTION	INTL
E	09/16/10	.169 +.004/-.011. WAS .162±.004	CRM

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 67:1
PERIMETER OUT (TOTAL) 22.091		AREA .828	WGT/FT .974
FACTOR 23	CIRCLE SIZE 4.912	INFILL VOLUME .158	

RXX 1.542	SXX .786	IXX 1.970	CXX 2.507
RYY .595	SYY .283	IYY .293	CYY 1.033

OPEN BACK SILL 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

DRAWN BY SRD	DRWG DATE 11/30/02	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14240		REV D

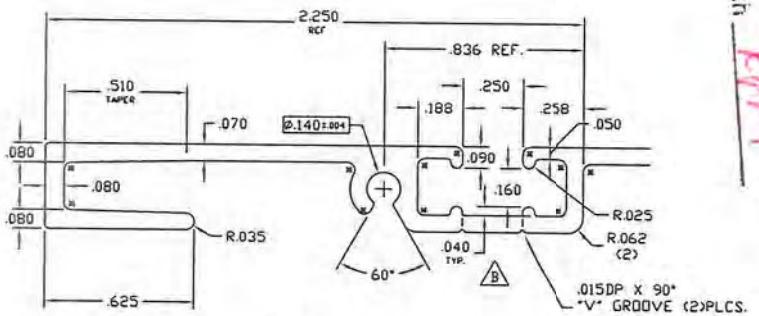
Architectural Testing

Test sample complies with these details.
Deviations are noted.

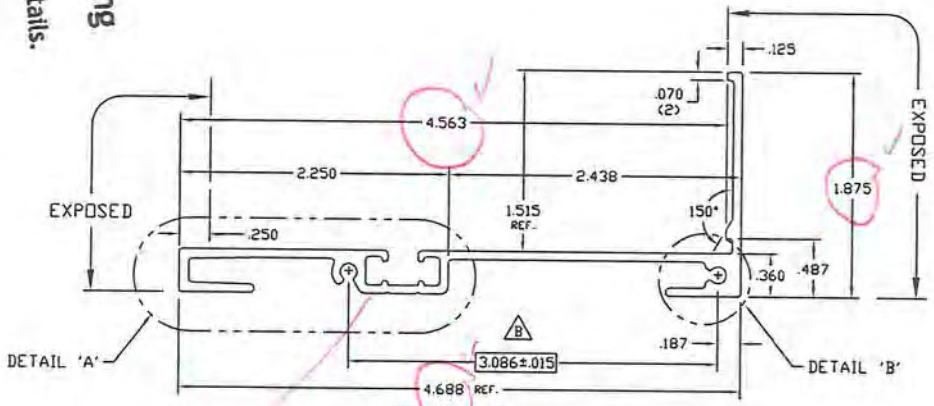
Report # B6913

Date 4/30/10 Tech [illegible]

E14055 B

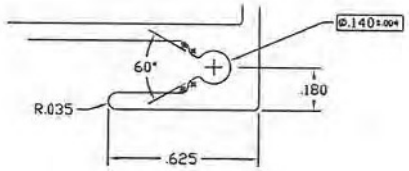


DETAIL "A"
SCALE: 2X



ACTUAL SIZE

Debr. dyed 0.75"



DETAIL "B"
SCALE: 2X

DO NOT USE AS AN E PART
(NON-THERMAL PART)

INDICATES CRITICAL DIMENSION

B LANCED AND FULLY DEBRIDGE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INITL
	10/23/98	RELEASE TO TOOLING	CAT
	1/28/99	RELEASE TO PRODUCTION	CAT
	8/26/99	ADDED EXPOSED AREAS	CRH
A	03/13/06	REVISED P&D CAVITY FOR AZOBRADE	JEM
B	07/31/09	REVISED P&D CAVITY FOR LANCER, ADDED SCREW BOSSES	CRH
			CRH

WAS E908J04

WALL THK. 0.070	SECTION CLASS S	MAT'L 6063-T5	RATIO 80:1
PERIMETER OUT (TOTAL) 18.048		AREA .688	WGT/FT .809
FACTOR 22	CIRCLE SIZE 5.037		INFILL VOLUME .155

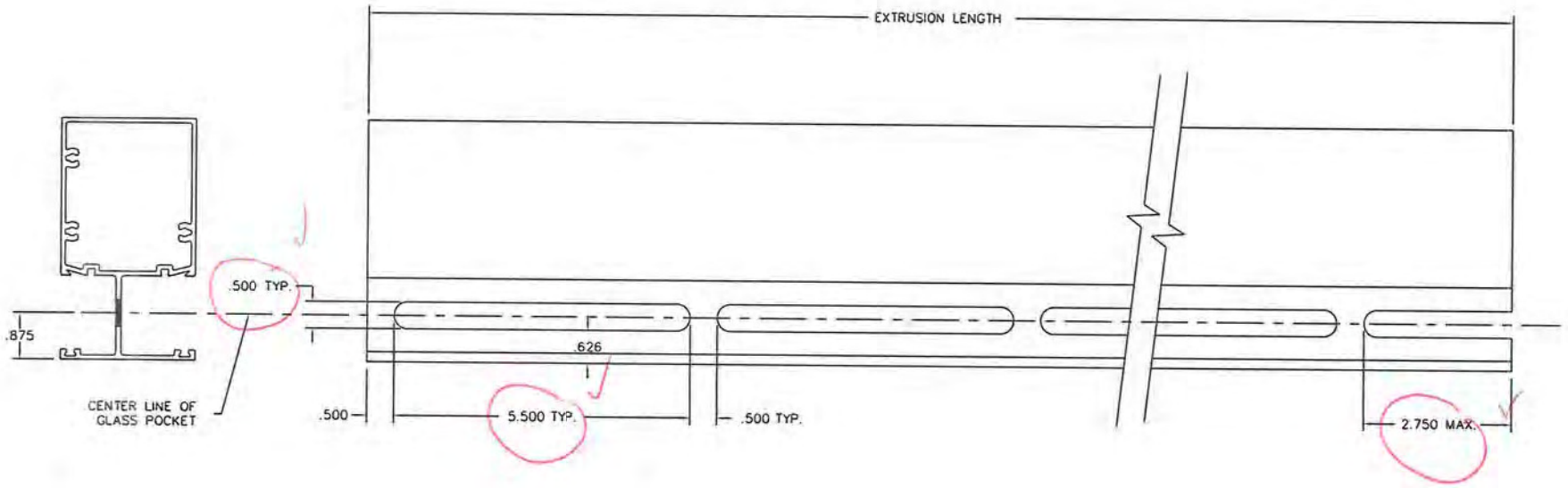
RXX 1.647	SXX .684	IXX 1.864	CXX 2.726
RYY .398	SYY .073	IYY .109	CYY 1.502

THERMAL SILL FLASHING 1 7/8" X 4 11/16"
T14000 THERMAL STOREFRONT

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D
CAT	10/23/98		

DVG SCALE	PRODUCT CODE		REV
NOTED	180	E14055	B

D-0123



NOTE: T-1950 SHOWN. SLOTTING OF OTHER SHAPES WILL BE SIMILAR.

Architectural Testing

Test sample complies with these details. Deviations are noted.

Report # B6913

Date 4/30/93 Insp. PSM

ALUMINUM ASSOCIATION STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS NOTED

▭ DENOTES O.C. CHECK POINTS

ALL CORNERS .015R UNLESS NOTED

+ INDICATES .031 RADIUS

TUBELITE
ARCHITECTURAL PRODUCTS
REED CITY MICHIGAN 49677

REVISIONS

ED NUMBER	DATE	DESCRIPTION	INITL
ED-1698	02/25/93	REPLACES LOST DWG DATED 2/23/89	REW

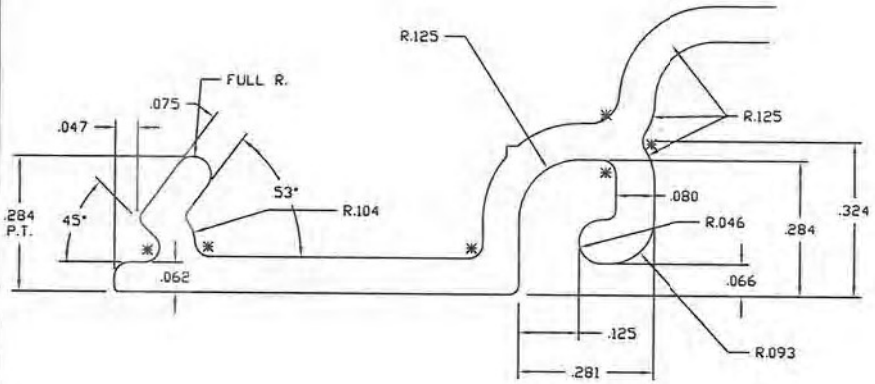
WALL THK.	SECTION CLASS	MATERIAL	RATIO
PRESS	CIRCLE SIZE	HOLES	FACTOR

PERIMETER OUT (TOTAL)	AREA	WGT/FT
RXX	SXX	IXX	CXX
RYY	SYY	IYY	CYY

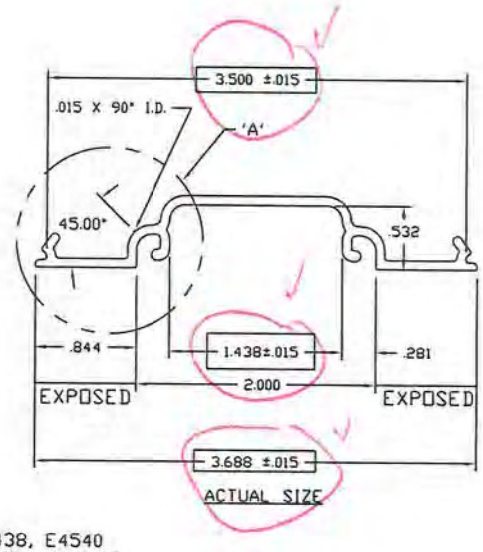
THERMAL SLOTTING STANDARD

DRAWN BY WESTERBURG	CHECKED BY	CHECK DATE
DRWG DATE 2/25/93	SCALE 1/2	REV
FACTORY ORDER NO.	K/V/RC	D-0123
COMMODITY CODE	PRODUCT CODE	

E14445



DETAIL 'A'
FOUR TIMES SIZE



MATES WITH:
E0405, E1435, E1438, E4540
E4541, E4544, E4545, E14047
E14052, E14140, E14141, E14144
E14240, E14241, E14243, E45005
E14441

SLOTTED FOR THERMAL USE

INDICATES CRITICAL DIMENSION

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL

WALL THK .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 1.341
PERIMETER OUT (TOTAL) 10.808		AREA .411	WGT/FT .484
FACTOR 22	CIRCLE SIZE 3.688	INFILL VOLUME N/A	

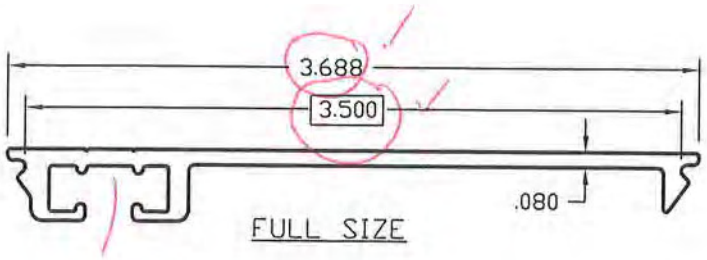
Rxx 1.086	Sxx .263	Ixx .485	Cxx 1.845
Ryy .214	Syy .055	Iyy .019	Cyy .340

SNAP IN FILLER WITH POCKET
E14000 NON THERMAL STOREFRONT

DRAWN BY CRH	DWG DATE 10/25/10	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14445		REV

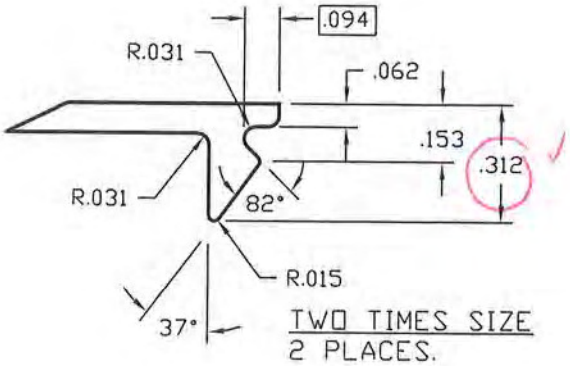
Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report# B6913
Date 4/30/11 Tech RDM

E6251 A

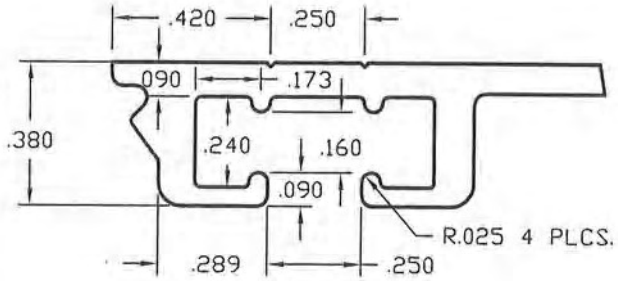


FULL SIZE

Debridged 0.06"



TWO TIMES SIZE
2 PLACES.



2 PLACES TYP.

TWO TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6913

Date 4/30/12 Tech RPM

POURED AND DEBRIDGE - FULL
THERE ARE NO EXPOSED SURFACES

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

ALL DIES PROPERTY OF TUBELITE

TUBELITE®
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	~~03/10/08~~	~~RELEASE FOR TOOLING~~	NIK
	04-01-08	RELEASE FOR PRODUCTION	NIK
A	04-28-08	REMOVED AZOBRADED NOTE	NIK

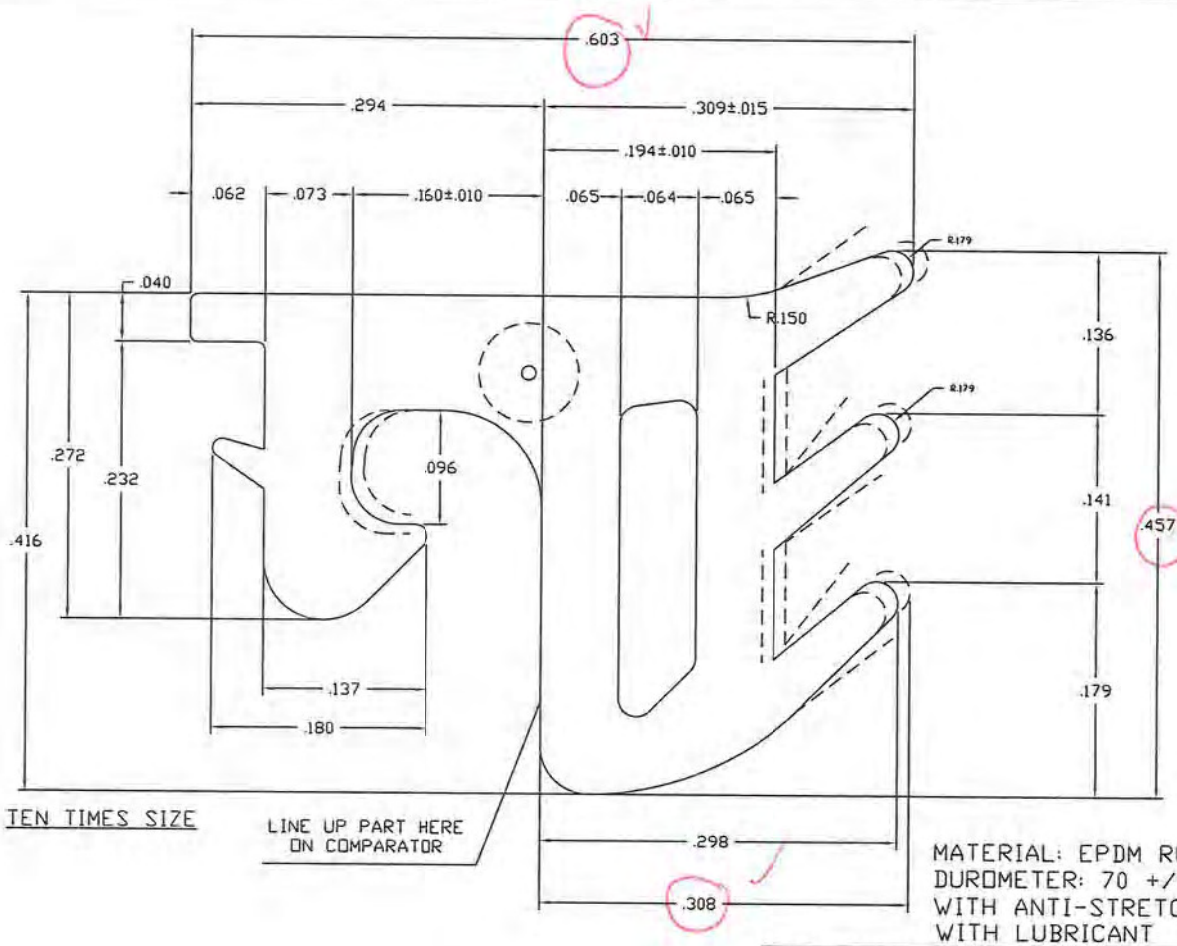
WALL THK. .080	SECTION CLASS S	MAT'L 6063-T5	RATIO 134
PERIMETER OUT (TOTAL) 9.982		AREA .412	WGT/FT .484
FACTOR 21	CIRCLE SIZE 4.5		INFILL VOLUME .158

RXX 1.153	SXX .264	IXX .548	CXX 2.075
RYY .101	SYY .015	IYY .004	CYY .286

THERMALLY BROKEN FLAT CLOSER PLATE
THERMAL DOOR

DRAWN BY NIK	DRWG DATE 02/18/08	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 111	E6251	REV A

P2728



TEN TIMES SIZE

LINE UP PART HERE ON COMPARATOR

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6913

Date 4/30/10

MATERIAL: EPDM RUBBER WITH ANTI-STRETCH CORD
DUROMETER: 70 +/- 5
WITH ANTI-STRETCH CORD
WITH LUBRICANT

ACTUAL SIZE

ACCEPTABLE STRING LOCATION

ALL TOLERANCES ARE RMA CLASS II UNLESS OTHERWISE NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

DENOTES CRITICAL DIMENSION

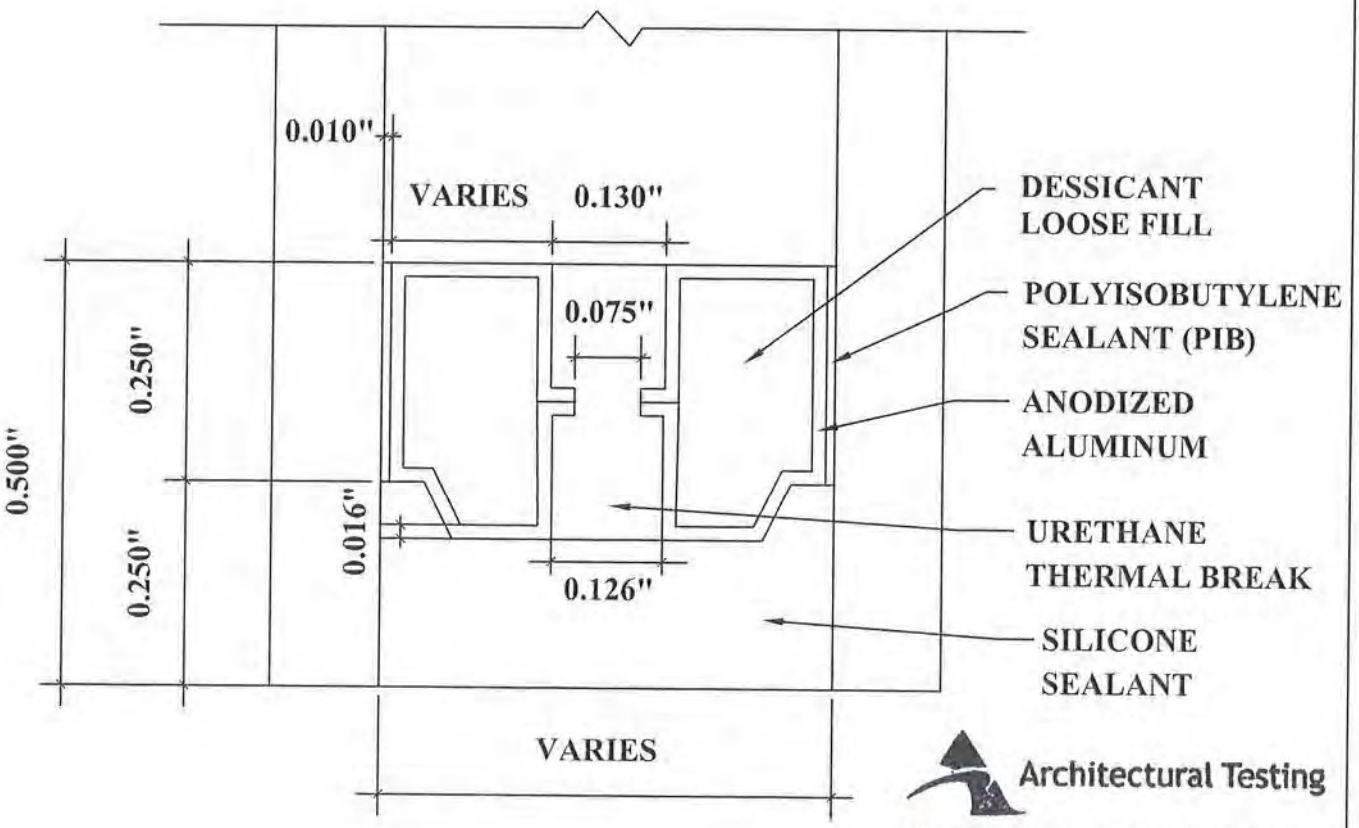
REV	DATE	DESCRIPTION	INTL
	08/20/09	RELEASE FOR PRODUCTION	MSJ

TUBELITE®
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

ROLL-IN GLAZING GASKET
14000 AND 4500 STOREFRONT SYSTEMS

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D	REV
JEM	08/14/09			
DRVG SCALE	PRODUCT CODE			
NOTED	190	P2728		



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B6913

Date 4/30/12 Tech RBM

DETAIL FOR THERMAL MODELING OF
AZON WARM-LIGHT SPACER (A2-D)