Architectural Testing

AAMA 501
TEST REPORT

Report Number: C1529.01-450-44

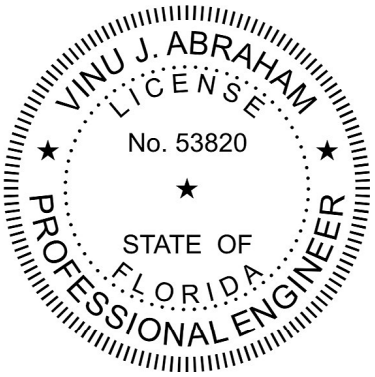
Rendered to:

Tubelite, Inc.
Walker, Michigan

MODEL DESIGNATION: E4500
PRODUCT TYPE: Non-Thermal Storefront

This report contains in its entirety:

Cover Page:	1 page
Report Body:	10 pages
Appendix A:	2 pages
Appendix B:	6 sheets
Appendix C:	34 pages
Appendix D:	21 sheets
Appendix E:	1 page
Alteration Log:	1 page
Revision Log:	1 page



Digitally Signed by: Vinu Abraham

2012.10.26 14:36:50 -04'00'

Test Dates:	09/13/12
Through:	09/21/12
Report Date:	10/26/12

1.0 CLIENT IDENTIFICATION

1.1 Report Issued To: Tubelite, Inc.
3056 Walker Ridge Drive NW
Walker, Michigan 49544

1.2 Contact Person: Tram Trinh

2.0 LABORATORY IDENTIFICATION

2.1 Laboratory Location: Architectural Testing, Inc.
6655 Garden Rd
Riviera Beach, Florida 33404

2.2 Laboratory Phone Number: 561.881.0020

3.0 PROJECT SUMMARY

3.1 Introduction: Tubelite, Inc. retained Architectural Testing to conduct AAMA 501 testing on their E4500 Non-Thermal Storefront.

3.2 Summary of Test Results: Table 1 provides a summary of the test results for each test specimen. Testing commenced September 13, 2012 and was completed September 21, 2012.

Table 1: Summary of Results

Specimen #	Test Method	Test Conditions	Test Conclusion
1 and 2	Air Infiltration Test (AAMA 501-05 and ASTM E283-04)	75 and 300 Pa (1.57 and 6.24 psf)	PASS
	Water Infiltration Test (AAMA 501-05 and ASTM E331-00)	575 Pa (12 psf)	PASS
	Dynamic Water Infiltration Test (AAMA 501.1-05)	575 Pa (12 psf)	PASS
	Static Load Test (AAMA 501-05 and ASTM E330-02)	+1436/-1436 Pa (+30/-30 psf) Design Wind Load	PASS

3.3 Test Record Retention End Date: All test records for this report will be retained until October 26, 2016.

4.0 APPLICABLE TEST METHODS, SPECIFICATIONS, AND PROTOCOLS

AAMA 501-05 – Methods of Tests for Exterior Walls
AAMA 501.1-05 – Standard Test Method for Water Penetration of Windows, Curtainwalls and Doors Using Dynamic Pressure
ASTM E283-04 – Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
ASTM E330-02 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
ASTM E331-00 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

5.0 TEST SPECIMEN IDENTIFICATION

5.1	Test Specimen Type:	Non-Thermal Storefront
5.2	Model Designation:	E4500 Series
5.3	Overall Size:	Specimen #1: 3450 mm (136") w x 3280 (129") h Specimen #2: 3850 mm (151") w x 3660 mm (144") h
5.4	Number of Operable Door Leaves:	None tested
5.5	Configuration:	O/O-O/O-O/O
5.6	Drawings:	Test specimen construction was verified by Architectural Testing per the drawings located in Appendix B. Any deviations are documented herein and/or on the drawings.
5.7	Test Specimen Source:	Tubelite, Inc. provided the test specimens.

6.0 TEST SPECIMEN DESCRIPTION

6.1 Frame Construction

Each frame was fabricated using the aluminum extrusions defined in Table 2.

Table 2: Aluminum Extrusion Details

Specimen #	Frame Member	Part #	Material	Description
1	Head and jamb	E4541	6063-T5	Non-thermally broken extrusion
2	Head, jamb and intermediate vertical mullions			
1 and 2	Flat snap-in filler	P1745	6063-T5	150 mm (6") long - snap-fit to the head and jambs at each anchor location
1 and 2	Sill	E4540	6063-T5	Non-thermally broken extrusion
1 and 2	Intermediate horizontal mullion at left and right bays			
1 and 2	Snap-in filler	E4542	6063-T5	Snap-fit to the intermediate horizontal mullion at left and right bays
2				Snap-fit to the intermediate vertical mullions
1 and 2	Intermediate horizontal mullion at center bay	E4503	6063-T5	Non-thermally broken extrusion
1	Intermediate vertical mullions	E4552	6063-T5	Non-thermally broken extrusion
1 and 2	Sill flashing	E14059	6063-T5	Non-thermally broken extrusion
1 and 2	Glass stop	E4504	6063-T5	Snap-fit to the intermediate horizontal mullions and sills

6.1.1 Corner Construction

At each frame corner the vertical frame members ran through and the horizontal frame members were square cut, butted and mechanically attached via a frame clip. The additional details of the corner construction are described in Table 3. See "4500 Series Fabrication and Installation Instructions", "FRAME INSTALLATION INSTRUCTIONS" section for joint sealant and end dam details.

Table 3: Corner Construction

Specimen #	Location	Construction Details
1	Top corners	31.8 mm (1.25") long frame clip (Part # P532) was attached to the vertical frame member using two (2), #10-24 x 1-3/4" PH self-tapping (Type F) screws (Part # S009) and was attached to the head using two (2), #10-18 x 3/4" PH self-tapping screws. Each head fastener was sealed.
1	Intermediate horizontals and bottom corners	31.8 mm (1.25") long frame clip (Part # P531) was attached to the vertical frame member using two (2), #10-24 x 1-3/4" PH self-tapping (Type F) screws (Part # S009) and was attached to the horizontal using two (2), # 10-18 x 3/4" PH self-tapping screws. Each horizontal fastener was sealed.
2	Intermediate horizontal at center bay	Attached to the vertical frame member at each end using three (3), 10-24 x 1" HH (Type 23) screws (Part # S202)
2	Typical	Attached to the vertical frame member at each end using two (2), 10-24 x 1" HH (Type 23) screws (Part # S202)

6.2 Mullion Reinforcement

The vertical mullion members were reinforced using the parts defined in Table 4.

Table 4: Vertical Reinforcement Details

Specimen #	Item #	Dimensions	Material	Description
1	None tested			
2	P1437	28.58 mm x 104.8 mm x 3.18 mm (1.125" x 4.125" x 0.125")	Steel	3560 mm (140") long rolled steel centered in the intermediate vertical mullions – attached using a single row of #10-24 x 3/4" SS FH screws spaced at 410 mm (16") on center.

6.3 Glazing Details

6.3.1 Glazing Materials

Glass Types C and D both consisted of 6.4 mm (1/4") thick (nominal) clear tempered glass.

6.3.2 Glazing Method

Each glass lite used in the test specimen was exterior glazed at both the interior and exterior sides using a 70±5 durometer EPDM gasket (Part # P2728). The gasket joints were sealed using butyl sealant. See Appendix E, "Photographs" for a depiction of this sealant.

6.3.3 Daylight Opening and Glass Bite

Table 5 provides the daylight opening and glass bite for each lite used in each test specimen.

Table 5: Daylight Opening Size and Glass Bite Details

Specimen #	Quantity	Glazing Material Type	Location	Daylight Opening Size	Glass Bite
1	1	D	Bottom row, center lite	1100 mm x 1567 mm (43" x 61-11/16")	7.938 mm (5/16") at the verticals, 14.29 mm (9/16") at the center bay intermediate horizontal and 15.9 (5/8") in all other areas
	5	C	All other areas		
2	1	B	Bottom row, center lite	1200 mm x 1757 mm (48" x 69-3/16")	
	5	A	All other areas		

6.4 Weather Stripping

No weather stripping was used.

6.5 Hardware

No hardware was used.

6.6 Drainage

Table 6 provides details of the drainage openings and accessories used in the test specimens.

Table 6: Weep Slot and Accessory Details

Specimen #	Quantity	Location	Description
1 and 2	Four (4) per sub sill	51 mm (2") from each end of each daylight opening and at the quarter points	6.4 mm x 13 mm (1/4" x 1/2") slot with weep baffle (Part # PTB42)
1 and 2	Two (2) per intermediate horizontal	Corner of each lite	Water diverter (Part # P878) - see "4500 Series Fabrication and Installation Instructions", "FRAME INSTALLATION" section, "Step #6", for water diverter installation details.

7.0 TEST SPECIMEN INSTALLATION

Table 7 provides details of the test specimen installation into the steel opening. The rough opening allowed for a 6.4 mm (1/4") shim space. The test specimen was sealed at the interior and exterior perimeter. Each sill was sealed to the sill flashing at the interior using a continuous bead of silicone sealant. Each anchor at the head and sill flashing was sealed and cap-sealed.

Table 7: Test Specimen Installation Details

Specimen #	Location	Quantity	Anchor Description	Fastener Schedule/Location
1	Head	Six (6)	1/4-20 x 3-3/4" Grade 5 self-drilling FH screws	150 mm (6") on the side of the jambs and 150 (6") on each side of each intermediate vertical
1	Sill flashing	Six (6)	1/4-20 x 1-1/2" Grade 5 self-drilling HH screws	
1	Jambs	Eight (8) per jamb	1/4-20 x 3-3/4" Grade 5 self-drilling FH screws	150 mm (6") from the top end, 150 mm (6") and 368 mm (14-1/2") from the bottom end, and at 460 mm (18") on center thereafter
2	Head	Six (6)	1/4-20 x 2-3/4" Grade 5 self-tapping FH screws	150 mm (6") on the side of the jambs and 150 mm (6") on each side of each intermediate vertical
2	Sill flashing	Six (6)	1/4-20 x 2" Grade 5 self-drilling FH screws	
2	Jambs	Nine (9) per jamb	1/4-20 x 2-3/4" Grade 5 self-tapping FH screws	150 mm (6") from each end and at 460 mm (18") on center thereafter

8.0 TEST SEQUENCE

Table 8 provides a summary of the test sequence for each test specimen.

Table 8: Test Sequence

Test Specimen 1	Test Specimen 2
1. Uniform Static Load Test: Positive Pre-Load	1. Uniform Static Load Test: Positive Pre-Load
2. Air Infiltration Test	2. Air Infiltration Test
3. Water Infiltration Test	3. Water Infiltration Test
4. Dynamic Water Infiltration Test	4. Dynamic Water Infiltration Test
5. Uniform Static Load Test: Positive Design Load	5. Uniform Static Load Test: Positive Design Load
6. Uniform Static Load Test: Negative Pre-Load	6. Uniform Static Load Test: Negative Pre-Load
7. Uniform Static Load Test: Negative Design Load	7. Uniform Static Load Test: Negative Design Load
8. Water Infiltration Test	8. Water Infiltration Test
9. Uniform Static Load Test: Positive Overload	9. Uniform Static Load Test: Positive Overload
10. Uniform Static Load Test: Negative Overload	10. Uniform Static Load Test: Negative Overload

9.0 TEST RESULTS

9.1 Air Infiltration Test

9.1.1 Results

Table 9 provides the results for the air infiltration test.

Table 9: Air Infiltration Test Results

Specimen #	Sequence #*	Test Pressure	Measured	Allowed
1	2	+75 Pa (1.57 psf)	0.00 L/s/m² (0.00 cfm/ft²)	N/A
		+300 Pa (6.24 psf)	0.05 L/s/m² (0.01 cfm/ft²)	0.30 L/s/m² (0.06 cfm/ft²)
2	2	+75 Pa (1.57 psf)	0.00 L/s/m² (0.00 cfm/ft²)	N/A
		+300 Pa (6.24 psf)	0.05 L/s/m² (0.01 cfm/ft²)	0.30 L/s/m² (0.06 cfm/ft²)

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

9.1.2 Conclusion

Architectural Testing observed a measured air infiltration less than the allowed air infiltration through each test specimen; as such, each test specimen satisfies the requirements of AAMA 501-05 and ASTM E 283-04.

9.2 Water Infiltration Test

9.2.1 Results

Table 10 provides the results for the water infiltration test.

Table 10: Water Infiltration Test Results

Specimen #	Sequence #*	Test Pressure	Result
1	3	575 Pa (12.0 psf)	Pass
	8	575 Pa (12.0 psf)	Pass
2	3	575 Pa (12.0 psf)	Pass
	8	575 Pa (12.0 psf)	Pass

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

9.2.2 Conclusion

Architectural Testing observed zero (0) water infiltration through the innermost plane of each test specimens; as such, each test specimen satisfies the requirements of AAMA 501-05 and ASTM E 331-00.

9.3 Dynamic Water Infiltration Test

9.3.1 Results

Table 11 provides the results for the dynamic water infiltration test.

Table 11: Water Infiltration Test Results

Specimen #	Sequence #*	Test Pressure	Result
1	4	575 Pa (12.0 psf)	Pass
2	4	575 Pa (12.0 psf)	Pass

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

9.3.2 Conclusion

Architectural Testing observed zero (0) water infiltration through the innermost plane of each test specimens; as such, each test specimen satisfies the requirements of AAMA 501.1-05.

9.4 Uniform Static Load Test

9.4.1 Deflection Gage Locations

Appendix A shows the deflection gage locations for the uniform static load test.

9.4.2 Ambient Conditions

Table 12 provides the ambient conditions during the uniform static load test.

Table 12: Ambient Conditions

Specimen #	Temperature Range
1	26.0°C – 31.5°C (79°F - 89°F)
2	29.0°C – 31.0°C (84°F - 88°F)

9.4.3 Results

Tables 13 and 14 provide the positive and negative uniform static load test results, respectively. The results are for the deflection gage locations shown in Appendix A. The deflection reported is the overall deflection between three points (longest unsupported span) which accounts for support movement.

Table 13: Positive Uniform Static Load Test Results

Sequence #*	Load	Gage Location	Deflection		Permanent Set	
			Measured	Allowed	Measured	Allowed
Specimen #1						
5	+1436 Pa (+30.00 psf)	C	0.0 mm (0.000 in)	2.6 mm (0.103 in)	0.0 mm (0.000 in)	0.9 mm (0.036 in)
		E	1.5 mm (0.059 in)	6.5 mm (0.256 in)	0.0 mm (0.000 in)	2.3 mm (0.090 in)
		G	18.7 mm (0.736 in)	18.7 mm (0.737 in)	0.3 mm (0.013 in)	6.6 mm (0.258 in)
		I	2.0 mm (0.079 in)	6.5 mm (0.256 in)	0.4 mm (0.014 in)	2.3 mm (0.090 in)
9	+2155 Pa (+45.00 psf)	C	0.0 mm (0.000 in)	N/A	0.1 mm (0.002 in)	1.00 mm (0.036 in)
		E	2.0 mm (0.079 in)		0.5 mm (0.021 in)	2.3 mm (0.090 in)
		G	29.7 mm (1.168 in)		0.1 mm (0.002 in)	6.6 mm (0.258 in)
		I	0.00 mm (0.000 in)		0.1 mm (0.003 in)	2.3 mm (0.090 in)
Specimen #2						
5	+1436 Pa (+30.00 psf)	C	0.0 mm (0.000 in)	2.6 mm (0.103 in)	0.0 mm (0.000 in)	0.9 mm (0.036 in)
		E	1.4 mm (0.054 in)	7.2 mm (0.284 in)	0.2 mm (0.007 in)	2.5 mm (0.100 in)
		G	19.4 mm (0.762 in)	20.9 mm (0.823 in)	0.0 mm (0.000 in)	7.3 mm (0.288 in)
		I	1.9 mm (0.073 in)	7.2 mm (0.284 in)	0.1 mm (0.003 in)	2.5 mm (0.100 in)
9	+2155 Pa (+45.00 psf)	C	0.00 mm (0.000 in)	N/A	0.0 mm (0.000 in)	0.9 mm (0.036 in)
		E	2.1 mm (0.081 in)		0.2 mm (0.007 in)	2.5 mm (0.100 in)
		G	30.4 mm (1.195 in)		1.1 mm (0.042 in)	7.3 mm (0.288 in)
		I	0.00 mm (0.000 in)		0.0 mm (0.000 in)	2.5 mm (0.100 in)

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

Table 14: Negative Uniform Static Load Test Results

Sequence #*	Load	Gage Location	Deflection		Permanent Set	
			Measured	Allowed	Measured	Allowed
Specimen #1						
7	-1436 Pa (-30.00 psf)	C	0.1 mm (0.004 in)	2.6 mm (0.103 in)	0.2 mm (0.006 in)	0.9 mm (0.036 in)
		E	1.1 mm (0.043 in)	6.5 mm (0.256 in)	0.1 mm (0.004 in)	2.3 mm (0.090 in)
		G	18.1 mm (0.714 in)	18.7 mm (0.737 in)	0.2 mm (0.009 in)	6.6 mm (0.258 in)
		I	0.0 mm (0.000 in)	6.5 mm (0.256 in)	0.4 mm (0.015 in)	2.3 mm (0.090 in)
10	-2155 Pa (-45.00 psf)	C	0.0 mm (0.000 in)	N/A	0.0 mm (0.000 in)	1.00 mm (0.036 in)
		E	1.3 mm (0.052 in)		0.1 mm (0.004 in)	2.3 mm (0.090 in)
		G	28.1 mm (1.105 in)		0.2 mm (0.006 in)	6.6 mm (0.258 in)
		I	0.0 mm (0.000 in)		0.0 mm (0.000 in)	2.3 mm (0.090 in)
Specimen #2						
7	-1436 Pa (-30.00 psf)	C	0.0 mm (0.000 in)	2.6 mm (0.103 in)	0.0 mm (0.000 in)	0.9 mm (0.036 in)
		E	0.3 mm (0.013 in)	7.2 mm (0.284 in)	0.0 mm (0.000 in)	2.5 mm (0.100 in)
		G	20.9 mm (0.821 in)	20.9 mm (0.823 in)	0.8 mm (0.033 in)	7.3 mm (0.288 in)
		I	1.5 mm (0.059 in)	7.2 mm (0.284 in)	0.0 mm (0.000 in)	2.5 mm (0.100 in)
10	-2155 Pa (-45.00 psf)	C	0.0 mm (0.000 in)	N/A	0.0 mm (0.000 in)	0.9 mm (0.036 in)
		E	1.8 mm (0.069 in)		0.3 mm (0.012 in)	2.5 mm (0.100 in)
		G	28.1 mm (1.108 in)		0.7 mm (0.026 in)	7.3 mm (0.288 in)
		I	0.0 mm (0.000 in)		0.0 mm (0.000 in)	2.5 mm (0.100 in)

*Please refer to Section 8.0, "Test Sequence" for a description of the sequence number.

9.4.4 Conclusion

Architectural Testing observed no signs of failure in any area of any test specimen during the uniform static load test. In addition, each test specimen met the deflection and permanent set requirements; as such, each test specimen satisfies the uniform static load test requirements of AAMA 501-05 and ASTM E 330-02.

10.0 TEST EQUIPMENT

DEFLECTION MEASURING DEVICE: Linear transducers 2" dial indicators

11.0 LABORATORY COMPLIANCE STATEMENTS

All tests performed on these test specimens were conducted in accordance with the specifications of the applicable standards and test methods listed herein. All results obtained apply only to the specimens tested.

Film was used to seal against air leakage during structural testing. In the judgment of the test engineer the film did not influence the results of the test.

Test specimen construction was verified by Architectural Testing, Inc. per the drawings located in Appendix B. Any deviations are documented herein and/or on the drawings.

Architectural Testing, Inc. will service this report for the entire test record retention period. Test records that are retained, such as detailed drawings, data sheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Architectural Testing, Inc. for the entire test record retention.

If any test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen can be made. 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

12.0 APPENDICES

This test report is incomplete if not accompanied by the following Appendices:

13.0 WITNESSES

Name	Title	Company
Tram Trinh	Product Applications Engineer II	Tubelite, Inc.
Vinu Abraham, P.E.	Vice President – Southeast Region	Architectural Testing, Inc.
Jeff McGovern	Director – Regional Operations	Architectural Testing, Inc.
Kristin Nolan	Lab Manager	Architectural Testing, Inc.
Martin Gibbard	Foreman	Architectural Testing, Inc.
John Spallina	Test Technician	Architectural Testing, Inc.
Veron Wickham	Test Technician	Architectural Testing, Inc.
Kris Conte	Test Technician	Architectural Testing, Inc.

14.0 SIGNATURES

Digitally Signed by: Angela Abramczyk
Digitally Signed by: Kristin N. Nolan

Angela Abramczyk and Kristin Nolan
Technical Writer and Lab Manager
(Authors)

Digitally Signed by: Vinu Abraham

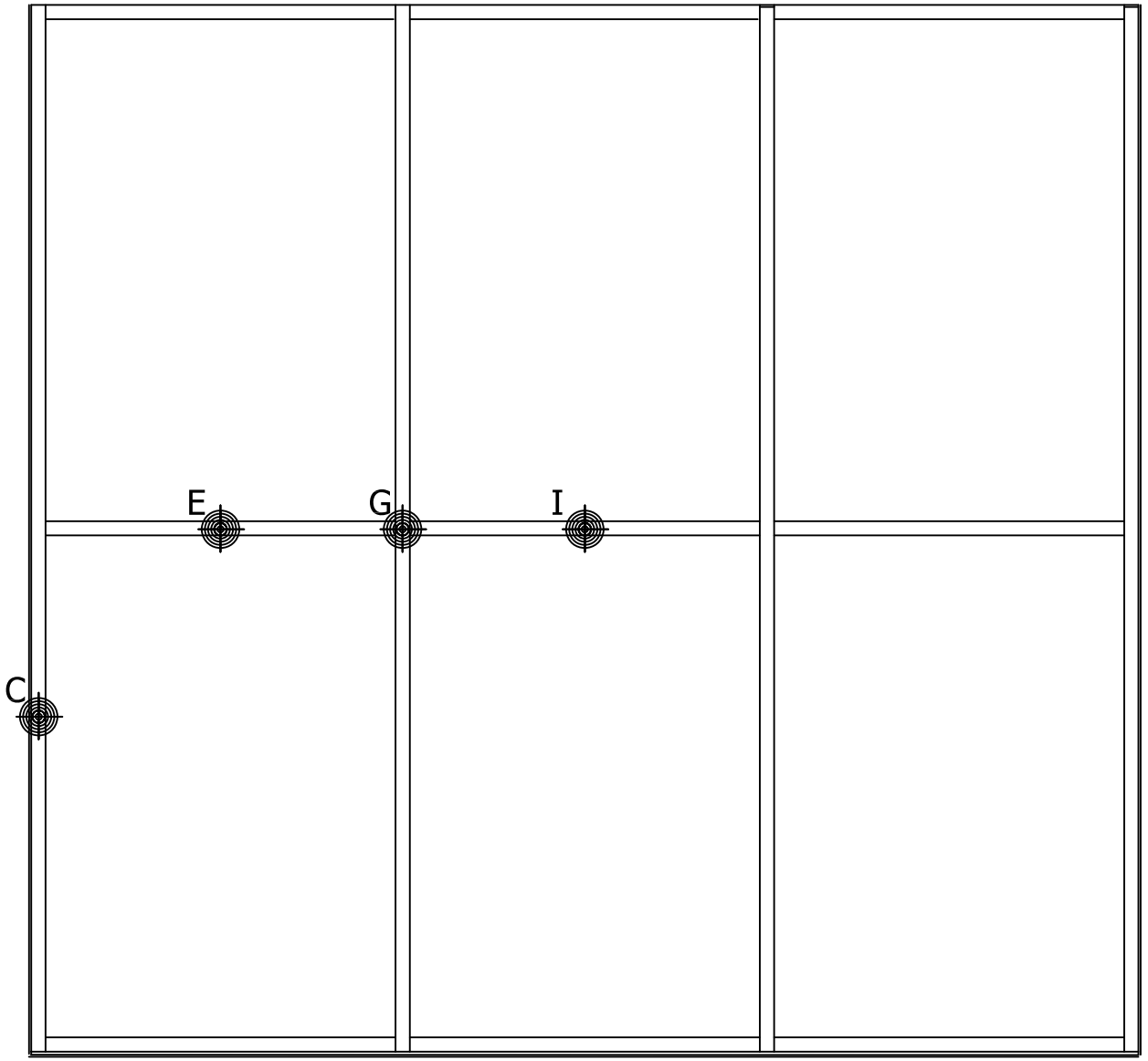
Vinu J. Abraham, P.E.
Vice President – Southeast Region

This report produced from controlled document template ATI 00607, issued 06/12/12.

APPENDIX A:

Gage Locations
2 SHEETS

REV	DATE	DESCRIPTION	BY

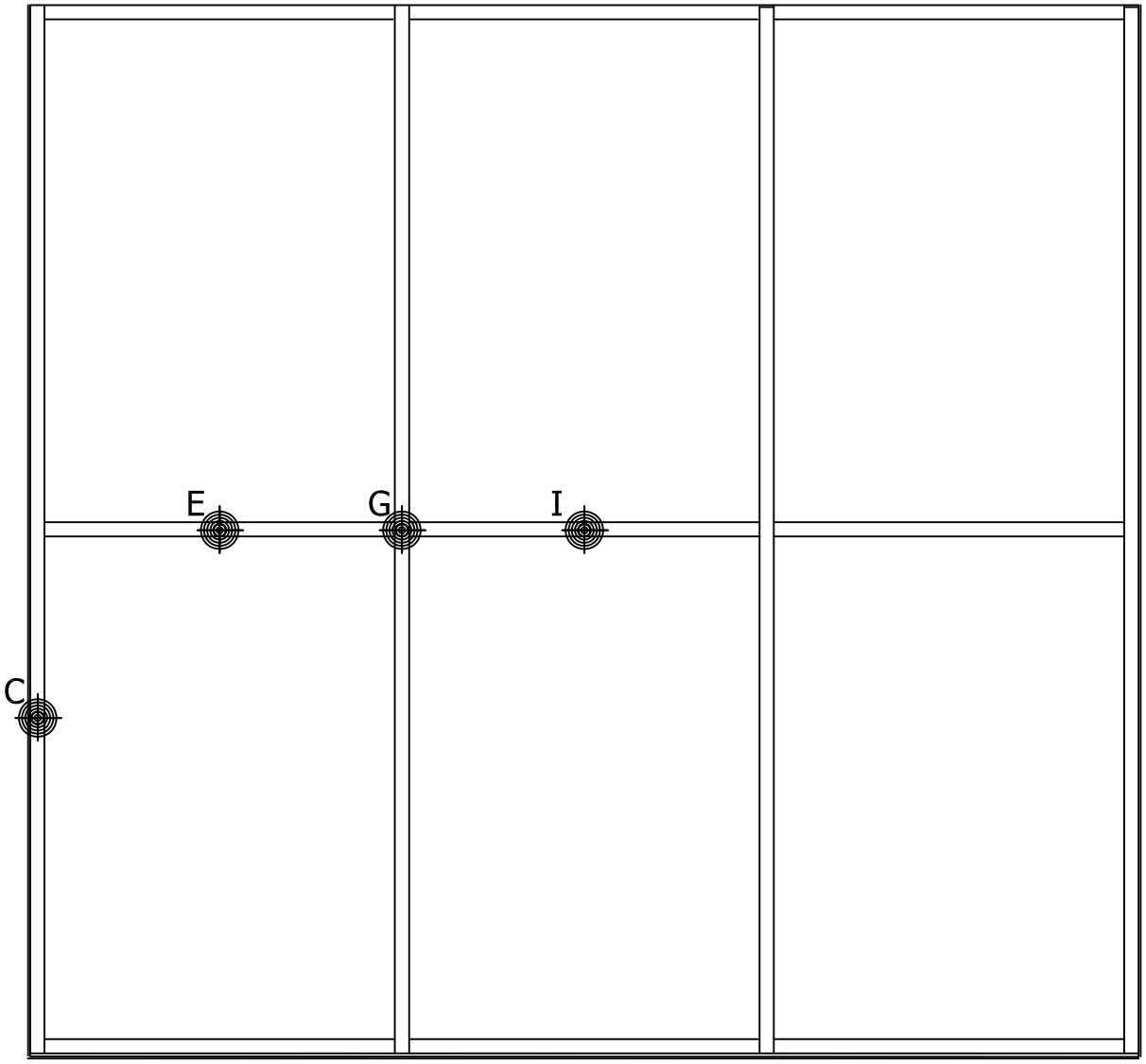


SPECIMEN 1

INDICATOR LOCATIONS

PROJECT NO.	PROJECT NAME:		DRAWING	DWG. BY:	SHEET
C1529.01	E4500 NON THERMAL STOREFRONT SPECIMEN 1	Architectural Testing	SPECIMEN 1 INDICATOR LOCATIONS	FN	1 OF 2
–	CLIENT: TUBELITE INC.			DATE: 09/13/12	

REV	DATE	DESCRIPTION	BY



SPECIMEN 2

INDICATOR LOCATIONS

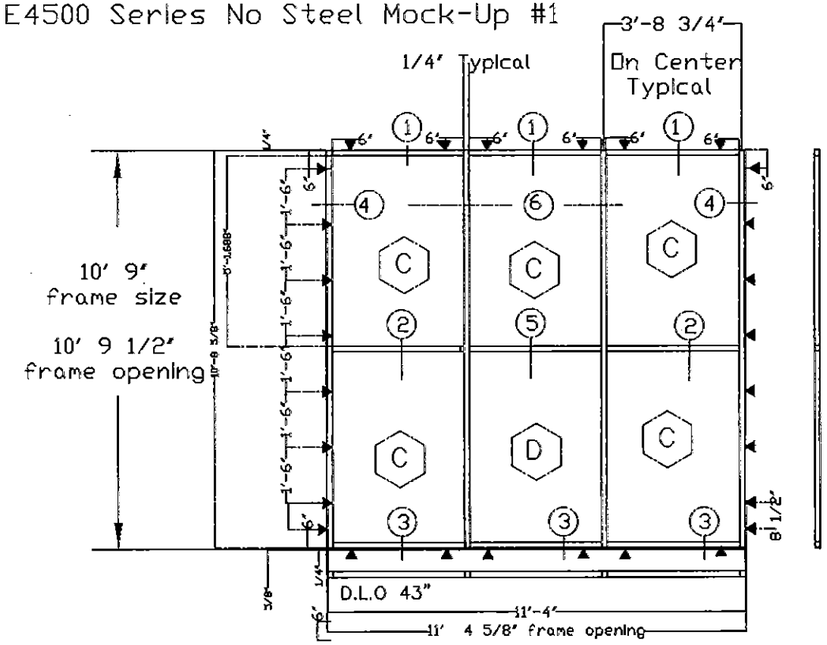
PROJECT NO.	PROJECT NAME:		DRAWING	DWG. BY:	SHEET
C1529.01	E4500 NON THERMAL STOREFRONT SPECIMEN 2	Architectural Testing	SPECIMEN 2 INDICATOR LOCATIONS	FN	2 OF 2
–	CLIENT: TUBELITE INC.			DATE: 09/13/12	

APPENDIX B:

Test Specimen Drawings
6 SHEETS

Mock up #1 - no steel

E4500 Series No Steel Mock-Up #1



▸ Anchor location

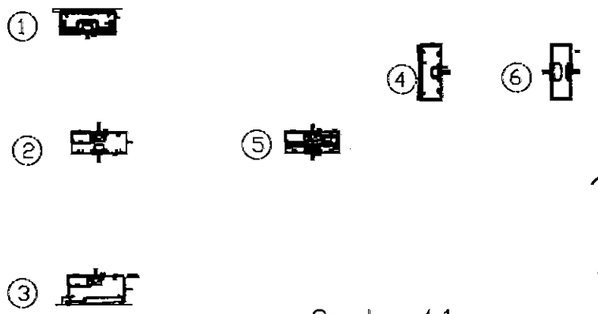
E4500 Series No Steel Mock-Up #1
Scale: 1/2" = 1'-0"

(C) Glass size = DLO + 5/8" = 62 5/16"

(D) Glass size = DLO + 9/16" when using E4503 = 62 1/4"

Glazing Material = 1/4" clear tempered glass

E4500 Series No Steel Mock-Up #1



Scale: 4:1

Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-411
Date 10/26/12 Tech AD

E4500 Series PerformanceTests - No steel reinforcement

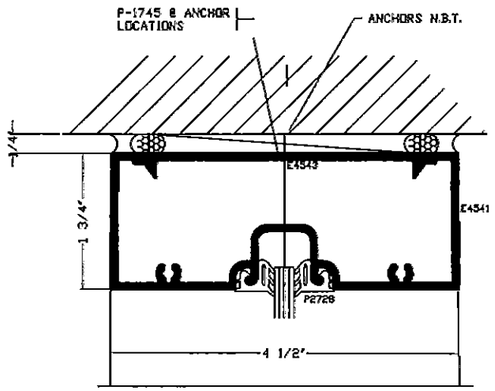
Preload @ 50% Design Pressure (15 psf)
Air Infiltration Per ASTM E283-04 (6.24 psf)
Static Water Penetration Per ASTM E331-00 (12 psf)
Water Penetration Per AAMA 501.1-05 (12 psf)
Structural Performance Per ASTM E330-02 (30 psf)
Structural Overload Per ASTM E330-02 (45 psf)

TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

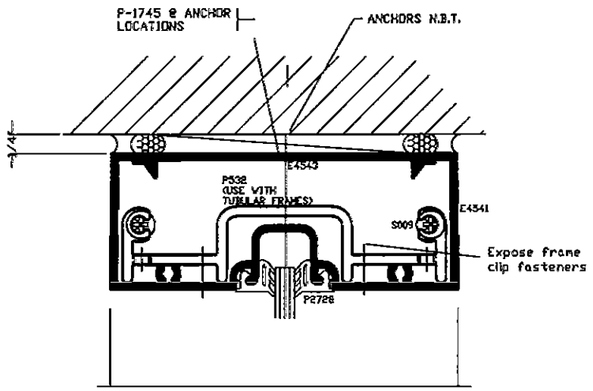
E4500 SF
Mock up #1 - No Steel reinforced
Structural Testing

DRAWN BY TT	DRWG DATE 9/13/12	APPV'D BY	DATE APPV'D	
DRWG SCALE 1/2"=1'	PRODUCT CODE 190	SHEET NO. 1 OF 3		REV

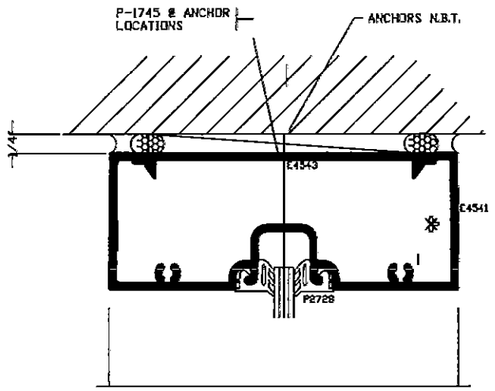
Cad Code:



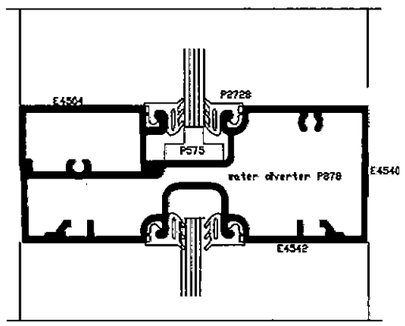
1



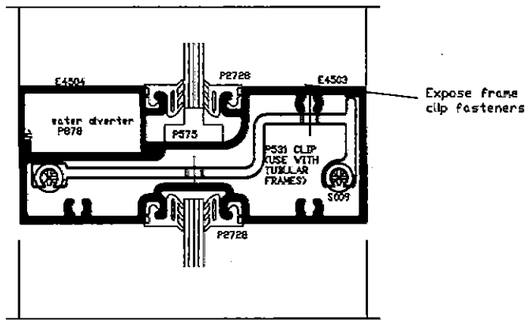
1



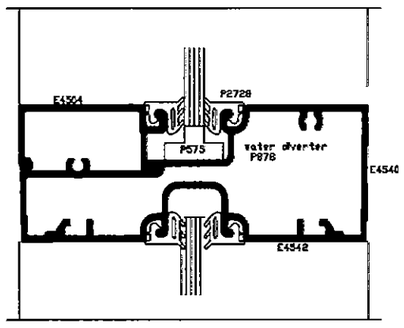
1



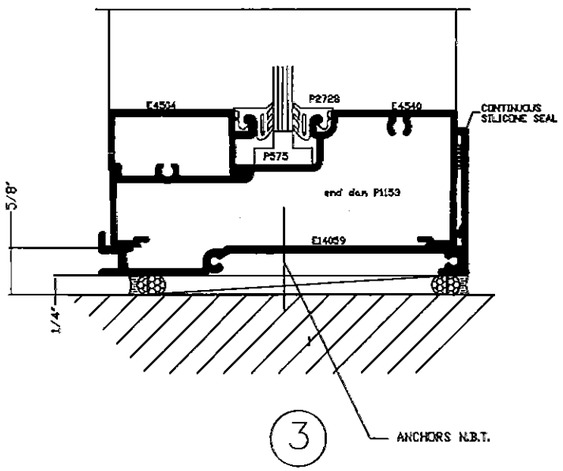
2



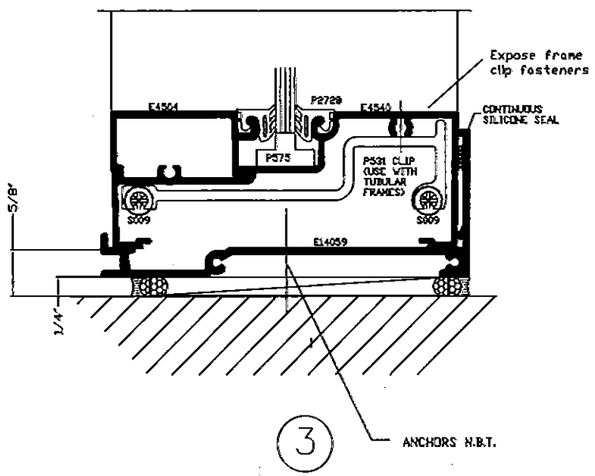
5



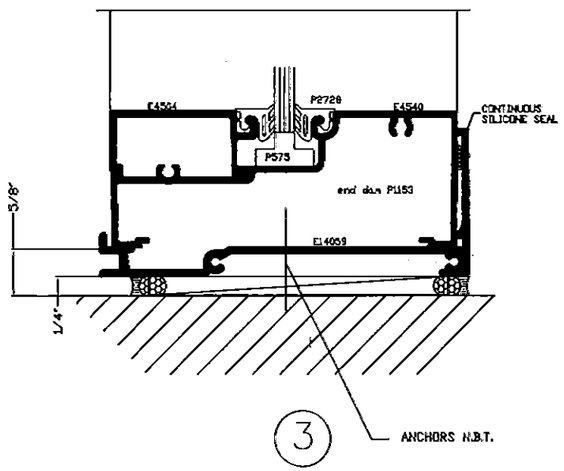
2



3



3



3

PERIMETER ANCHOR LOCATIONS:
Mock up #1 No steel reinforcement

–6" ON EACH SIDE OF VERTICAL MULLIONS FOR HEAD AND SUB SILL.

–CAP AND SEAL ALL ANCHORS

– Head: Use 1/4–20 x 3 3/4" Flat head screws. Grade 5, Self drilling

–Sill: Use 1/4–20 x 1 1/2" HH, Grade 5, Self drilling

Exposed Frame Clip Fastener:
Mock up #1 No steel reinforcement

–#10–18 x 3/4" self tapping screws
–Cap and seal all exposed frame clip screws.

Architectural Testing

Test sample complies with these details. Deviations are noted.

Report # C1529.01-450.44

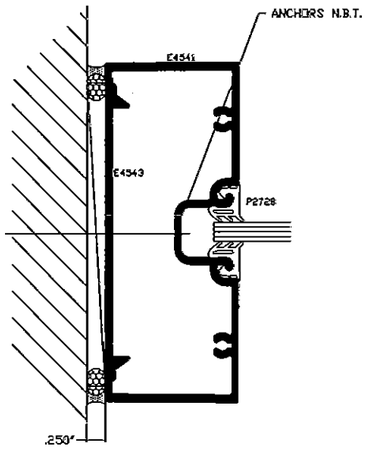
Date 10/26/12 **Tech** AJ

SCALE FULL SIZE	FACTORY ORDER NO
DRAWN BY TT	JOB NAME 4500 series structural testing Mock Up #1
REVISED	LOCATION
	ARCHITECT
	CUSTOMER
	ORDER NO.

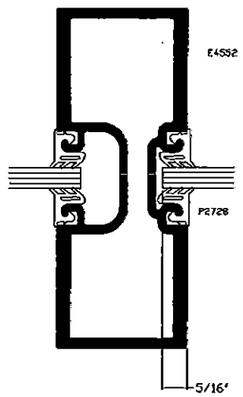
TUBELITE INC.
8200 MACKINAW TRAIL, P.O. BOX 118
REED CITY, MICHIGAN 49677
616-832-2811

DATE 10/2012 SHEET 2 OF 3 DRAWING NO. No steel

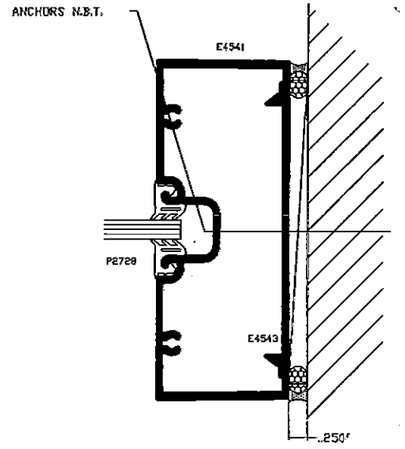
Cad Code:



4



6



4

Jambs Anchoring:

– Use 1/4–20 x 3 3/4" Flat head screws. Grade 5, self drilling along the jambs.

– Start at 6" from head and sill and 18" O.C.

Architectural Testing

Test sample complies with these details. Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 **Tech** AA

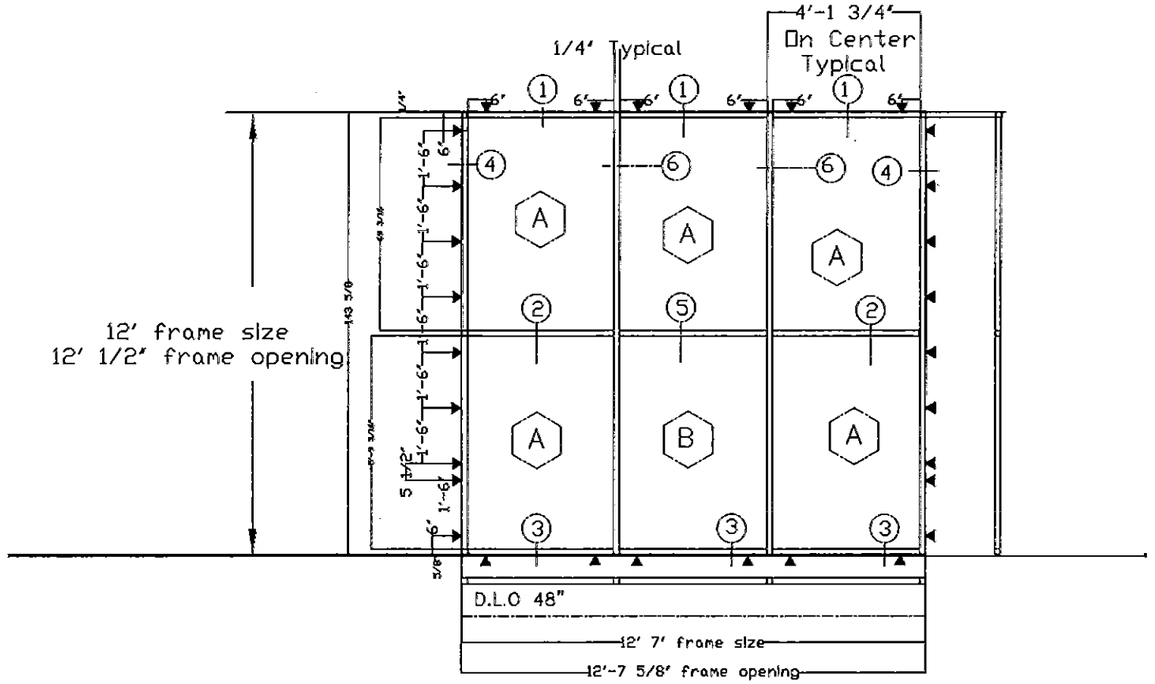
SCALE FULL SIZE	FACTORY ORDER NO.
DRAWN BY TT	JOB NAME 4500 Structural test - No reinforcement
REVISED	LOCATION Vertical details
	ARCHITECT
	CUSTOMER
	ORDER NO.

TUBELITE INC.

8200 MACKINAW TRAIL, P.O. BOX 118
REED CITY, MICHIGAN 49677
616-832-2211

DATE 10/2012 SHEET 3 OF 3 DRAWING NO. No steel

E4500 Series Test Mock-up #2 with Steel



E4500 Series Test Mock-up #2 with Steel

Scale: 1/2" = 1'-0"

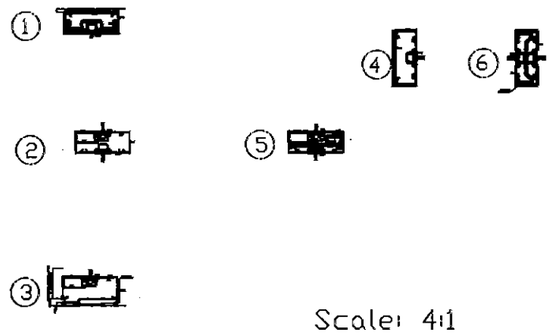
△ Anchor location

(A) Glass size = DLO + 5/8" = 5' - 9 13/16" or 69.8125 "

(B) Glass size = DLO + 9/16" when using E4503 = 5' - 9 3/4" or 69.75"

Glass Material: 1/4" clear tempered glass

E4500 Series Test Mock-up #2 with Steel



Scale: 4:1

E4500 Series PerformanceTests

Preload @ 50% Design Pressure (15 psf)
Air Infiltration Per ASTM E283-04 (6.24 psf)
Static Water Penetration Per ASTM E331-00 (12 psf)
Water Penetration Per AAMA 501.1-05 (12 psf)
Structural Performance Per ASTM E330-02 (30 psf)
StructuralOverload Per ASTM E330-02 (45 psf)

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AA

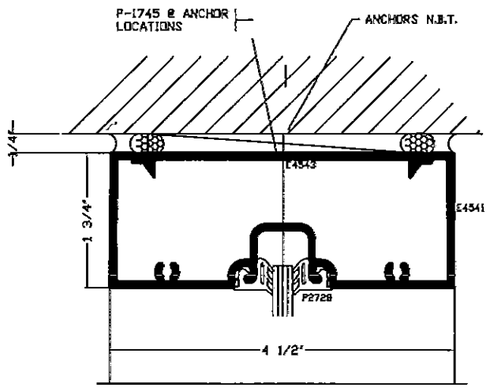
TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

E4500 SF
Mock up #2 - Steel reinforced
Structural Testing

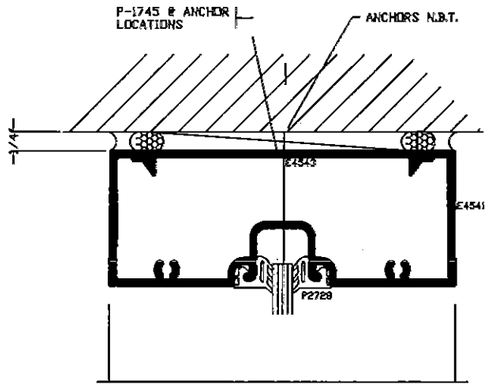
DRAWN BY TT	DRVG DATE 9/13/12	APPV'D BY	DATE APPV'D	
DRVG SCALE 1/2"=1'	PRODUCT 190	SHEET NO. 1 OF 3		REV

Mock up #2 - Steel Reinforced

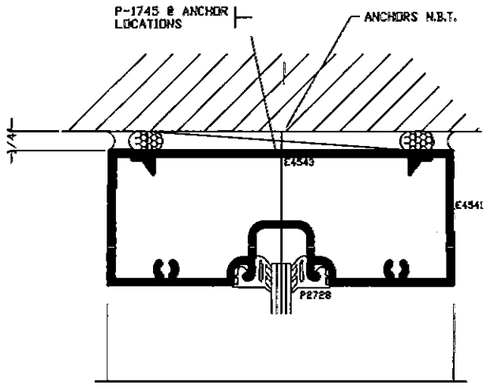
Cad Code:



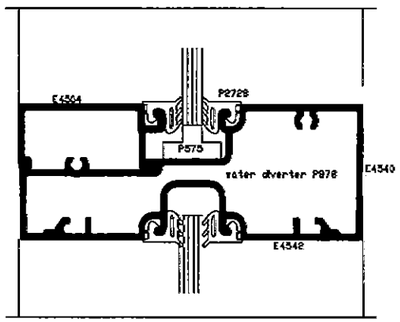
1



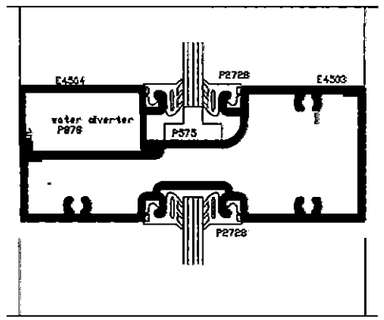
1



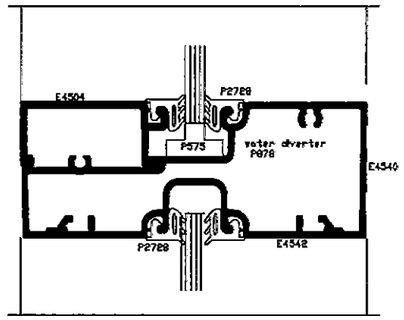
1



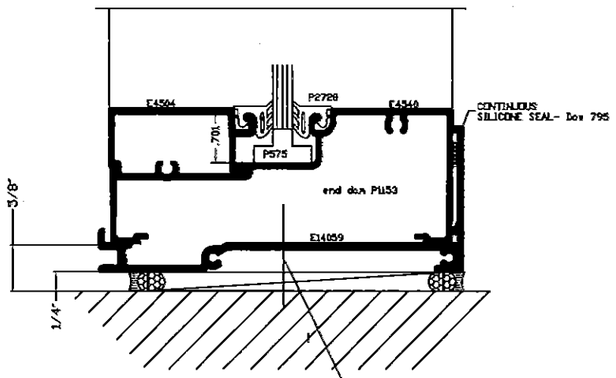
2



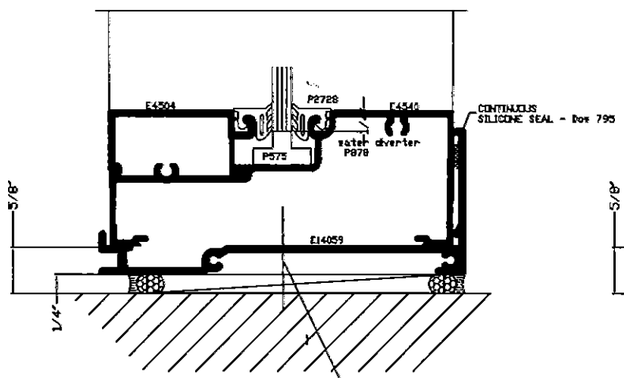
5



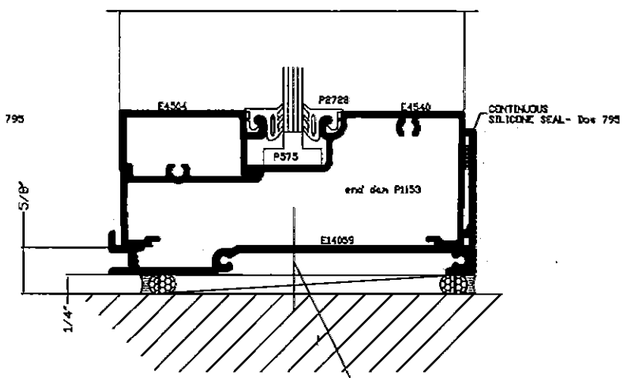
2



3



3



3

PERIMETER ANCHOR LOCATIONS:
Mock up #2 steel reinforcement

–6" ON EACH SIDE OF VERTICAL MULLIONS FOR HEAD AND SUB SILL.

–CAP AND SEAL ALL ANCHORS

– Use 1/4–20 x 2" Flat head screws. Grade 5, Self drilling At the sub sill

–Use SS 1/4–20 x 2 3/4" flat head screws, Grad 5, self tapping along the head.

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

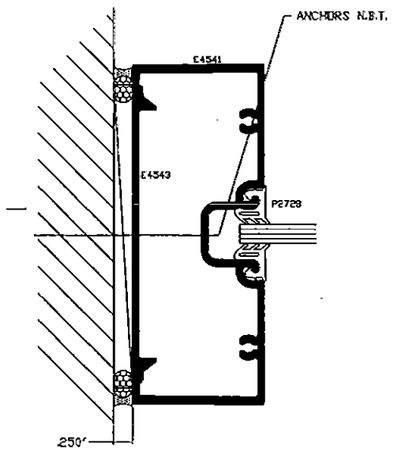
Date 10/26/12 Tech AT

SCALE FULL SIZE	FACTORY ORDER NO
DRAWN BY TT	JOB NAME 4500 series structural testing Mock Up #2
REVISED	LOCATION
	ARCHITECT
	CUSTOMER
	ORDER NO.

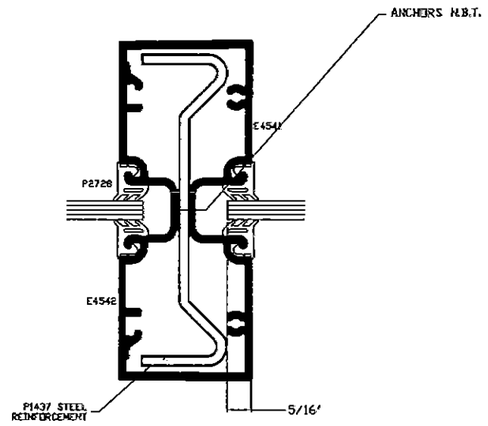
TUBELITE INC.
8200 MACKINAW TRAIL, P.O. BOX 118
REED CITY, MICHIGAN 49677
616-832-2211

DATE 10/2012 SHEET 2 OF 3 DRAWING NO. Steel

Cad Code:



4



6

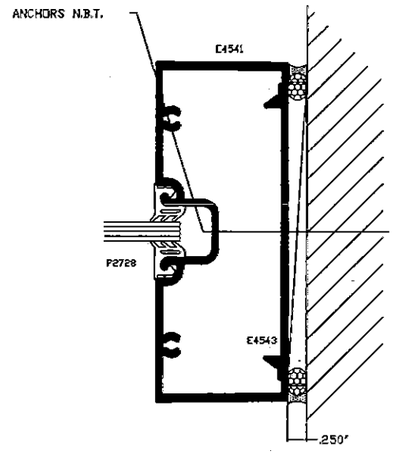
Fabricate steel reinforcement:

–Cut P1437 steel channel 4" shorter than mullion height. Paint ends to prevent rust.

–Insert the steel into the mullion (E4541) and aligned and center steel with mullion.

–Drill 0.213" diameter through center of the deep pocket of mullion and steel at 16" O.C.

–Tap holes and steel channel only for use #10 x3/4" SS flat head fastener. Cut flush with steel after installation.



4

Jambs Anchoring:

– Use SS 1/4–20 x 2 3/4" Flat head screws. Grade 5, self tapping along the jambs.

– Start at 6" from head and sill and 18" O.C.

Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-44
Date 10/26/12 **Tech** AA

SCALE FULL SIZE	FACTORY ORDER NO. Mock up #2
DRAWN BY TT	JOB NAME 4500 Structural test steel reinforcement
REVISED	LOCATION Vertical details
	ARCHITECT
	CUSTOMER
	ORDER NO.

TUBELITE INC.
8200 MACKINAW TRAIL, P.O. BOX 118
REED CITY, MICHIGAN 49677
616-832-2211

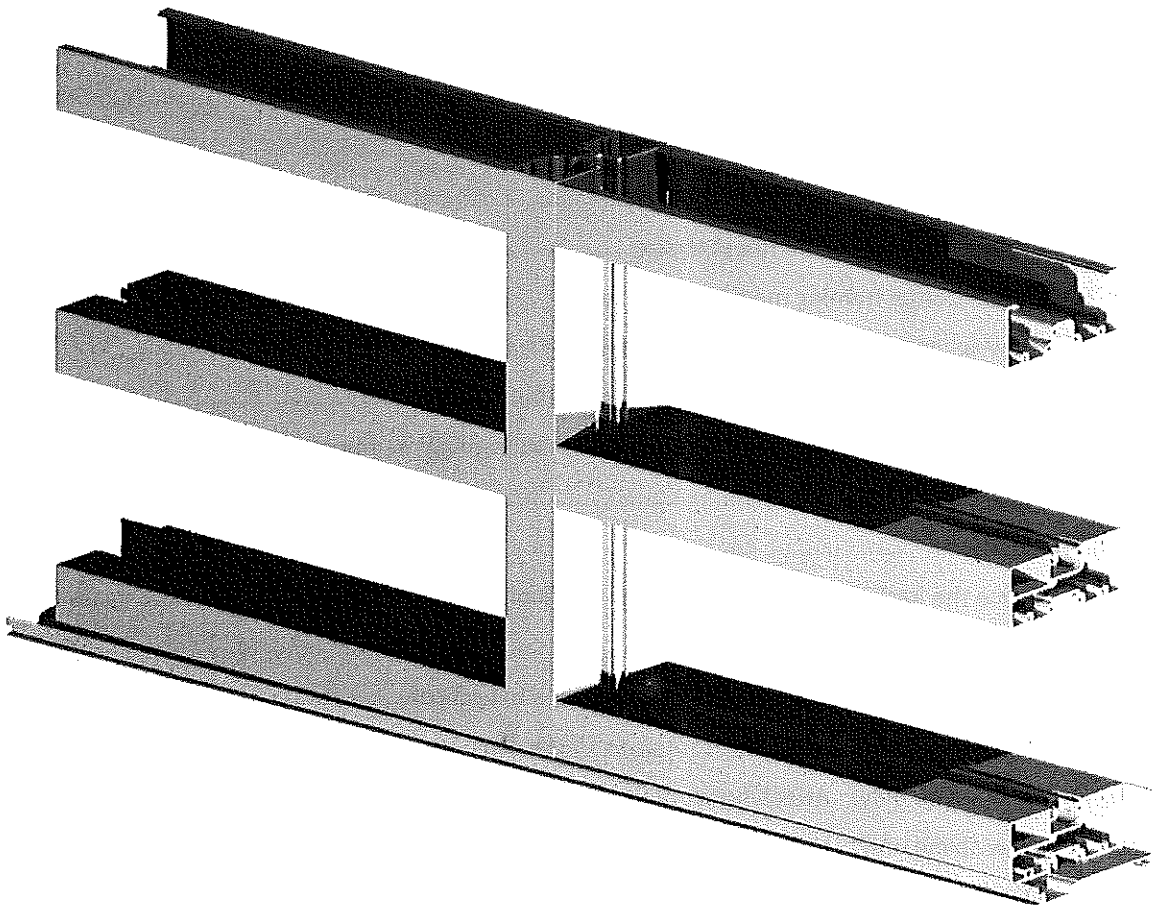
DATE	SHEET	OF	DRAWING NO.
10/2012	3	3	Steel

APPENDIX C:

Installation Instructions
34 PAGES

4500 Series

Fabrication and Installation Instructions



TUBELITE®

STOREFRONT, CURTAINWALL & ENTRANCES

DEPENDABLE

E4500 Series –September, 2012

Table of Contents

GENERAL CONSTRUCTION NOTES

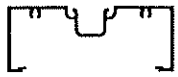
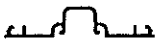
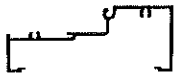
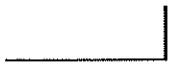
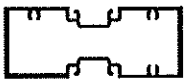
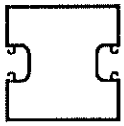
1. These instructions cover typical product application, fabrication, installation and standard conditions and are general in nature. They provide useful guidelines, but the final distribution drawings may include additional details specific to this project. Any conflict or discrepancies must be clarified prior to execution.
2. Materials stored at the job site must be kept in a safe place removed from possible damage by other trades. Stack with adequate separation so materials will not rub together, and store off the ground. Cardboard or paper wrapped materials must be kept dry. Check arriving materials for quantity and keep record of where various materials are stored.
3. All field welding must be done in accordance with AISC guidelines. All aluminum and glass should be shielded from field welding to avoid damage from weld splatter. Results will be unsightly and may be structurally unsound. Advise general contractor and other trades accordingly.
4. Coordinate protection of installed work with general contractor and/or other trades.
5. Coordinate sequence of other trades which affect framing installation with the general contractor (e.g. fire proofing, back up walls, partitions, ceiling, mechanical ducts, convectors, etc.).
6. General contractor should furnish and guarantee bench marks, offset lines and opening dimensions. These items should be checked for accuracy before proceeding with erection. Make certain that all adjacent substrate construction is in accordance with the contract documents and/or approved shop drawings. If not, notify the general contractor in writing before proceeding with installation because this could constitute acceptance of adjacent substrate construction by others.
7. Isolate all aluminum to be placed directly in contact with masonry or other incompatible materials with a heavy coat of zinc chromate or bituminous paint.
8. Sealant selection is the responsibility and option of the erector, installer and/or glazing contractor and must be approved by the sealant manufacturer with regard to application and compatibility for its intended use. All sealants must be used in strict accordance with the manufacturer's instructions and applied only by trained personnel to surfaces that have been properly prepared.
9. Sealant must be compatible with all materials with which they have contact, including other sealant surfaces. Consult sealant manufacturer for recommendations relative to shelf life, compatibility, cleaning of substrate, priming, tooling adhesion, etc.
10. Drainage gutters and weep holes must be kept clean at all times. Tubelite cannot accept responsibility for improper drainage as a result of clogged gutters and weep holes.
11. This product requires clearances at head, sill and jambs to allow for thermal expansion and contraction. Refer to final distribution drawings for joint sizes. Joints smaller than ¼" may be subject to failure. Consult your sealant supplier.
12. All materials are to be installed plumb, level and true with regard to established bench marks and column center lines established by the general contractor and checked by the erector, installer and/or glazing contractor.
13. Cleaning of exposed aluminum surfaces should be done per AAMA recommendations.
14. Due to varying perimeter conditions and job performance requirements, anchor fasteners are

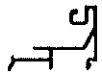
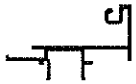
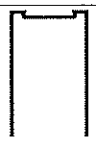
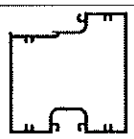
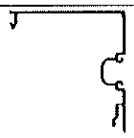
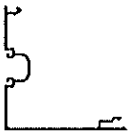
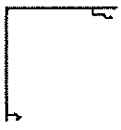
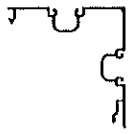
not specified in these instructions. For anchor fastening, refer to the shop drawings or consult the fastener supplier.

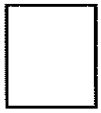
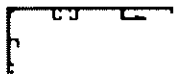
15. Codes governing the design and use of the products vary widely. Tubelite does not control the selection of the product configurations, operating hardware, or glazing materials, and assumes no responsibility of these design considerations. It is the responsibility of the owner, specifier, architect, general contractor and the installer to make these selections in strict conformance with all applicable codes.

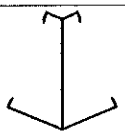
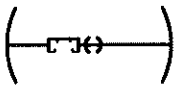
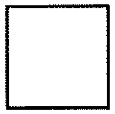
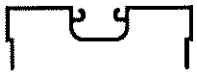
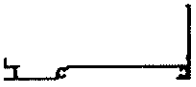
16. Check our website, www.tubeliteinc.com, for the latest installation manual prior to commencing work.

EXTRUDED ALUMINUM PARTS

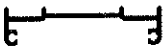
Shape	Description	Part No.
	Open Back Head, Jamb/Vertical	E4541
	Pocket Closure for Open Back Members	E4542
	Open Back Sill/Horizontal/ Head	E4540
	Sill Flashing	E45159
	Glazing Stop	E4504
	Open Back Door Jamb	E4544
	Door Header/ Transom Bar	E45123
	Door Header/ transom Bar	E45124
	Heavy wall vertical mullion	E4552
	Vertical mullion	E4500
	4 1/2" x 41/2" Vertical mullion	E45009
	Door stop	E4531

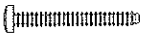
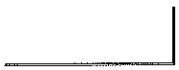
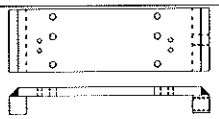
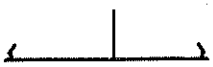
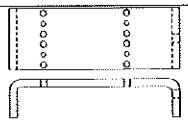
Shape	Description	Part No.
	Snap-in Glazing Gutter	E4026
	Screw applied Gutter	E4014
	Glazing Stop	E4015
	Snap-in Glazing Gutter	E4013
	Intermediate Horizontal	E4503
	4" Sidelight Base	E14026
	Sidelight Base Anchor Channel	E14027
	4 1/2" x 4 1/2" Sidelight Base/ Horizontal	E4534
	One Pocket Corner	E45108
	One Pocket Corner	E45109
	Pocketless corner	E45110
	Two pocket corner	E45111

Shape	Description	Part No.
	Screw applied door stop	E2298
	Open Back Door Jamb	E4545
	1 3/4" x 4 1/2" Tube	E0041
	4" x 41/2" Tube	E14080
	Head Receptor Female Half	E14129
	Head Receptor Male Half	E14130
	Head Receptor Channel	E45116
	Snap-in Pocket Filler	E4011
	Flat Closure for Open Back Members	E4543

Shape	Description	Part No.
	135° Corner	E45005
	Rotational mullion	E45248
	Center pivot member for E45248	E14247
	4 1/2" x 41/2" Tube	E0133
	Expansion Vertical - Male Half	E4506
	Expansion Vertical - Female Half	E4507
	1 3/4" x 4 1/2" Open-back tube	E0405
	Snap-in back with nail fin	E4553
	Extruded sill flashing	E14059

ACCESSORIES

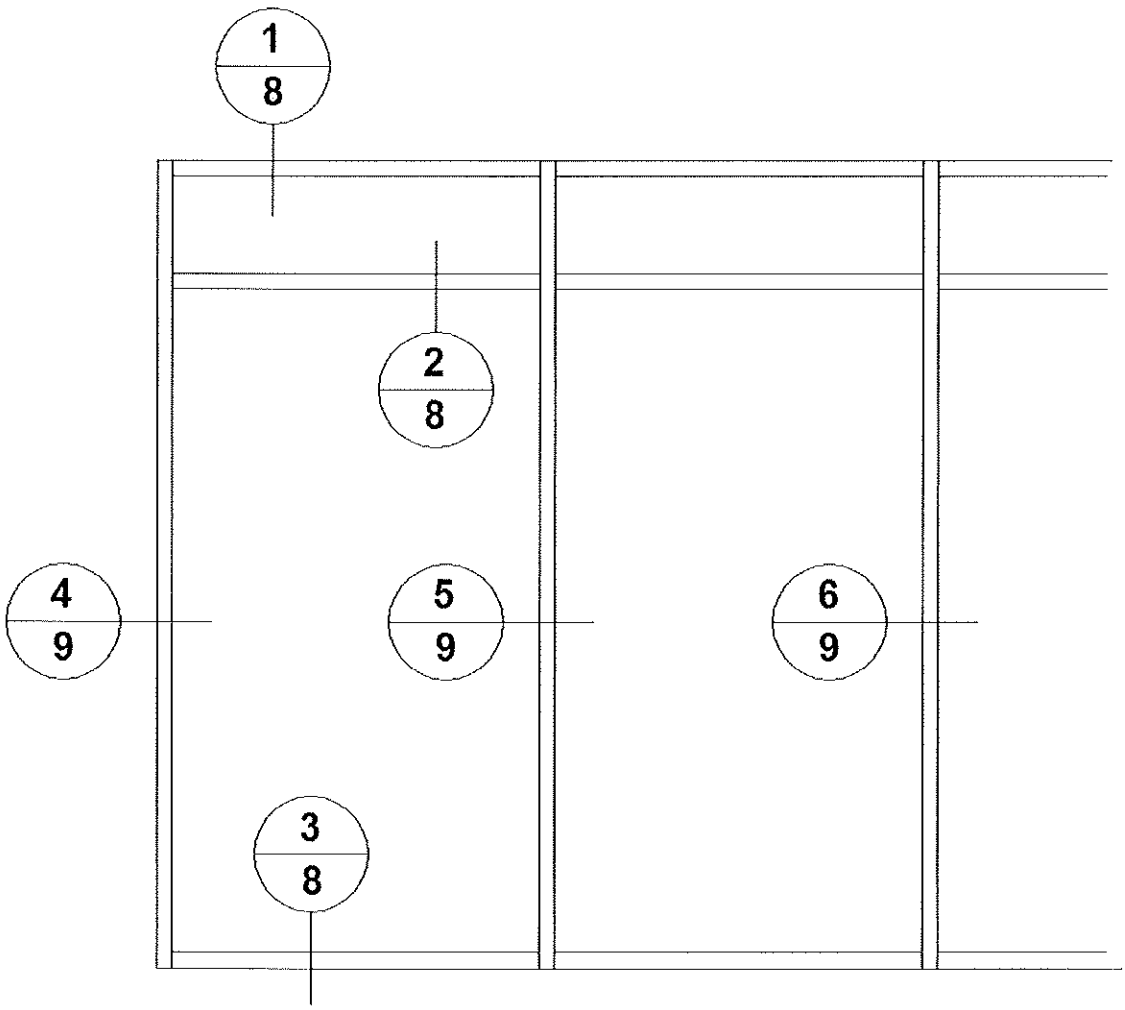
Shape	Description	Part No.
	Roll-In Glazing Gasket	P2428
	Roll-In Glazing Gasket	P487
	Improved Bulb type Gasket – use with E14129/E14130	P2511
	Wiper Gasket (use with E45116 & E45248)	P1221
	Pile Weathering with vinyl fin	P1098A
	Setting Block	P575
	Frame Clip	P531
	Frame Clip	P532 P532A
	Frame Clip	P917
	Door Stop Header Filler Block	P503
	Clip for Sidelight Base E14026	P1137
	End Dam for sill flashing	P1142
	Subsill splice	P1144

Shape	Description	Part No.
	Water Diverter	P878
	#10 x 1" Type 23 - Screw Spline Phillips/Hex Head Fastener	S202
	#10 x 1 ¾" Type B Phillips Pan Head Screw Fastener for clip to horizontal attachment.	S009
	#10 x 5/8" Phillips Flat Head for Clip Joint Connections	S192
	#12 x ¾" Type B Phillips Flat Head Screw	S149
	#10 x ½" Type B, Phillips Truss Head	S191
	Steel Reinforcing- Primer Painted 12'-0" lengths	P1437
	Splice Sleeve for E45159 Sill Flashing, with tape	P1143
	Drill Fixture	P796 B
	5/16" - 18 threaded swivel pad thumb screw w/ delrin tip for P1139	P1682
	PVC Closure – plate snap fits with open back frames, 10'0" lengths	P4543A
	Subsill end dam	P1153
	Drill Fixture	P1139

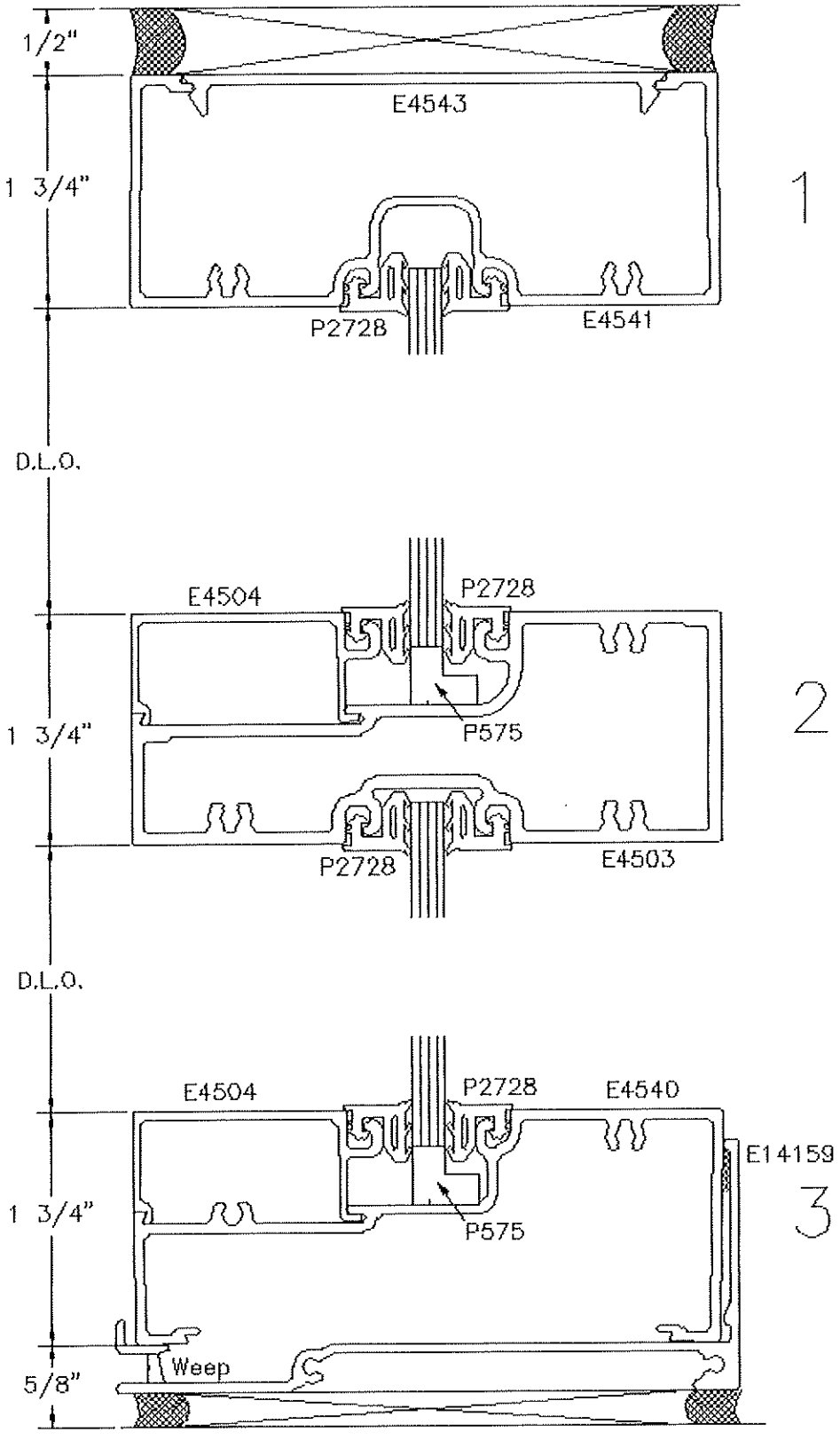
OVERVIEW

There are two distinct methods for assembling the 4500 Series: screw spline assembly, and shear block (frame clip) assembly.

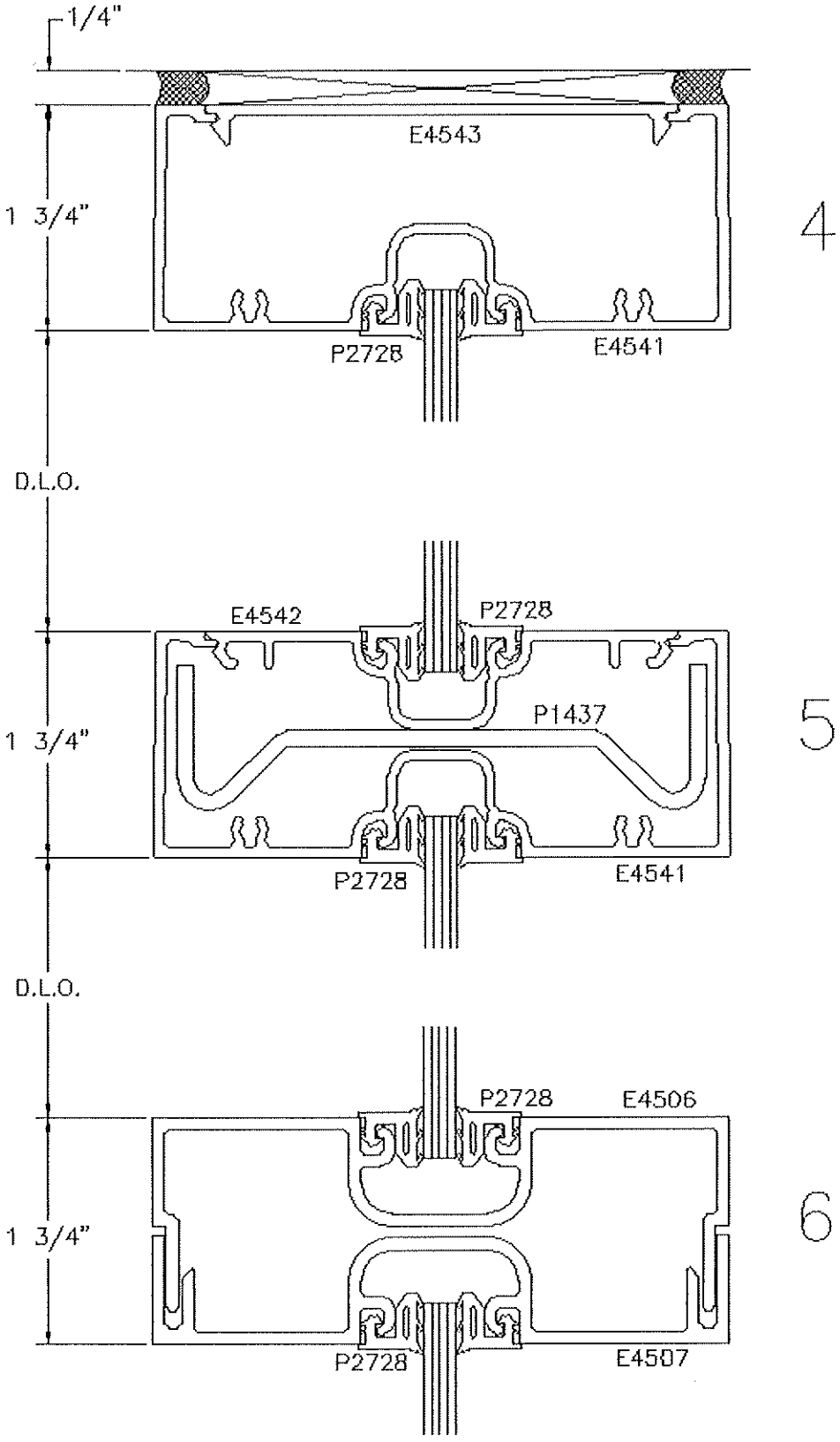
The illustration below shows the elevation view of a typical 4500 Series installation. The number in the top half of each circle is the number of a figure showing details of the associated system component; the number in the bottom half of each circle gives the page number on which that figure appears.



Elevation of a typical 4500 Series installation



Typical horizontal details



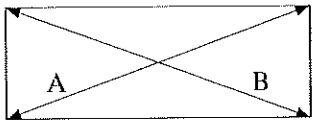
Typical vertical details

FRAME FABRICATION

Step #1: Determine frame size

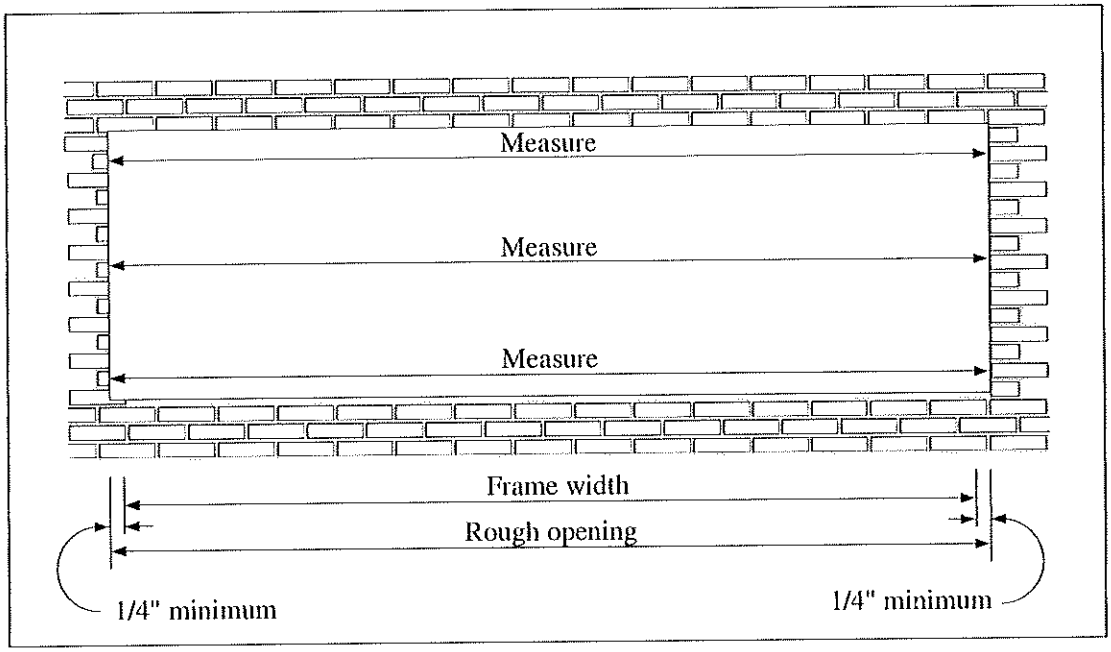
Determine frame width

Check that the opening is square and plumb at both ends. Units must be installed in a true rectangle.



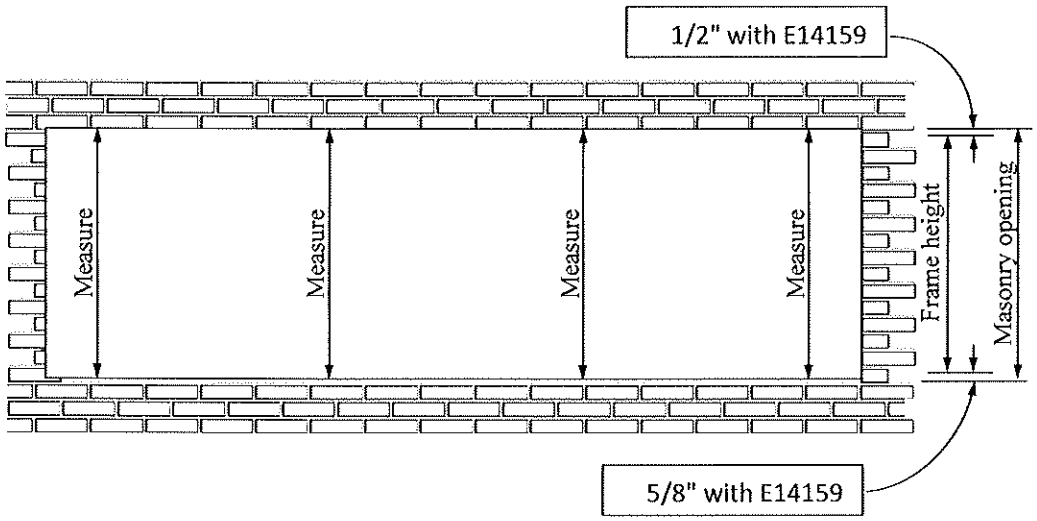
A = B

- Measure the width of the masonry opening at the top, middle and bottom.
- Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1/2" from the smallest measured width, to allow a minimum of 1/4" at each jamb for shimming and caulking. Allow a larger clearance if necessary to accommodate building tolerances, sub sill, an out-of-square opening, and/or anticipated thermal expansion within the unit.



Determine frame height

- Measure the height of the masonry opening in several places along the entire length of the opening.
- To determine the frame height to be used, select the smallest dimension measured and subtract 1 1/8" to allow a minimum of 5/8" at sill and 1/2" at head for shimming and caulking. Allow a larger clearance if necessary to accommodate building tolerances, an out-of-square opening, and/or anticipated thermal expansion within the unit.



Step #2: Cut sub sill to size

- Cut sill (E-14159) to frame width + 1/8" determined in Step #1 on page 11 (rough opening minus clearances). If the installation is to include an entrance, the sill should butt against the back of the door jamb (no clearance).
- Sill longer than 24' in length must be spliced using part number P-1144. If sill must be spliced, allow 3/8" to 1/2" for the width of the splice. Sill splice located at the center of the day light opening between verticals
- Expansion mullion require for every 16 – 20 feet of run with corresponding sub-sill splice located at the center of the day light opening between verticals. The dimension of the expansion mullion assembly should be adjusted based on the temperature at the time of assembly and expected high and low service temperatures. For example, the sight line will be reduced slightly when installed in hot weather and increased slightly when installed in cold weather.
- Weep holes: At 2" away from each side of the vertical mullion and at the quarter points of each light, drill 7/32" diameter holes in the sill and slot ¼" . Install a PTB42 weep baffle in the gutter of the extruded sill flashing behind each weep hole.

Step #3: Cut vertical framing members to size

- Verticals should be the frame height found in Step #1 above (rough opening height minus clearances).
- As shown in the elevation overview on page 8, vertical framing members run through.

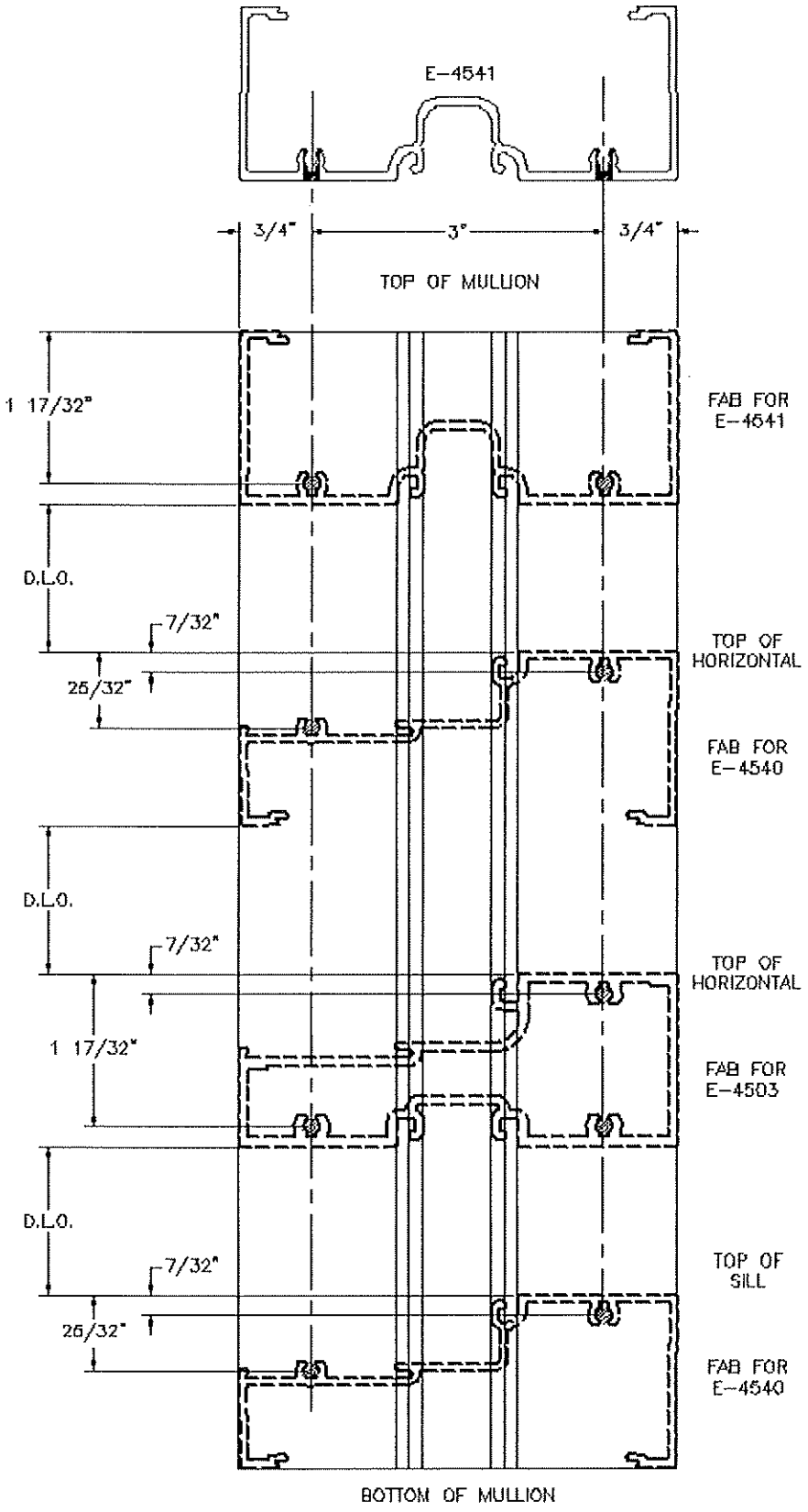
Step #4: Cut horizontal framing members to size

- Cut horizontal framing members to the daylight opening (the distance between verticals).
- For easier installation, cut horizontal glazing beads 1/32" shorter than the horizontal framing member.

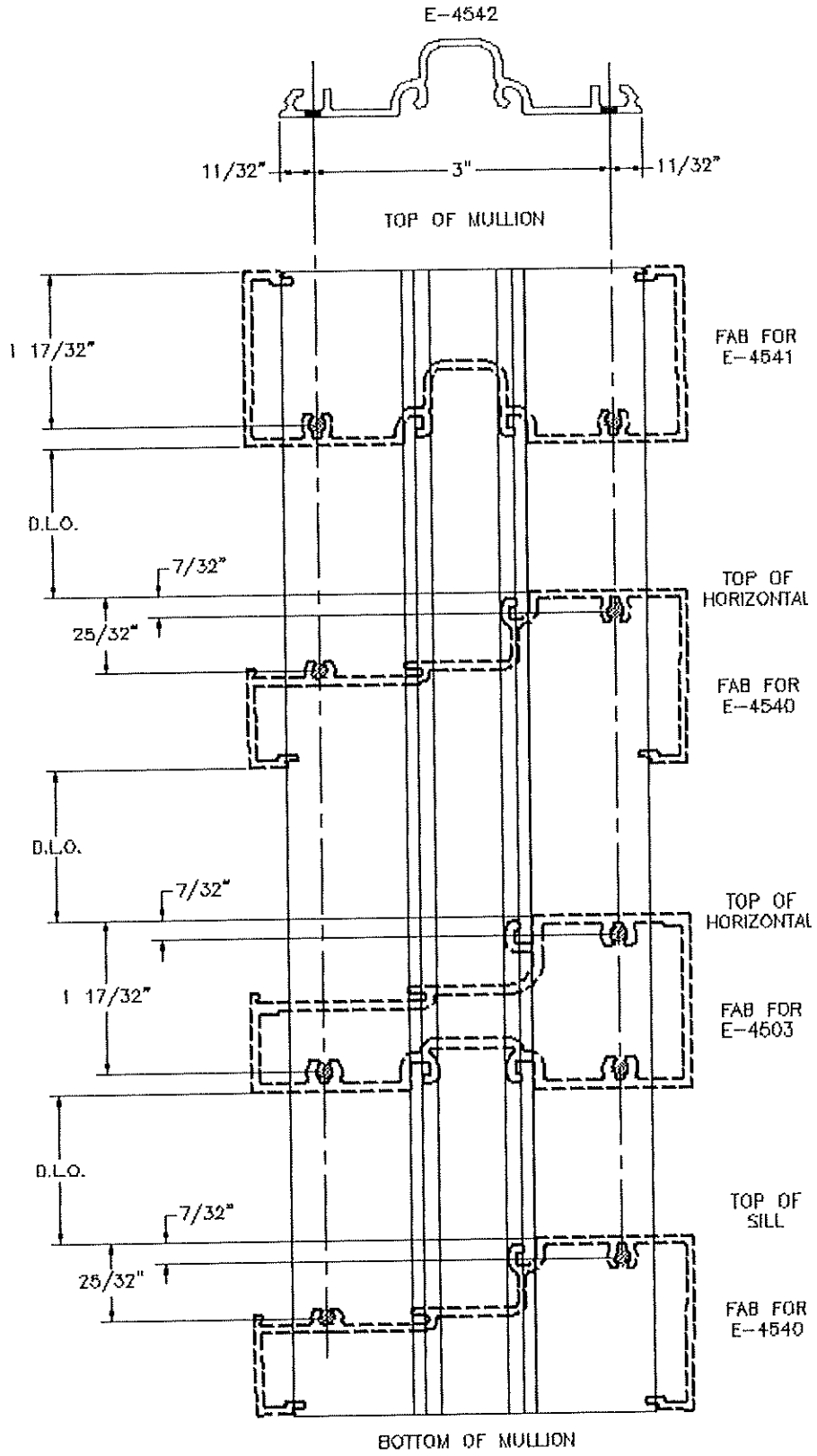
Step #5 (screw spline assembly): Drill holes in vertical framing members

In screw-spline assembly, screws are driven through holes in the vertical members, directly into screw splines on the horizontal members. These screws are what support the horizontal members and the glass. The four drawings in this section show where to drill the holes in the vertical members so that they line up with the screw splines on the horizontals.

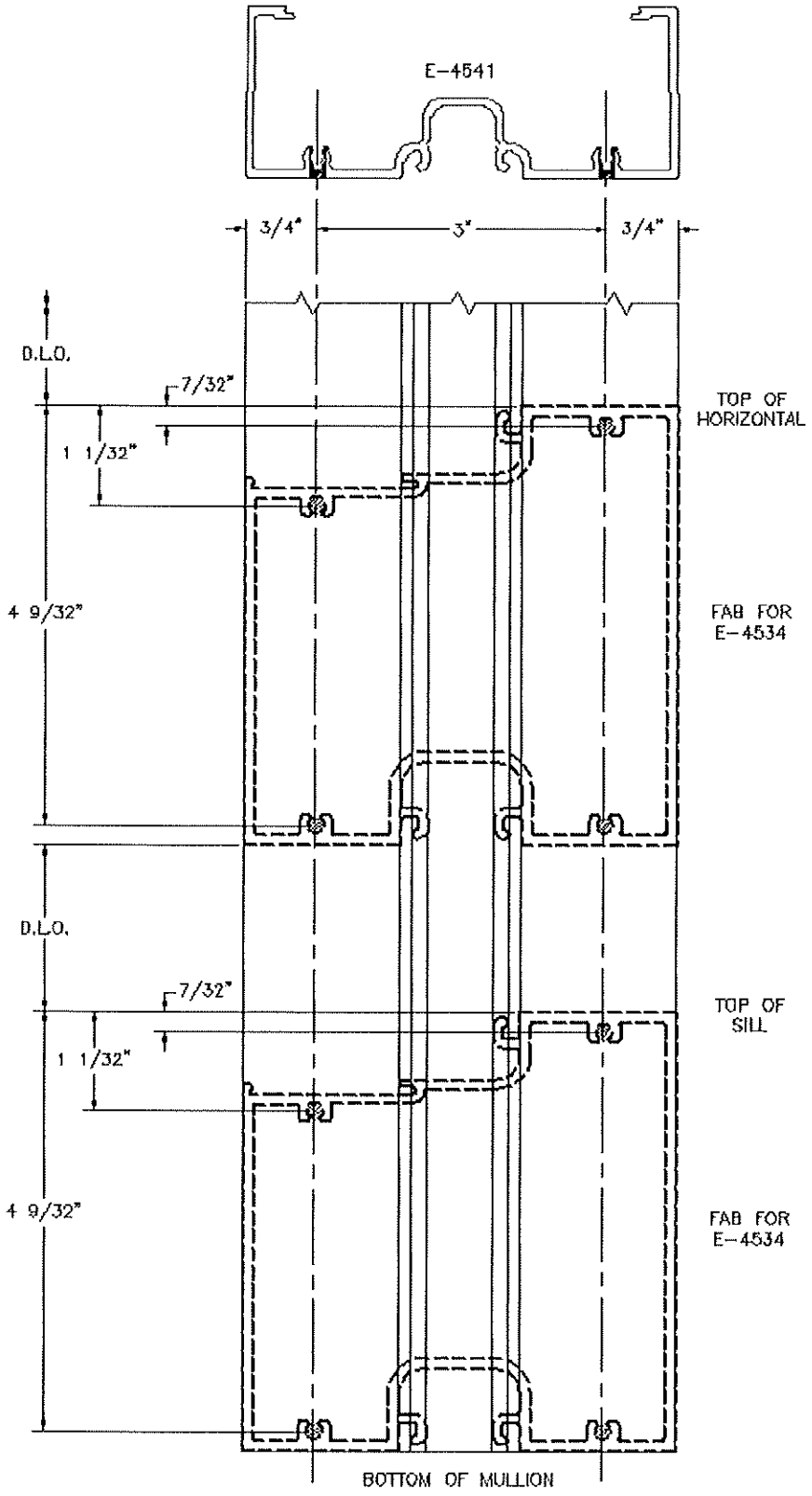
- The screw used for screw-spline assembly is a #10-24 x 1" Type 23 Phillips hex head (S-202). To accommodate this type of screw, the holes in the vertical framing members must be .201" in diameter, corresponding to a #7 drill.
- Tubelite offers a drill fixture (P796B) to help locate the correct hole locations quickly and accurately. This fixture is designed for use on both screw-spline and shear-block projects.



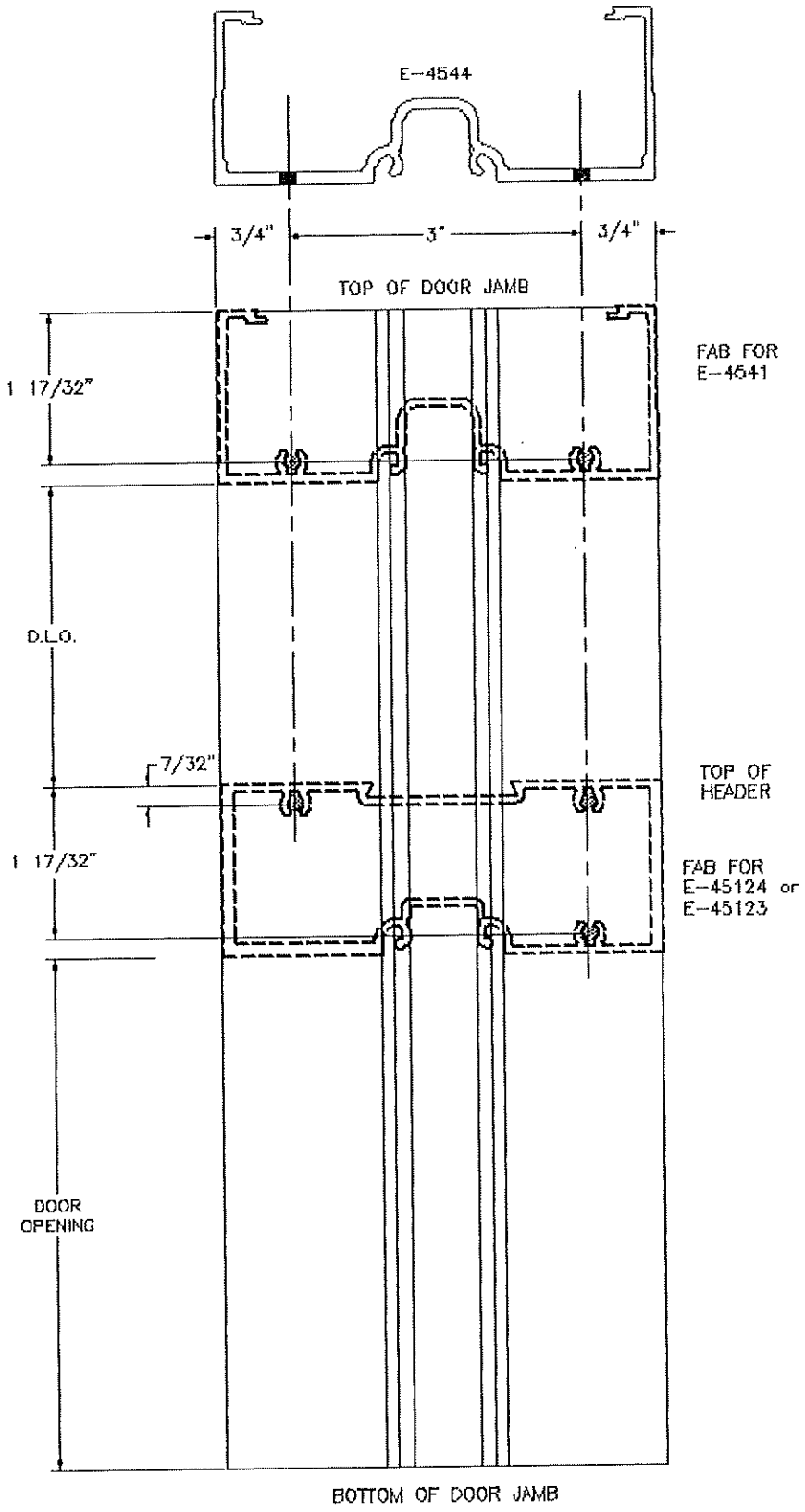
Drilling an open-back vertical (E-4541) --
Screw-spline, no door or sidelight



Drilling a closure pocket (E-4542) --
Screw-spline, no door or sidelight



Drilling an open-back vertical (E-4541) -- Screw-spline



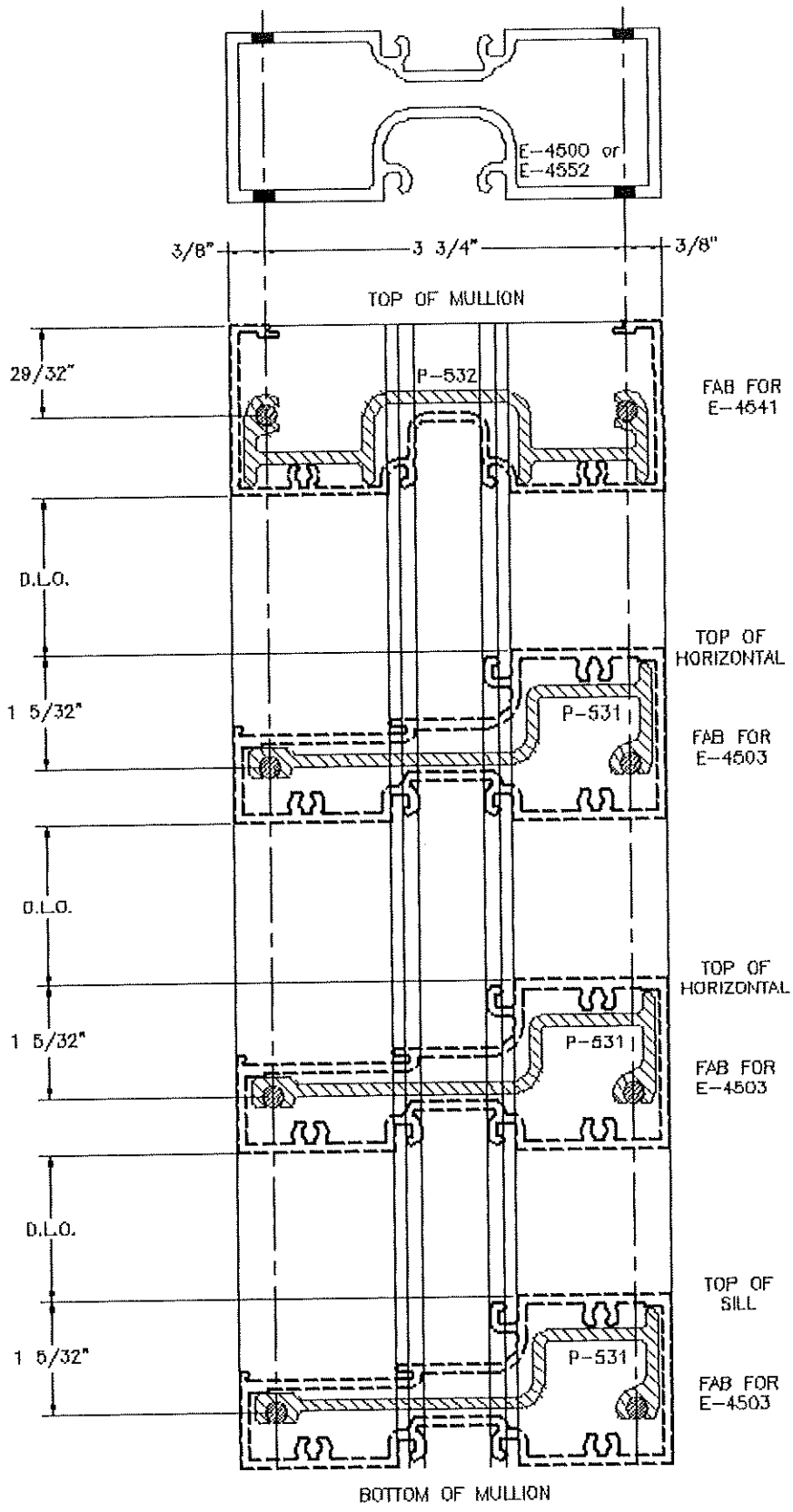
Drilling an open-back door jamb (E-4544) -- Screw-spline, next to a door

Step #5 (shear block assembly): Drill holes in vertical framing members

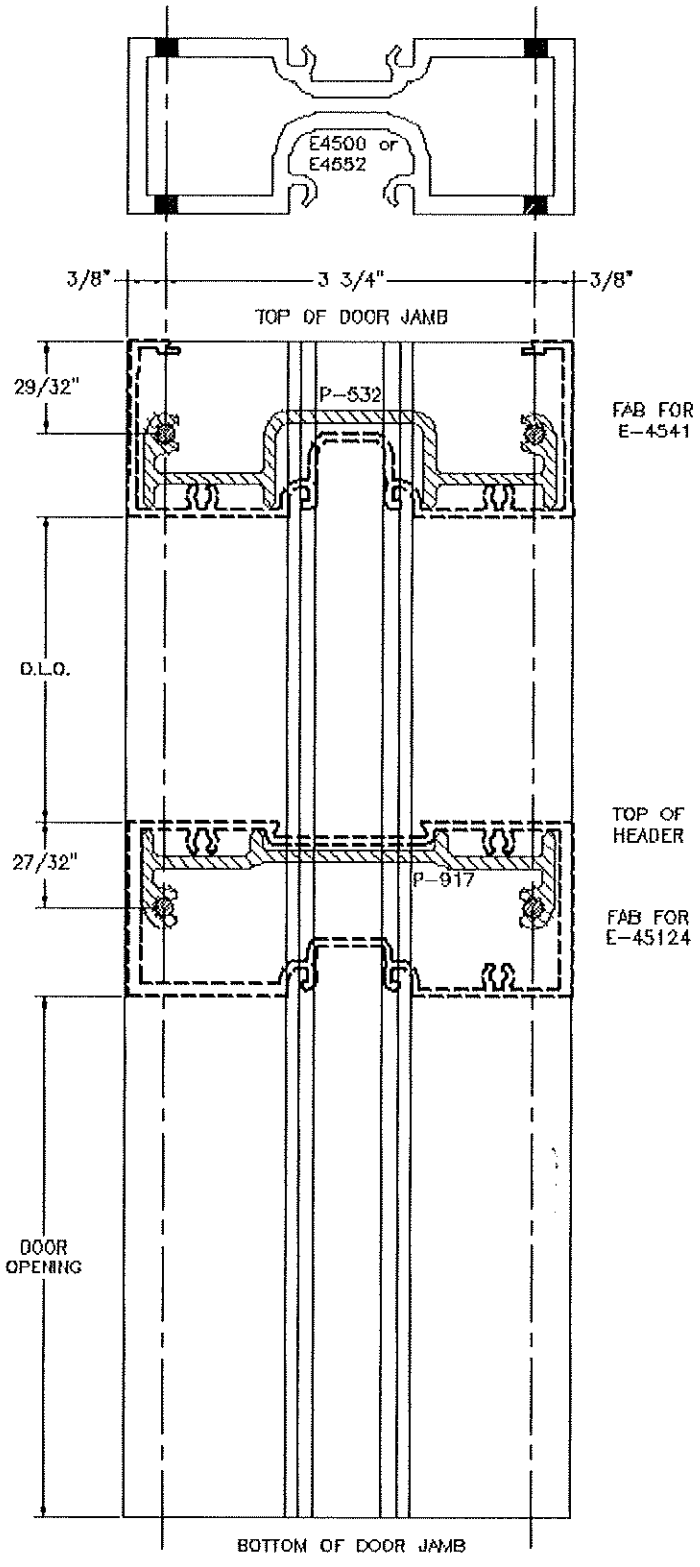
In screw-spline assembly, screws pass through holes in the vertical members, connecting them directly to the horizontal members. In shear-block assembly, the installer

- Secures frame clips (also known as shear blocks) to the vertical members with screws;
- Slides the horizontal members over the frame clips; and finally
- Secures the horizontal members to the frame clips with screws.

The screws used to secure frame clips to verticals require use of a #25 drill (.149" diameter). Tubelite recommends using a drill fixture (P796B) to facilitate quick and accurate drilling of holes in verticals for shear-block assembly projects. The following two illustrations show where to drill shear-block verticals to accommodate various types of horizontal framing members.



Drilling an intermediate vertical (E-4500) -- Shear-block, no door or sidelight

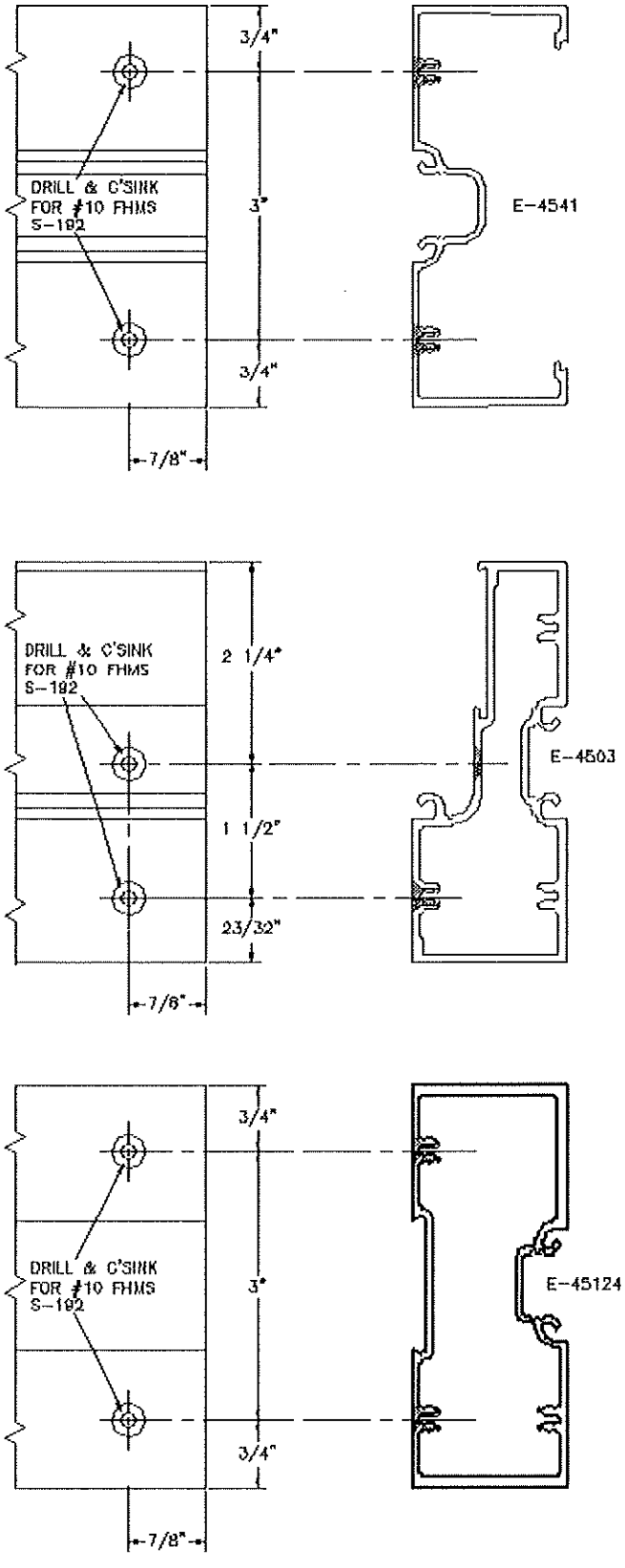


Drilling a door jamb (E-4552) --
Shear-block, next to a door

Step #6 (shear-block assembly): Drill holes in horizontal framing members

Screw-spline assembly does not require drilling of horizontal framing members, because screw splines are integral to the extrusions for horizontals. The shear block assembly method, on the other hand, requires drilling of horizontals, so that they can be screwed to frame clips (shear blocks).

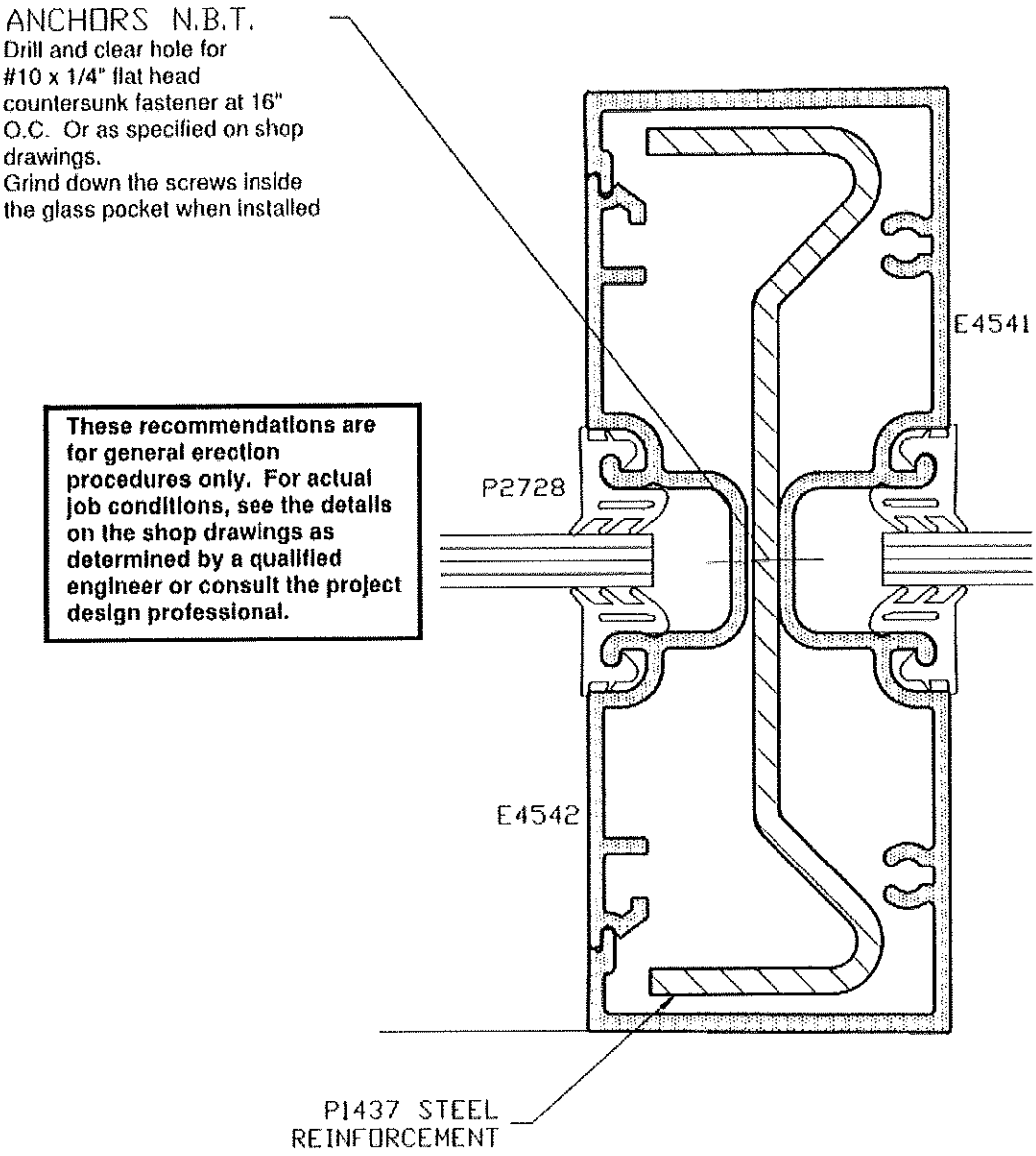
The illustrations in this section show the locations where holes must be drilled in the various kinds of horizontals for use in shear-block assembly. The illustrations also show the required drill sizes, because the shear-block assembly method uses screws of two different diameters to secure horizontals to frame clips.



Drilling horizontals --
Shear-block, no door or sidelight

Step #7: Steel Reinforcing

- Cut steel reinforcing channel, P1437, 4" shorter than mullion length. Paint cut ends to prevent rust.
- Insert the steel into the mullion. Align and center the steel with mullion, then drill through the assembly of the mullion and the steel at 16" O.C. Drill 0.213" diameter through holes ..
- Tap #3 holes in the steel channel only, for use for #10 flat countersunk head fastener.
- Do not attached the steel channel at this time. Steel reinforcing is attached to the vertical just prior to snapping the frame portions together.

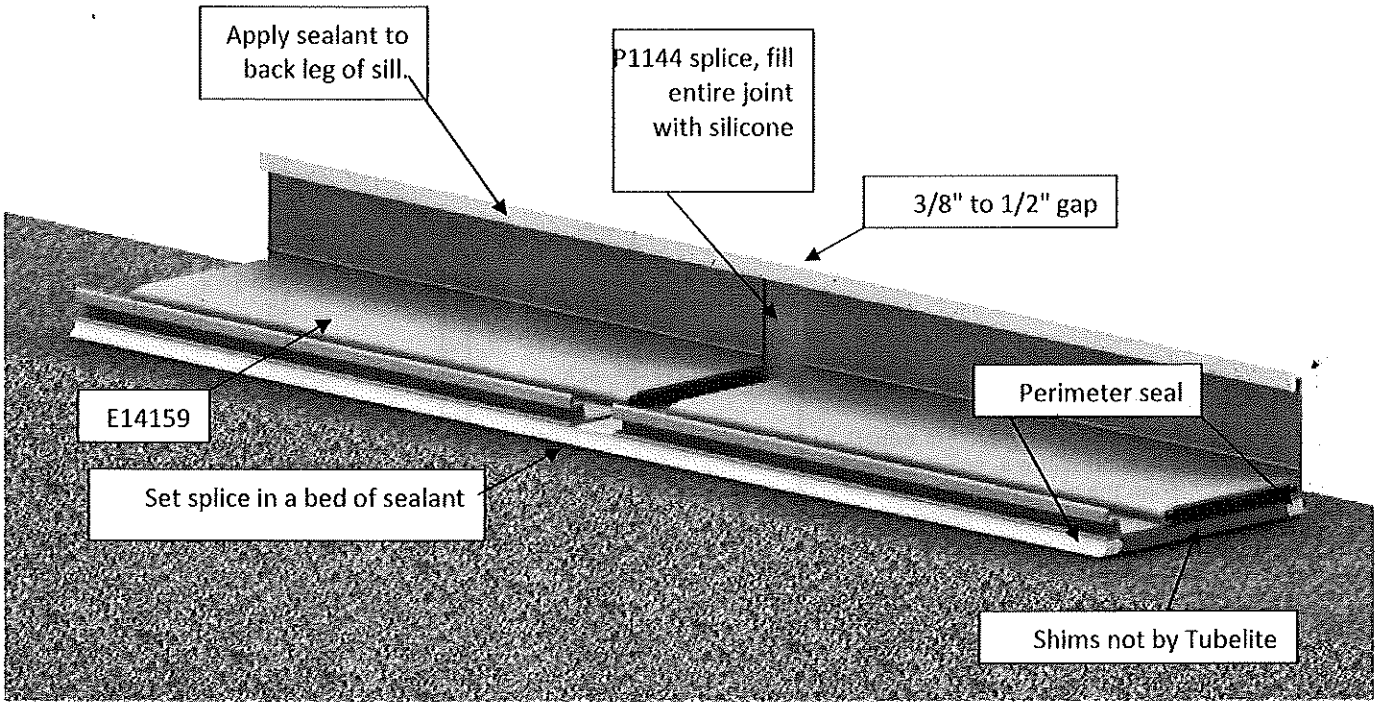


FRAME INSTALLATION

If there is an entrance, you should install it first, taking care to locate the entrance frame accurately within the opening.

Step #1 : Splice the sub sill where required per the final distribution dwgs.

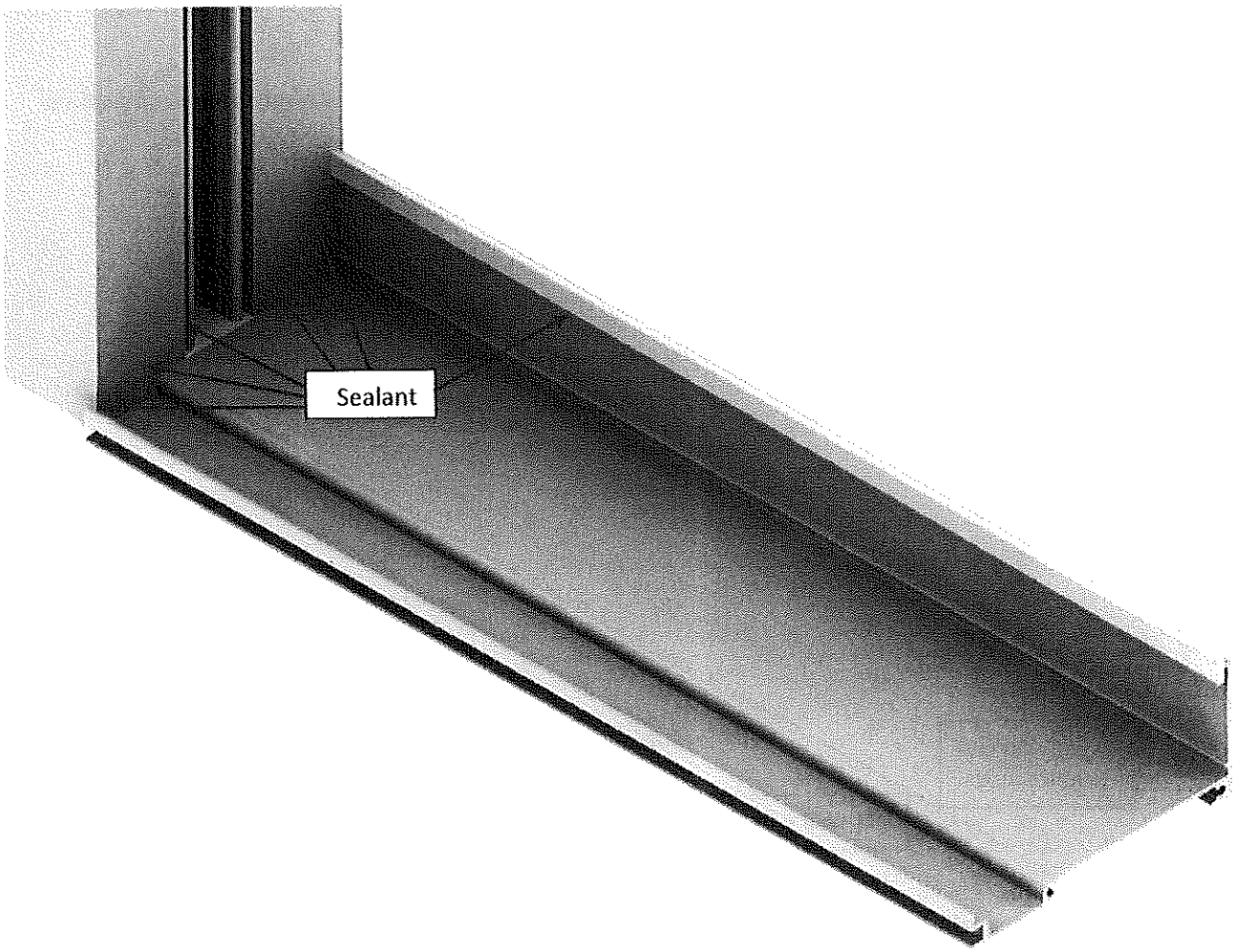
- Set splice in a bed of sealant at the predetermine splice location.
- Place the sill and anchor sill in the opening. The gap between any two pieces of flashing should be 3/8" to 1/2" wide.
- Apply silicone sealant between the two pieces of sill, spanning the splice joint.



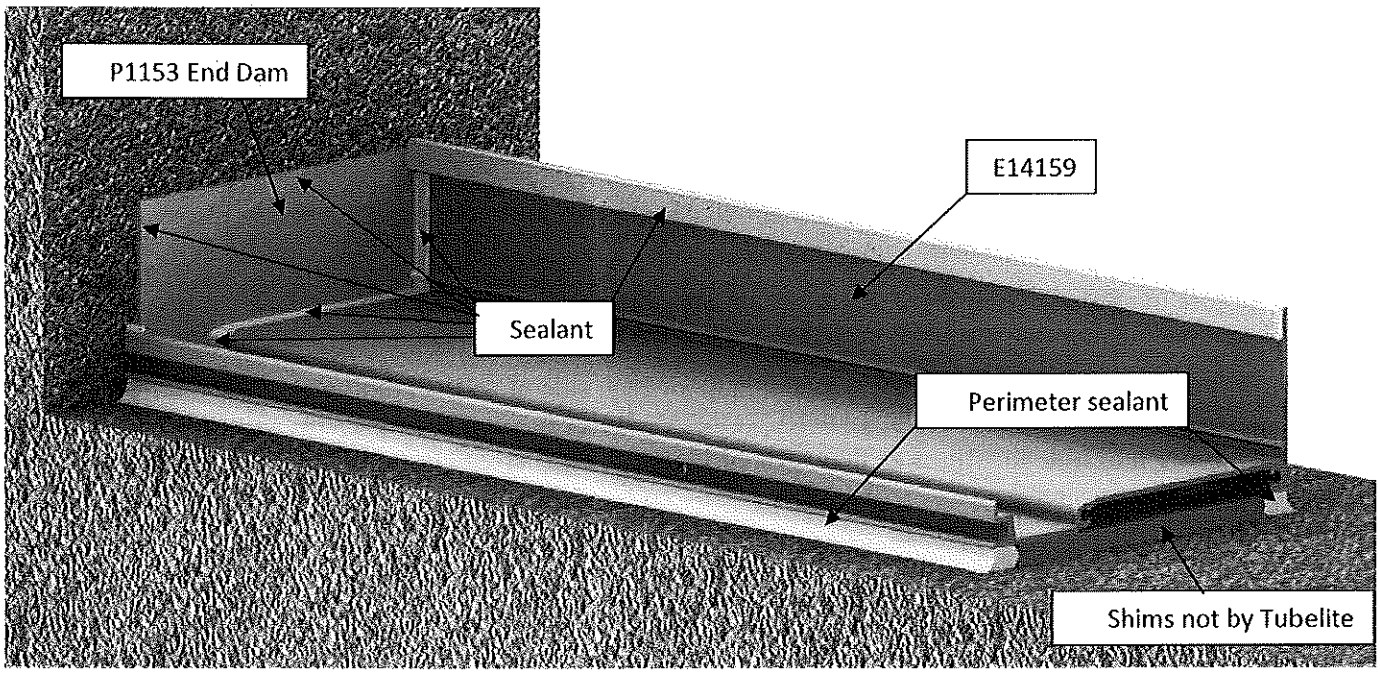
Splicing two pieces of sub sill

Step #2: Seal and anchor the sub sill

- Apply a full bed of sealant for an end dam and press the end dam(s) into the sealant. Seal the sill to the end dam(s) as shown on page 25.
- Butt the flashing up against the back of the door jamb (if present), and seal the flashing to the back of the entrance frame. Tool sealant into glass pocket of door jamb at sill to divert any water onto the sill as shown in the illustration below.
- Drill anchor holes through the sill and into the masonry, and secure the sill with the fasteners shown in the approved shop drawings.
- Before the fastener is inserted, force sealant into the hole for the sill perimeter fastener to ensure that the hole through the sill is sealed. Cap seal the anchors with silicone sealant.
- Perimeter anchors should be located within 6" of each side of vertical mullions. THIS IS FOR GENERAL ERECTION PROCEDURES ONLY. **Refer to shop drawings for appropriate fastener and hole locations as determined by a qualified engineer or consult the project design professional.**

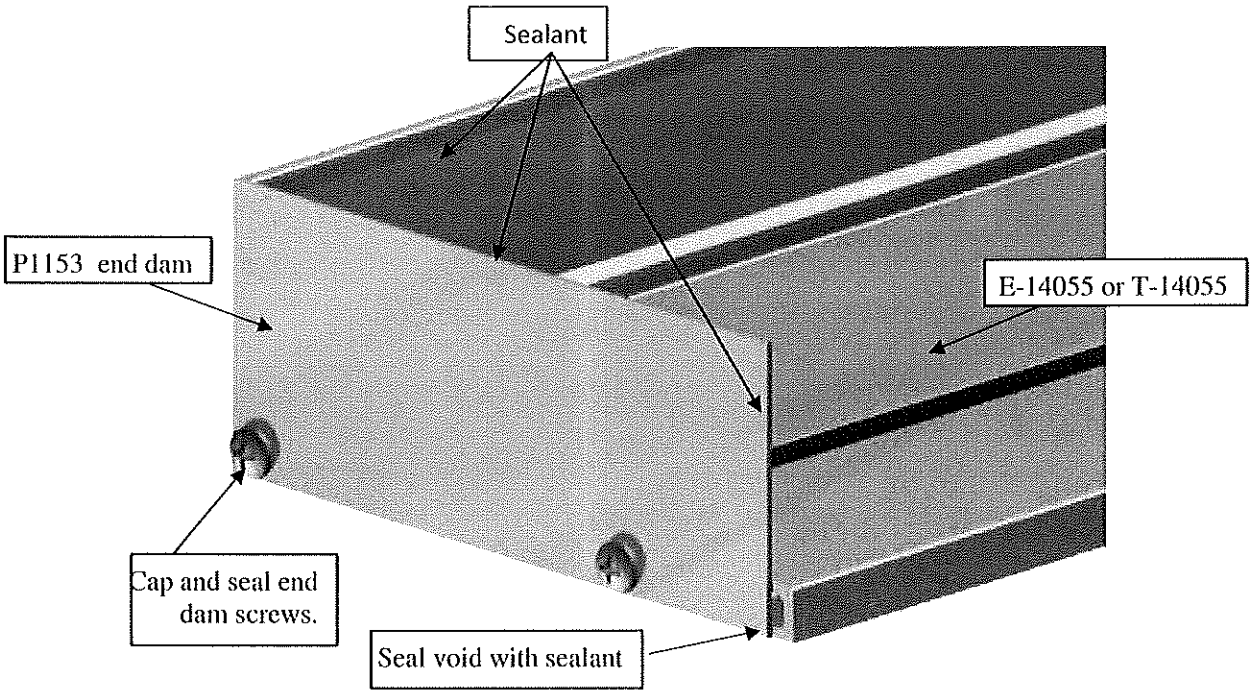


Sealing sill flashing to a door frame



Sealing sill to an end dam at a masonry wall

- Apply a bead of sealant along the back leg of the sill from end to end, straight across any splice joint. (See splicing illustration 24).

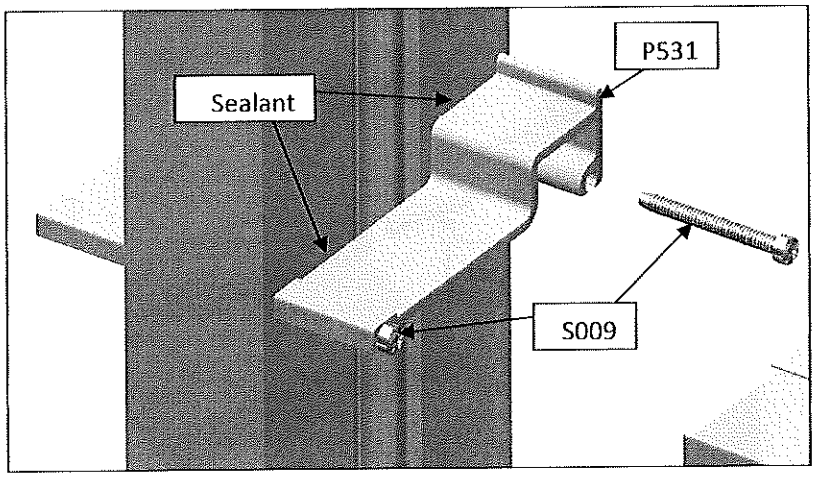


Sealing alternative sub sill E/T14055 to an end dam P1153 at a masonry wall

- At jamb conditions attach a P1153 end dam to the end of the sill 14055 with two S196 screws and seal the sill to the end dam as shown in the illustration above. Cap and seal screws.
- Fill void from the sill and end dam with sealant.
- Apply a bead of sealant along the back leg of the sill from end to end, straight across any splice joint. (See splicing illustration).
- End dam must be completely sealed on all sides. End dam must be sealed to the condition.

Step #3 (shear block only): Seal and secure frame clips to verticals

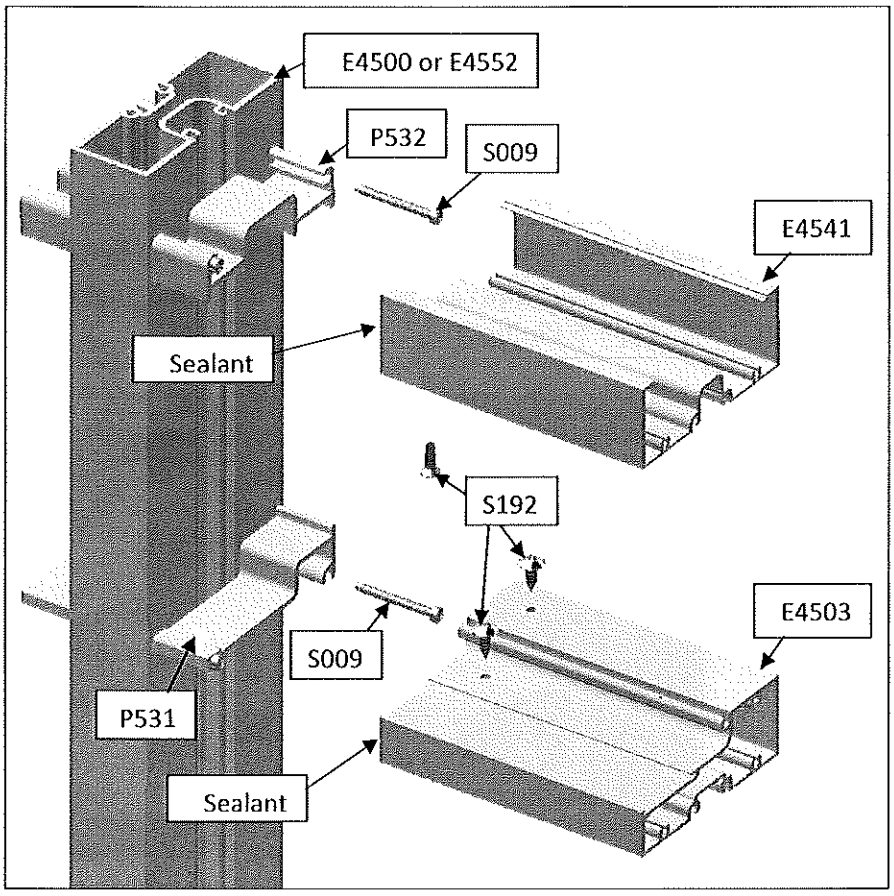
- Apply sealant to shear blocks (frame clips) as shown in the illustration below, and attached to the verticals with #10 x 1 3/4" Type B Phillips pan head screws (S-009).



Sealing and securing frame clips to verticals

Step #4 (shear block only): Attach horizontals to frame clips

- Apply sealant to the contact edge of the horizontal, as shown in the illustration below.

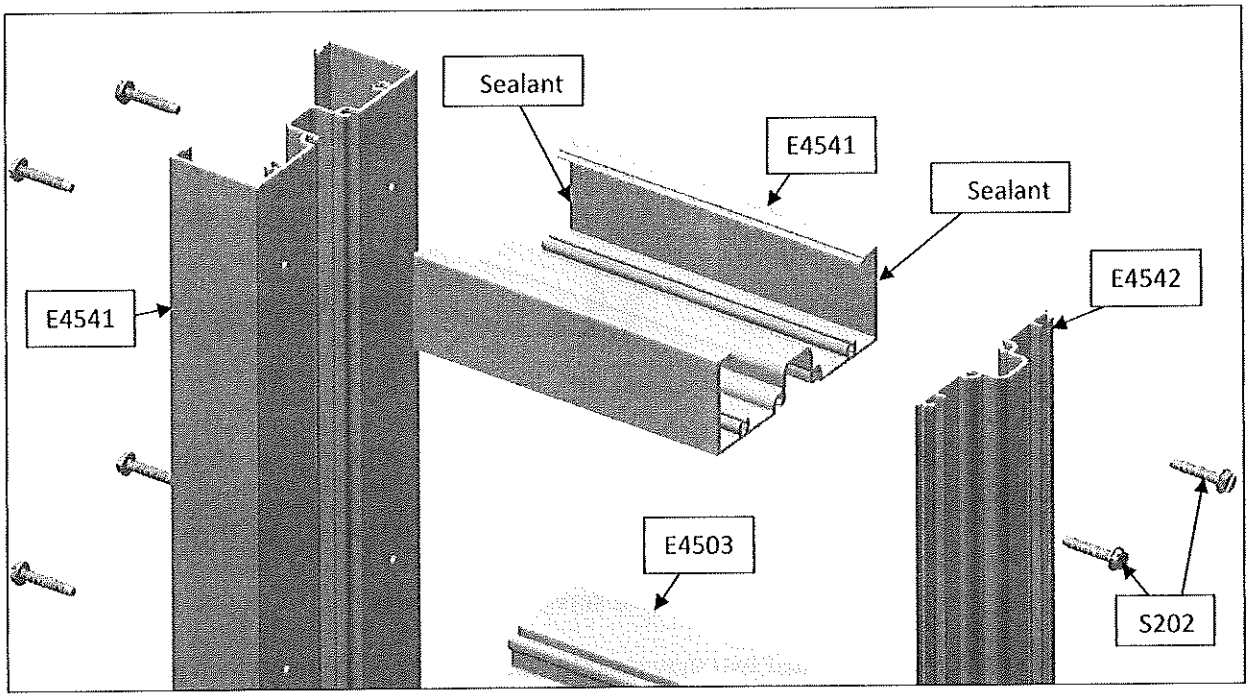


Attaching horizontals to frame clips

- Slide horizontals onto shear blocks (frame clips). Match drill tap holes in the shear blocks using holes in horizontals as guides, and secure horizontals to frame clips with #10 x 5/8" Phillips flat head screws (S-192).
- Apply sealant to the heads of the screws which secure the horizontals to the frame clips.

Step #3 (screw spline only): Attach horizontals to verticals

- Apply sealant to the contact edges of the horizontal as shown in the illustration below and above illustration.

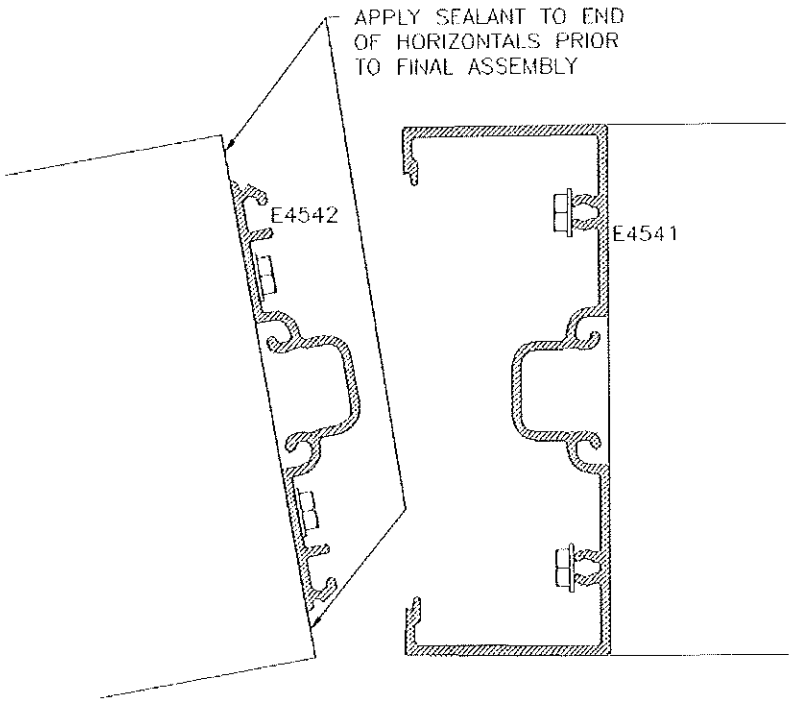


Attaching horizontals to verticals

- Secure horizontals to vertical on one side, and to closure pocket on the other side, using #10-24 x 1" Type 23 Phillips hex head screws (S-202).

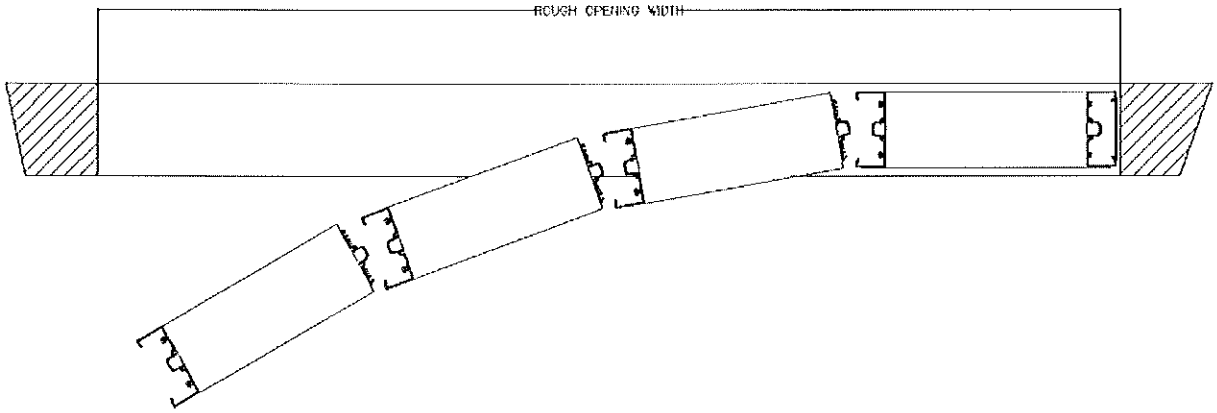
Step #4 (screw spline only): Install assembled units

- Apply sealant to end of horizontal as shown in the illustration below.



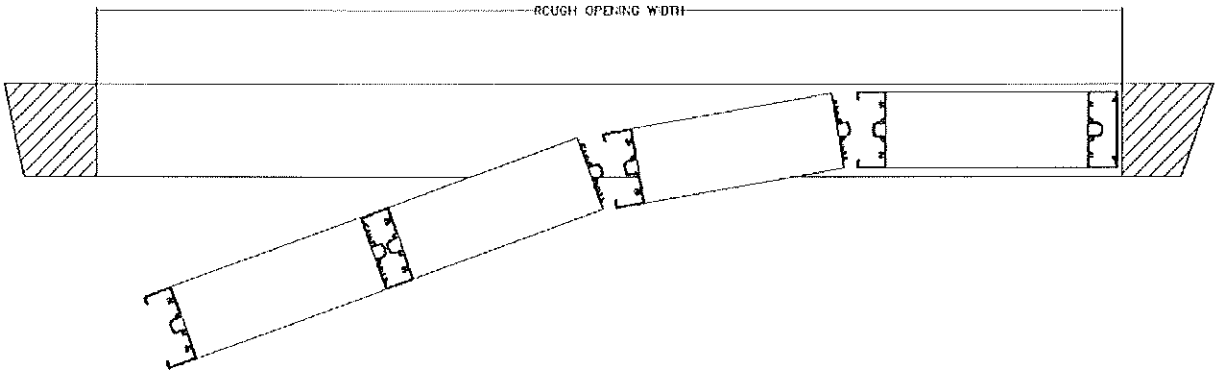
Sealing horizontal before final assembly

- Install the assembled units beginning at the entrance, and working toward the jambs. If there is no entrance, begin at one jamb and work toward the other, as in the illustration below.



Installing assembled screw-spline units

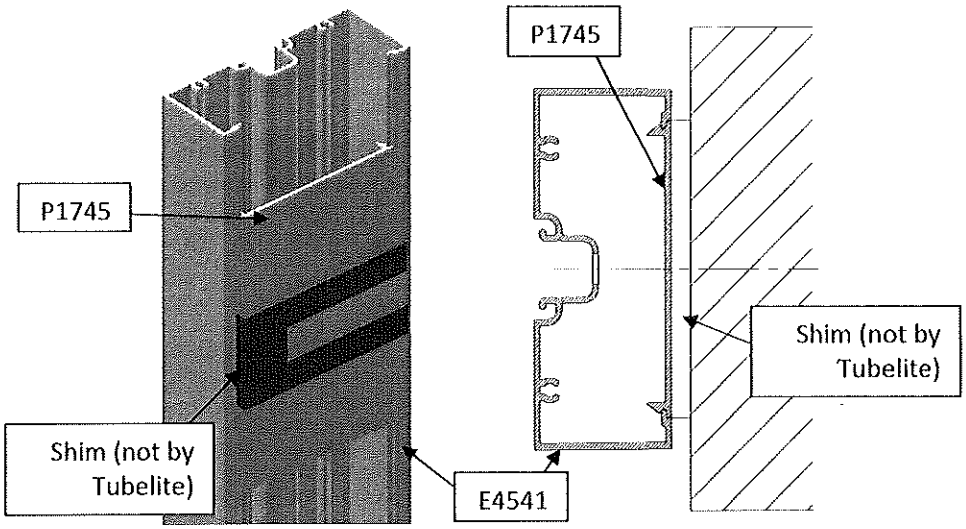
- In the case of smaller units, the last two may need to be snapped together and then pivoted into position together, as in the illustration on page 29.



Installing last two units together

Step #5: Attach frame to masonry

- For shear-block assembly, set the assembled unit into the opening. (For screw-spline assembly, this was done in pieces in Step #4 above.)
- Install shims at head and jambs, as shown in the illustration below. Use a P1745 to provide back-up support for shimming.

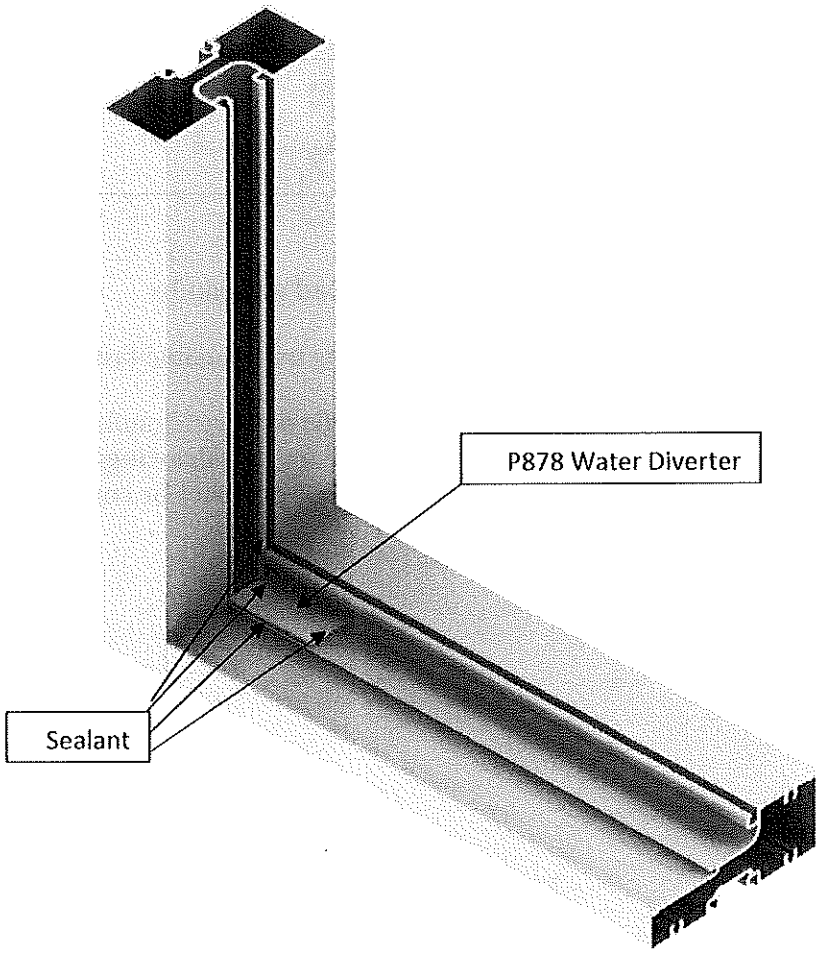


Shimming and anchoring the head and jambs

- Attach the jambs and head to the perimeter of the opening with suitable fasteners.
- Perimeter anchors should be located within 6" of each side of vertical mullions. THIS IS FOR GENERAL ERECTION PROCEDURES ONLY. **Refer to shop drawings for appropriate fastener and hole locations as determined by a qualified engineer or consult the project design professional**

Step #6: Install P878 water diverters

- Use MEK and a clean cloth to clean the surfaces of the horizontals where you will install water diverters. (See illustrations below.) Also clean the vertical reglets on both sides to at least 1" above the gasket reglets on the horizontal member.

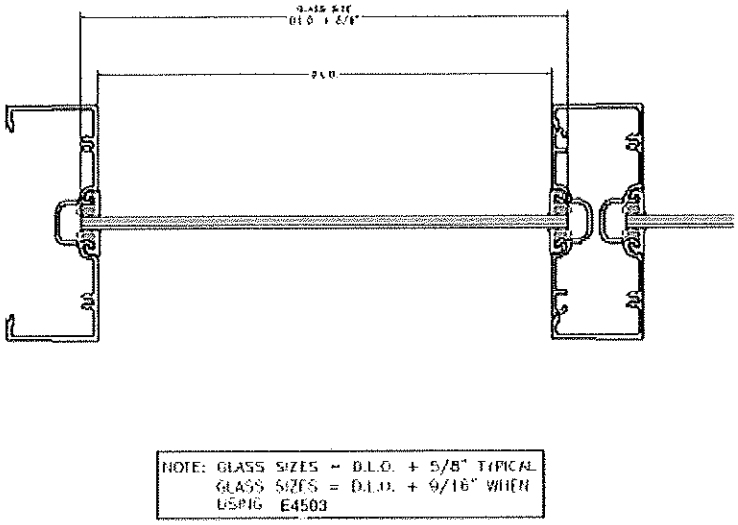


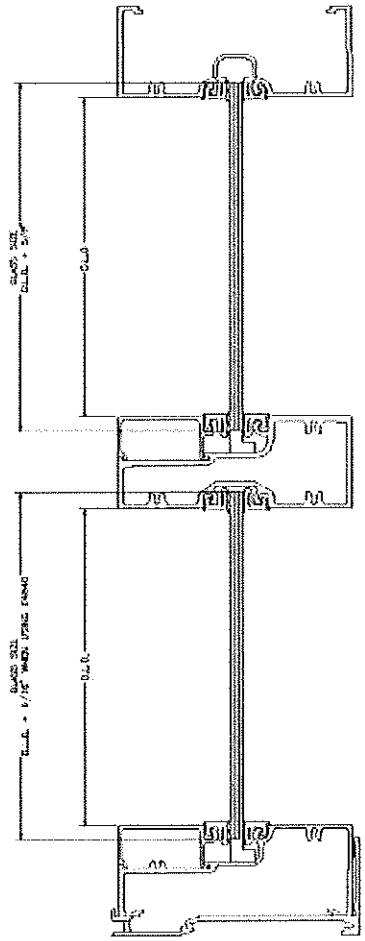
Water diverter -- 3D view

- When the surfaces are dry, peel the paper backing off the water diverter and attach the diverter to the horizontal in the glazing pocket. Extend water diverter past glass edge below.
- Pump sealant into both vertical gasket reglets, and seal the edges of the diverter on all sides **EXCEPT** the edge facing the pocket. You must avoid getting sealant in this area in order to allow the system to drain.
- Seal the joint between the vertical and horizontal members from the diverter to the top of the horizontal gasket reglet.

GLAZING INSTALLATION

Glass dimensions should not exceed day light opening (D.L.O.) plus 5/8". See illustration below.





This formula does not take into account out-of-square openings or glass tolerances. Consult your glass manufacturer before determining final glass sizes.

When cutting gaskets, you should add 1/16" to 1/8" per foot of daylight opening for shrinkage. (An eighth of an inch per foot is approximately 1%.) Open, unsealed gasket joints are a potential source of leakage, and water damage to interior finishes.

Install gaskets on the side of frame opposite glass stop first. Always begin at the ends of the gasket and work toward the center. DO NOT STRETCH THE GASKET OR IT WILL RETURN TO ITS ORGINAL FORM, CREATING GAPS AT THE GASKET INTERSECTIONS.

Step #1: Cut and install the interior gaskets

- Cut interior vertical gaskets to D.L.O. + 1" + shrinkage allowance (see above).
- Install the interior vertical gaskets, beginning 1/2" beyond the surfaces of the adjacent horizontal framing members.
- Apply butyl sealant to the vertical gaskets reglet for 1" from the intersection.

- Cut the interior horizontal gaskets to D.L.O. + shrinkage allowance (see page 30).
- Install the interior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

Step #2: Install the glass

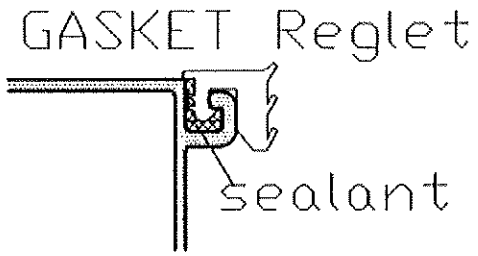
- Position setting blocks (P575) at points under glass at each quarter point (2 setting blocks per light) or as required.
- Position the glass in the frame.
- Lower the glass onto the setting blocks.

Step #3: Cut and install the exterior gaskets

- Cut the exterior vertical gaskets to D.L.O. + 1" + shrinkage allowance (see page 33).
- Install the exterior vertical gaskets. The vertical gasket should start 1/2" above the surface of the upper horizontal, and should extend 1/2" below the surface of the lower horizontal.
- Apply butyl sealant to the vertical gaskets reglet for 1" from the intersection.
- Cut the exterior horizontal gaskets to D.L.O. + shrinkage allowance (see page 33).
- Install the exterior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

Step #4: Seal perimeter of installation

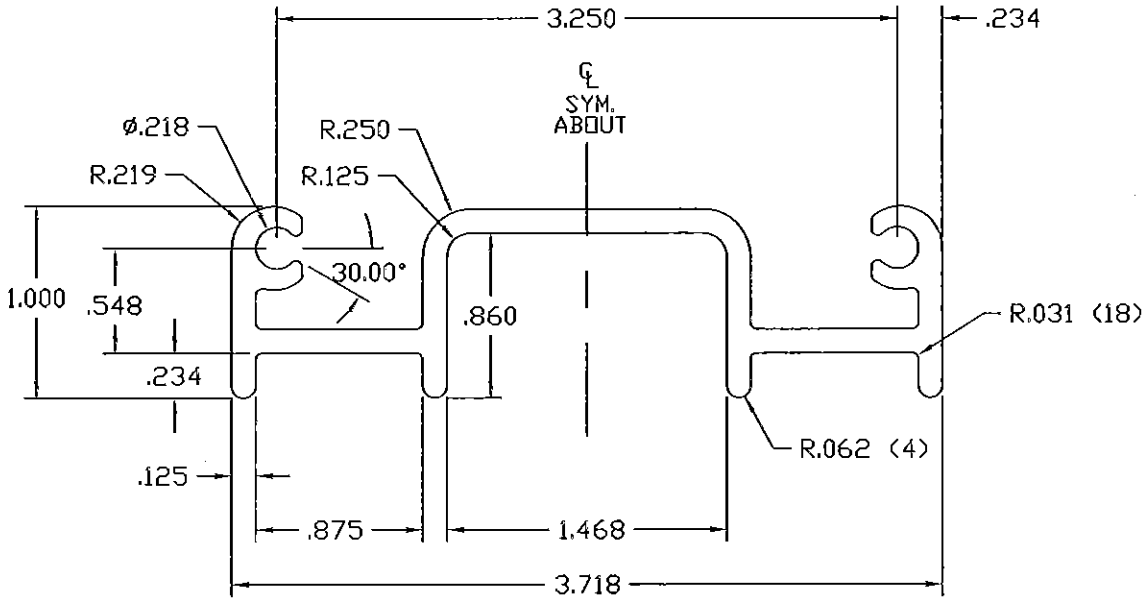
- Insert backer rod into the gap between the frame and the building substrate on top, sides, and bottom of the installation.
- Apply sealant to fill the void.
- Tool the sealant smooth.



APPENDIX D:

Die/Part Drawings
21 SHEETS

E4016



ACTUAL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-1150-44

Date 10/26/12 **Tech** AP

NO EXPOSED SURFACES

USE WITH E4000 & E4012

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
X	XX/XX/XX	XXXXXXXXX	XXX

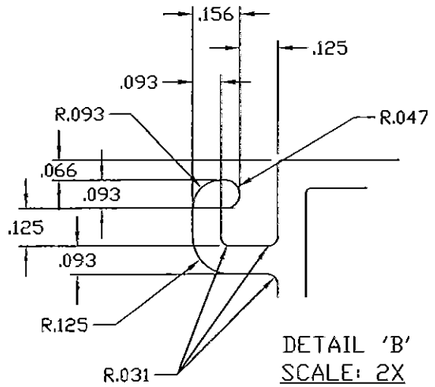
WALL THK. .125	SECTION CLASS S	MAT'L 6063-T5	RATIO 57:1
PERIMETER OUT (TOTAL) 15.533		AREA .970	WGT/FT 1.141
FACTOR 14	CIRCLE SIZE 3.792		INFILL VOLUME N/A

RXX 1.282	SXX .858	IXX 1.594	CXX 1.859
RYY .292	SYY .184	IYY .083	CYY .550

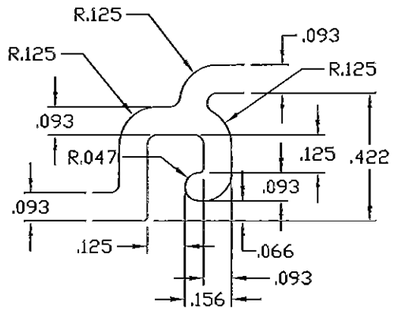
HORIZONTAL HEAD ANCHOR
E4000 STOREFRONT

DRAWN BY LDO	DRWG DATE 11/30/05	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 150	E4016	REV

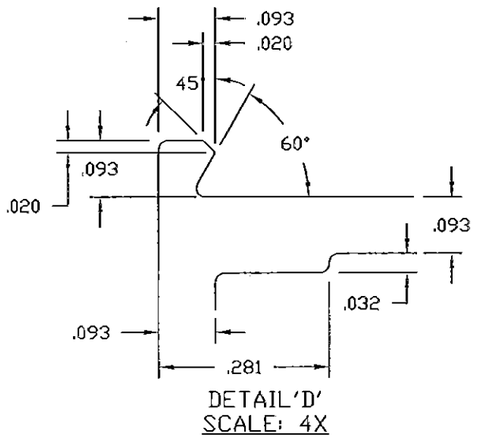
E4503 C



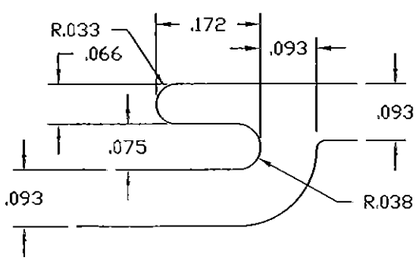
DETAIL 'B'
SCALE: 2X



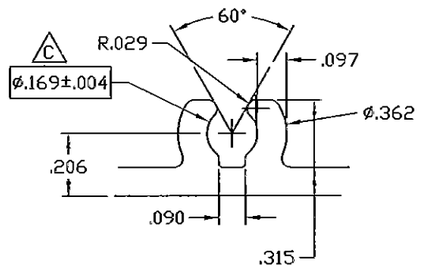
DETAIL 'E'
SCALE: 2X



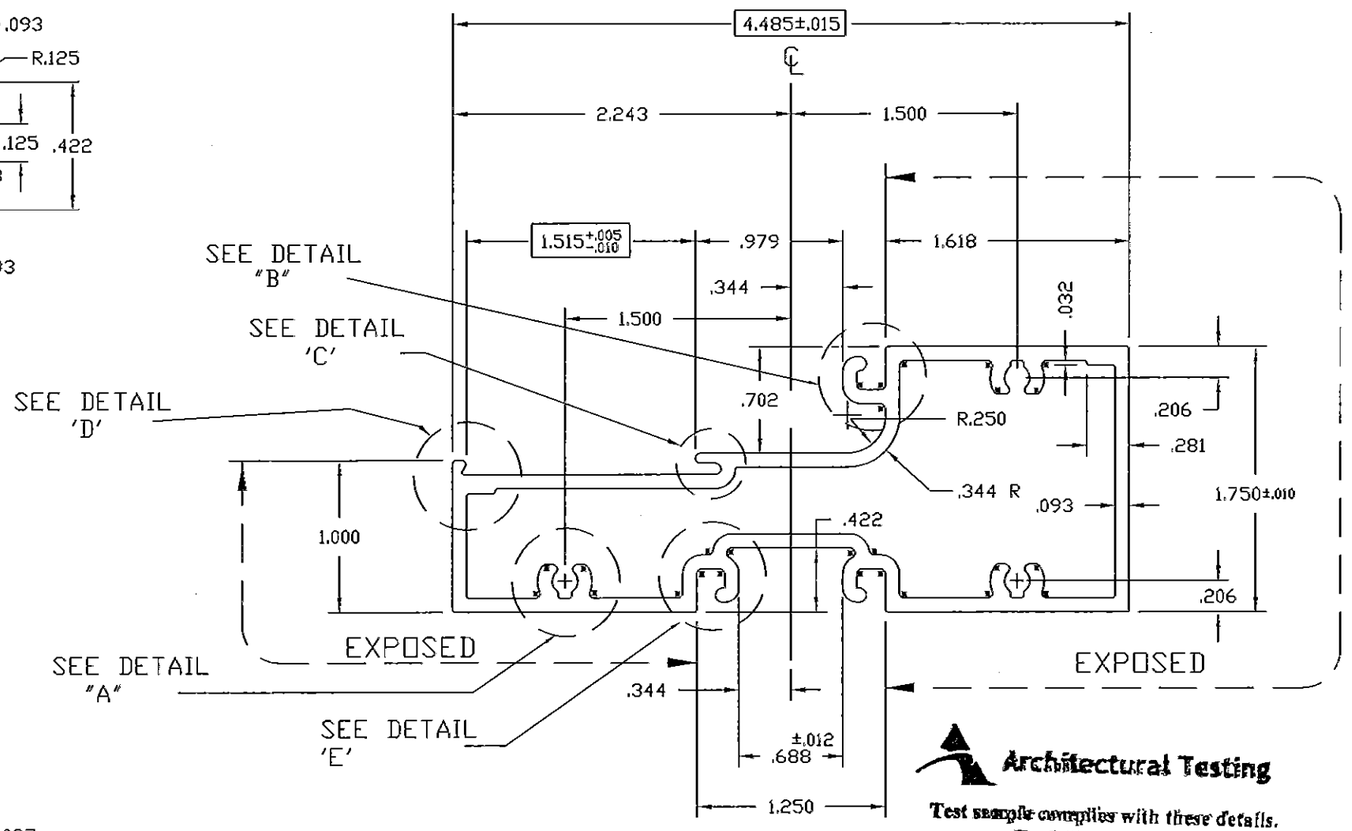
DETAIL 'D'
SCALE: 4X



DETAIL 'C'
SCALE: 4X



DETAIL 'A'
SCALE: 2X



ACTUAL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# C1529.01-450-44

Date 10/24/12 Tech AD

TYP WALL = .093 +.009 -.005

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
ED	11-03-95	REDRAWN FOR AUTOCAD R12	ALT
A	11/29/06	CHANGED PART NUMBER FROM E4503 TO E45003	NIK
B	05/01/07	CHANGED PART NUMBER FROM E45003 TO E4503	JEH
C	01/12/11	WAS .162+/-.004	CRH

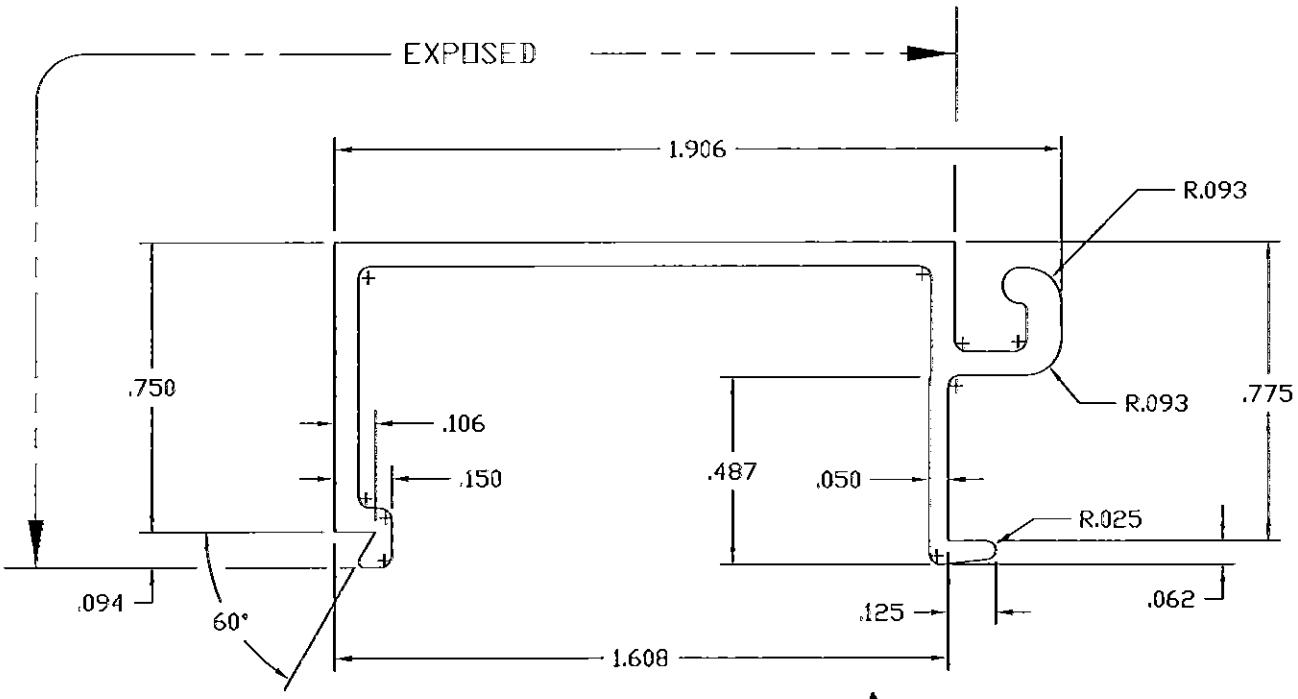
WALL THK. NOTED	SECTION CLASS H	MAT'L 6063-T5	RATIO 381
PERIMETER OUT (TOTAL) 15.736 (30.277)		AREA 1.458	WGT/FT 1.715
FACTOR 18	CIRCLE SIZE 4.809		INFILL VOLUME N/A

RXX 1.406	SXX 1.181	IXX 2.881	CXX 2.439
RYY .584	SYY .477	IYY .497	CYY 1.041

HORIZONTAL MULLION
4500 SERIES

DRAWN BY ALT	DRWG DATE 09/21/95	APPV'D BY	DATE APPV'D	REV
DWG SCALE NOTED	PRODUCT CODE 160	E4503		C

E4504



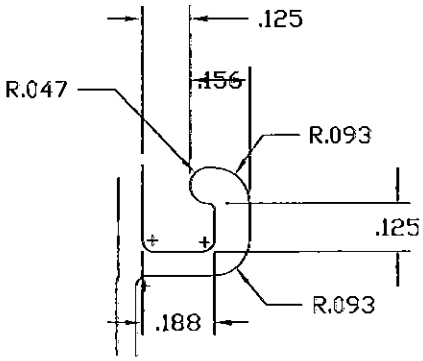
TWO TIMES SCALE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

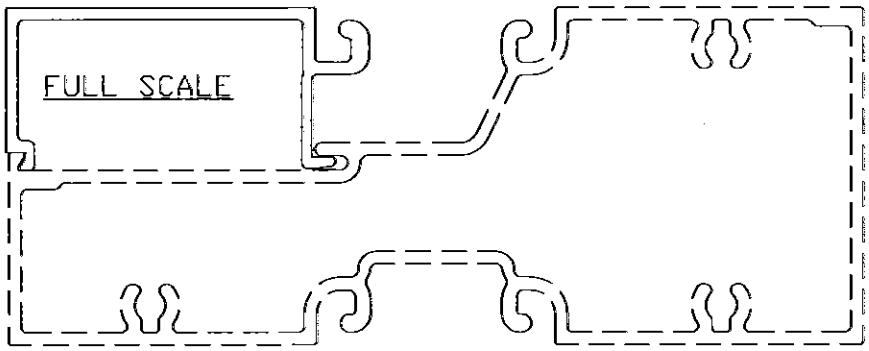
Report # C1529.01-450-14

Date 10/26/12 Tech



TWO TIMES SCALE

E4503



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

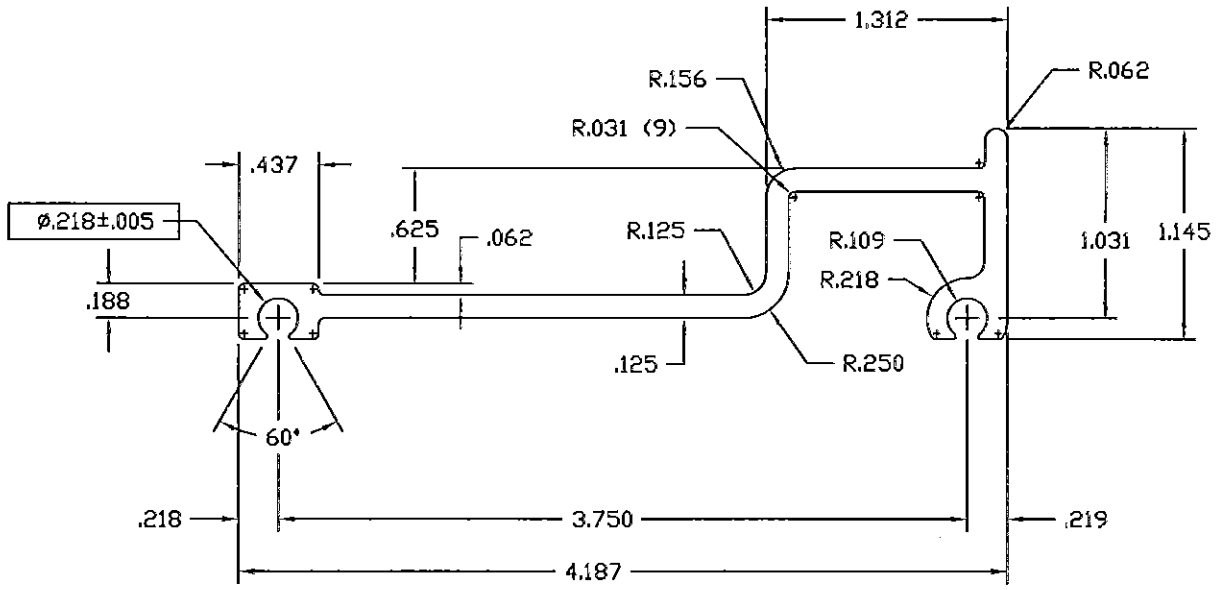
WALL THK. .062	SECTION CLASS S	MAT'L 6063-T5	RATIO 56
PERIMETER OUT (TOTAL) 7.8147		AREA .244	WGT/FT .287
FACTOR 27	CIRCLE SIZE 2.005		INFILL VOLUME N/A

RXX .698	SXX .123	IXX .118	CXX .959
RYY .259	SYY .027	IYY .016	CYY .591

SQUARE SNAP IN STOP 3/4" X 1 29/32"
E4500 STOREFRONT

DRAWN BY PJ	DWG DATE 01/31/85	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 160	E4504	REV

E4517



FULL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AA

NO EXPOSED SURFACES

USED W/ E4503, E4519, E4523

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
X	XX/XX/XX	XXXXXXXXXXXXX	XXX

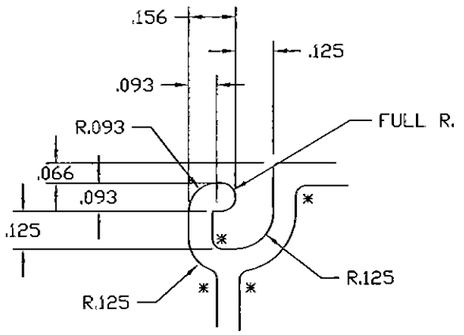
WALL THK. .125	SECTION CLASS S	MAT'L 6063-T5	RATIO 681
PERIMETER OUT (TOTAL) 13.362		AREA .812	WGT/FT .955
FACTOR 14	CIRCLE SIZE 4.320		INFILL VOLUME N/A

RXX 1.359	SXX .896	IXX 1.500	CXX 2.512
RYY .308	SYY .194	IYY .077	CYY .748

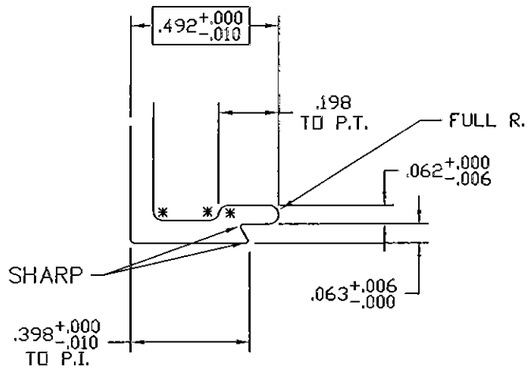
HORIZONTAL EXTRUSION FRAME CLIP
E4500 STOREFRONT

DRAWN BY LDD	DRWG DATE 12/15/04	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 160	E4517	REV

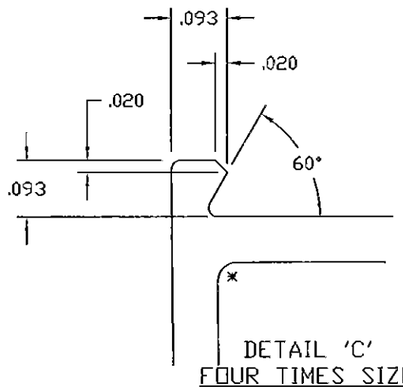
E4540 C



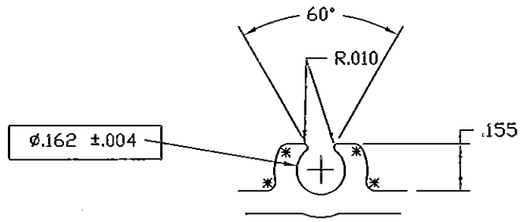
DETAIL 'A'
TWO TIMES SIZE



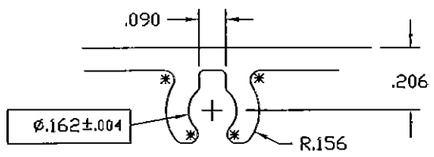
DETAIL 'B'
TWO TIMES SIZE



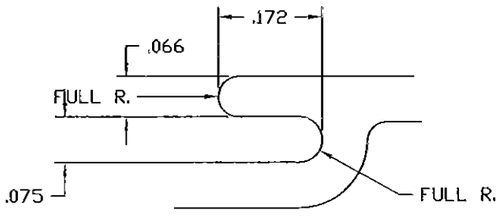
DETAIL 'C'
FOUR TIMES SIZE



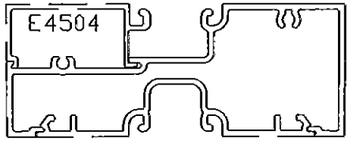
DETAIL 'D'
TWO TIMES SIZE



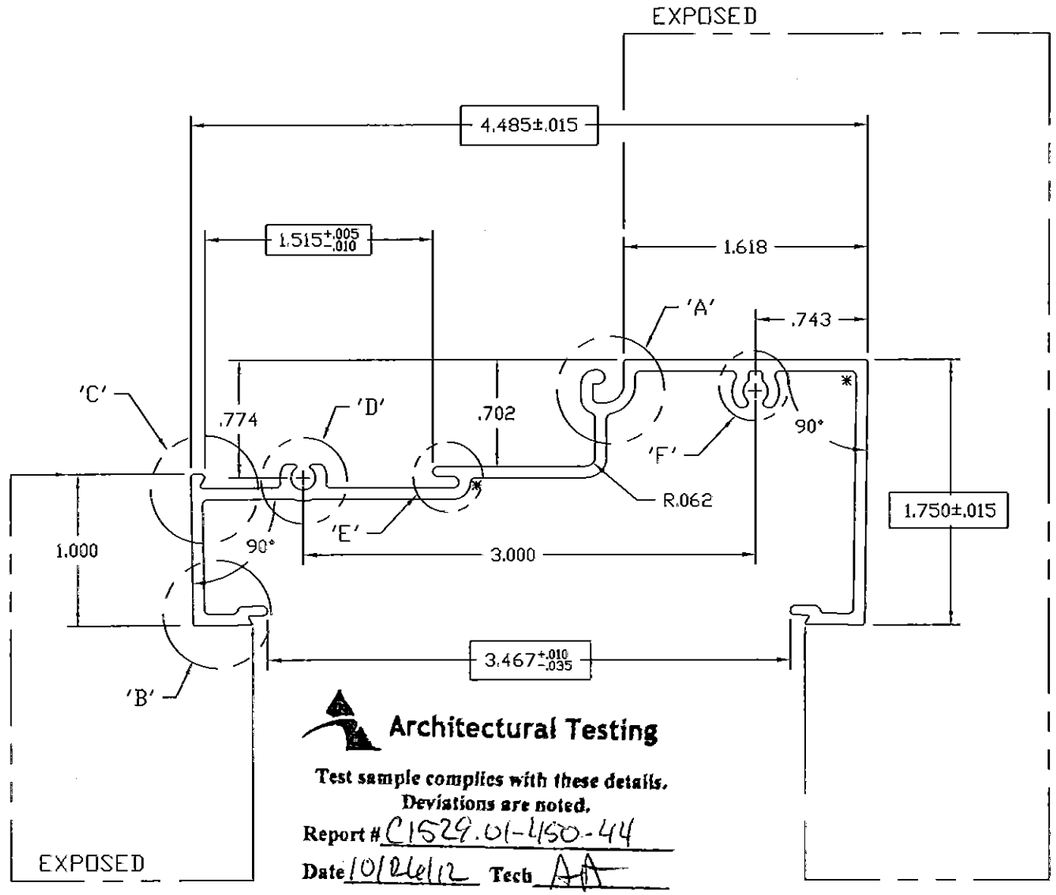
DETAIL 'F'
TWO TIMES SIZE



DETAIL 'E'
FOUR TIMES SIZE



HALF SIZE ASSEMBLY



FULL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-1150-44

Date 10/26/12 Tech AA

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
A	03/07/03	REVISED GL POCKET AND REGLET - REDUCED WEIGHT	SRD
	03/07/03	RENAMED E912011 - RELEASE FOR PRODUCTION	SRD
B	11/29/06	CHANGED PART NUMBER FROM E4540 TO E45040	NIK
C	05/01/07	CHANGED PART NUMBER FROM E45040 TO E4540	JEK

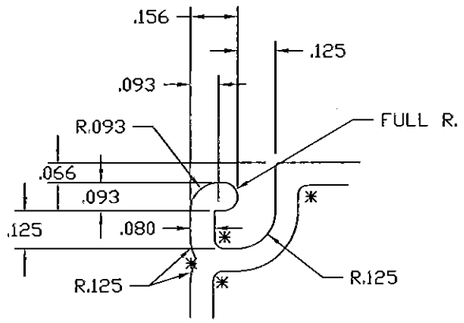
WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 7.31
PERIMETER OUT (TOTAL) 19.877		AREA .755	WGT/FT .888
FACTOR 22	CIRCLE SIZE 4.798	INFILL VOLUME N/A	

RXX 1.586	SXX .771	IXX 1.899	CXX 2.464
RYY .530	SYY .211	IYY .212	CYY 1.007

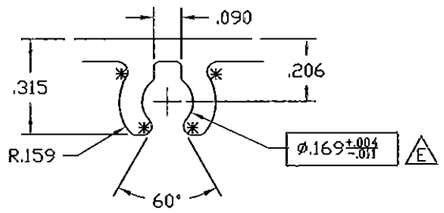
SILL 1 3/4" X 5"
E4500 STOREFRONT

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
SRD	12/16/02			
DWG SCALE NOTED	PRODUCT CODE 160	E4540		C

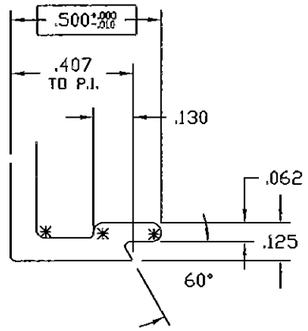
E4541 E



DETAIL 'A'
TWO TIMES SIZE



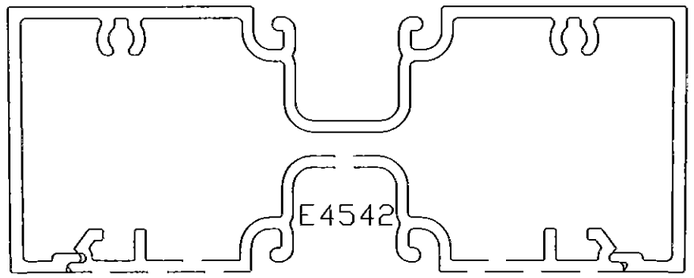
DETAIL 'C'
TWO TIMES SIZE



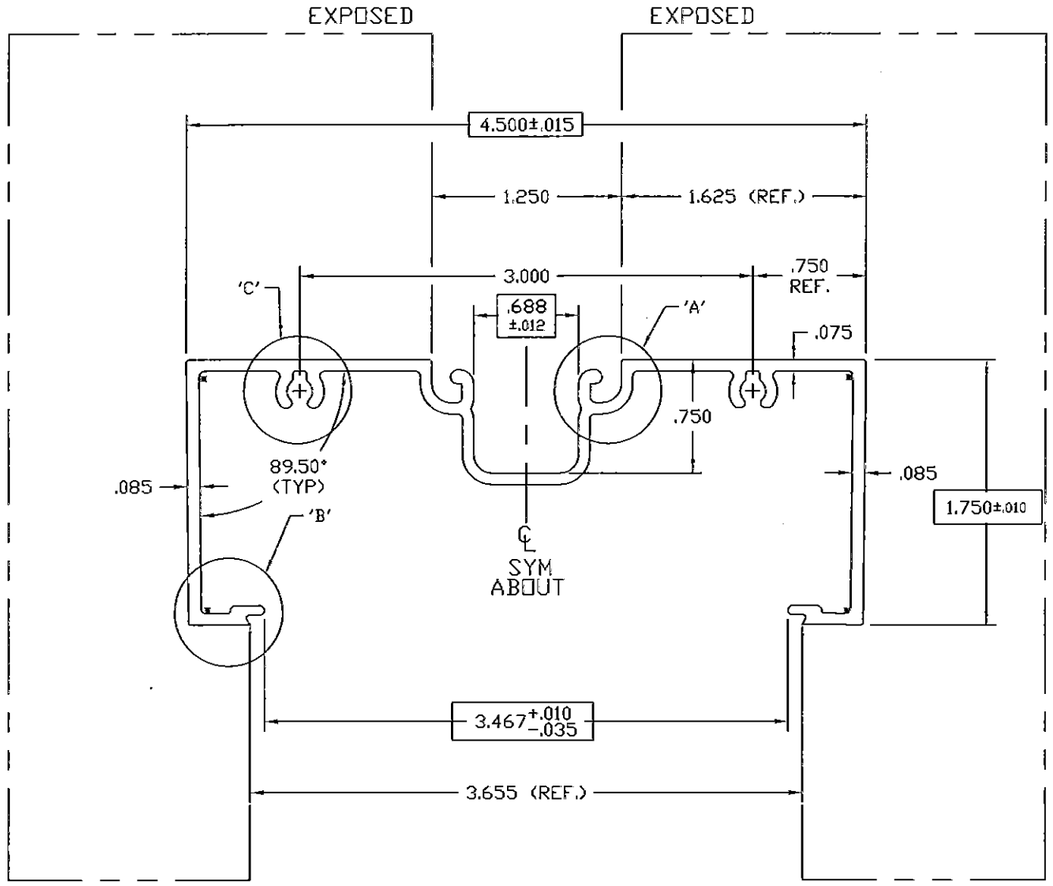
DETAIL 'B'
TWO TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-44
Date 10/26/12 Tech AP



HALF SIZE ASSEMBLY



FULL SIZE

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
A	03-11-02	CORRECTED SCREW BOSS TO .080 WALL TYP.	CRH
B	03/07/03	REVISED GL POCKET AND REGLET - REDUCED WEIGHT	SRD
	03/07/03	RENAMED E912C12 - RELEASE FOR PRODUCTION	SRD
C	12/05/06	PART NUMBER CHANGED FROM E4541 TO E45041	NIK
D	05/01/07	PART NUMBER CHANGED FROM E45041 TO E4541	JEM
E	02/17/12	WAS .162 ±.004	CRH

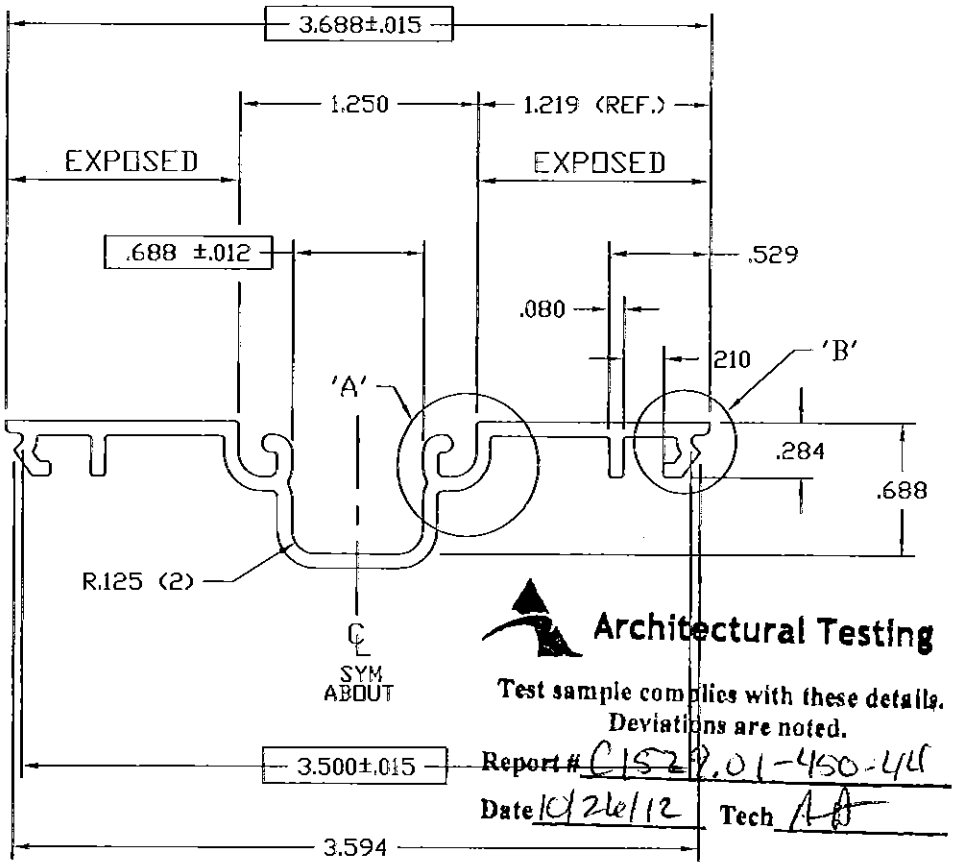
WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 6:1
PERIMETER OUT (TOTAL) 22.810		AREA .905	WGT/FT 1.064
FACTOR 22	CIRCLE SIZE 4.818	INFILL VOLUME N/A	

RXX 1.636	SXX 1.076	IXX 2.420	CXX 2.250
RYY .563	SYY .240	IYY .287	CYY 1.196

HEAD/JAMB/MULLION 1 3/4" X 4 1/2"
E4500 STOREFRONT

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D	REV
SRD	12/04/02			
DWG SCALE NOTED	PRODUCT CODE 160	E4541		E

E4542 B



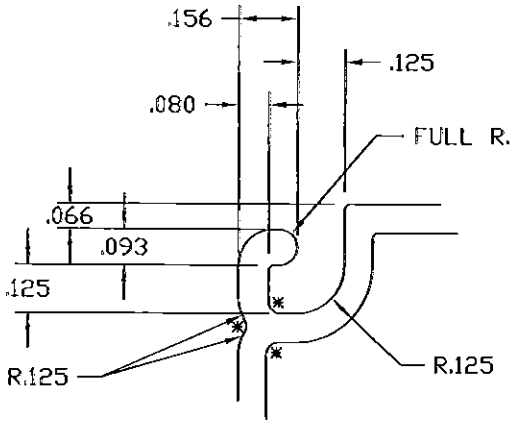
FULL SIZE

Architectural Testing

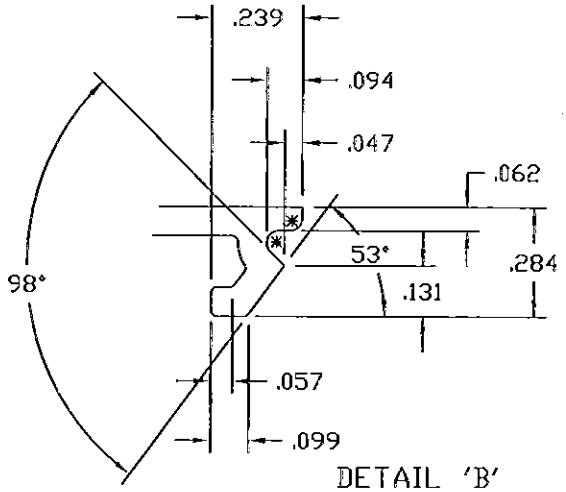
Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AA



DETAIL 'A'
TWO TIMES SIZE



DETAIL 'B'
TWO TIMES SIZE

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
A	03/07/03	REVISED GL POCKET AND REGLET - REDUCED WEIGHT	SRD
	03/07/03	RENAMED E912C13 - RELEASE FOR PRODUCTION	SRD
B	11/29/05	PART NUMBER WAS E4542 NOW E45042	NIK
C	05/01/07	PART NUMBER WAS E45042 NOW E4542	JEN

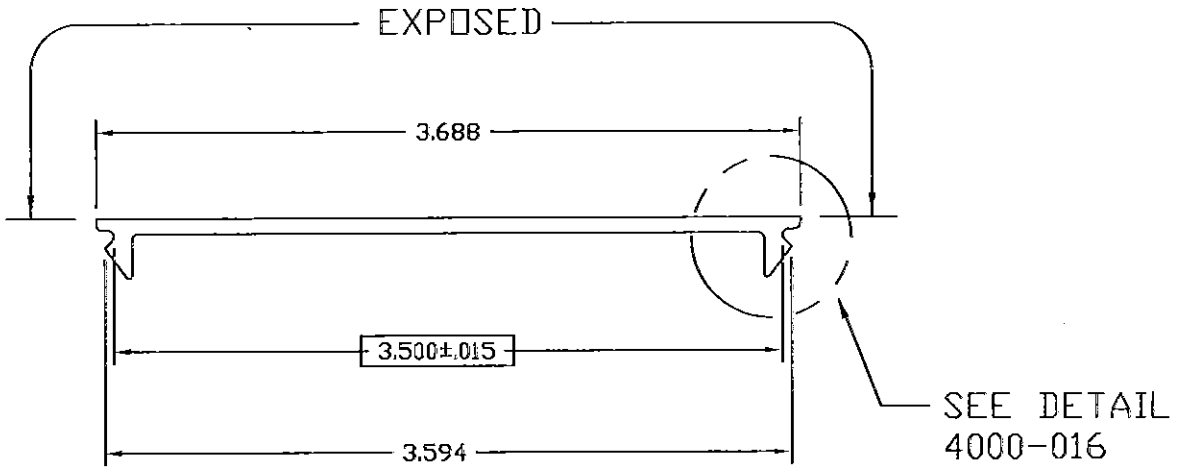
WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 117:1
PERIMETER OUT (TOTAL) 12.466		AREA .472	WGT/FT .555
FACTOR 23	CIRCLE SIZE 3.688		INFILL VOLUME N/A

RXX 1.043	SXX .278	IXX .513	CXX 1.844
RYY .232	SYY .048	IYY .025	CYY .531

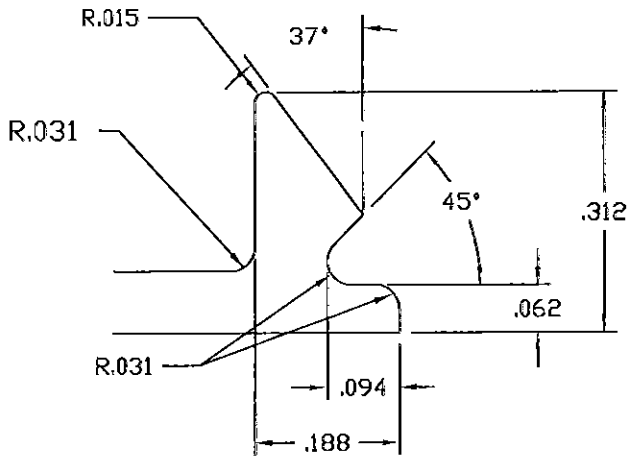
SNAP-IN FILLER
E4500 STOREFRONT

DRAWN BY SRD	DRWG DATE 12/07/02	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 160	E4542	REV B

E4543



ACTUAL SIZE



4000-016

FOUR TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AD

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
		RELEASE TO TOOLING	
	6/26/86	RELEASE TO PRODUCTION	

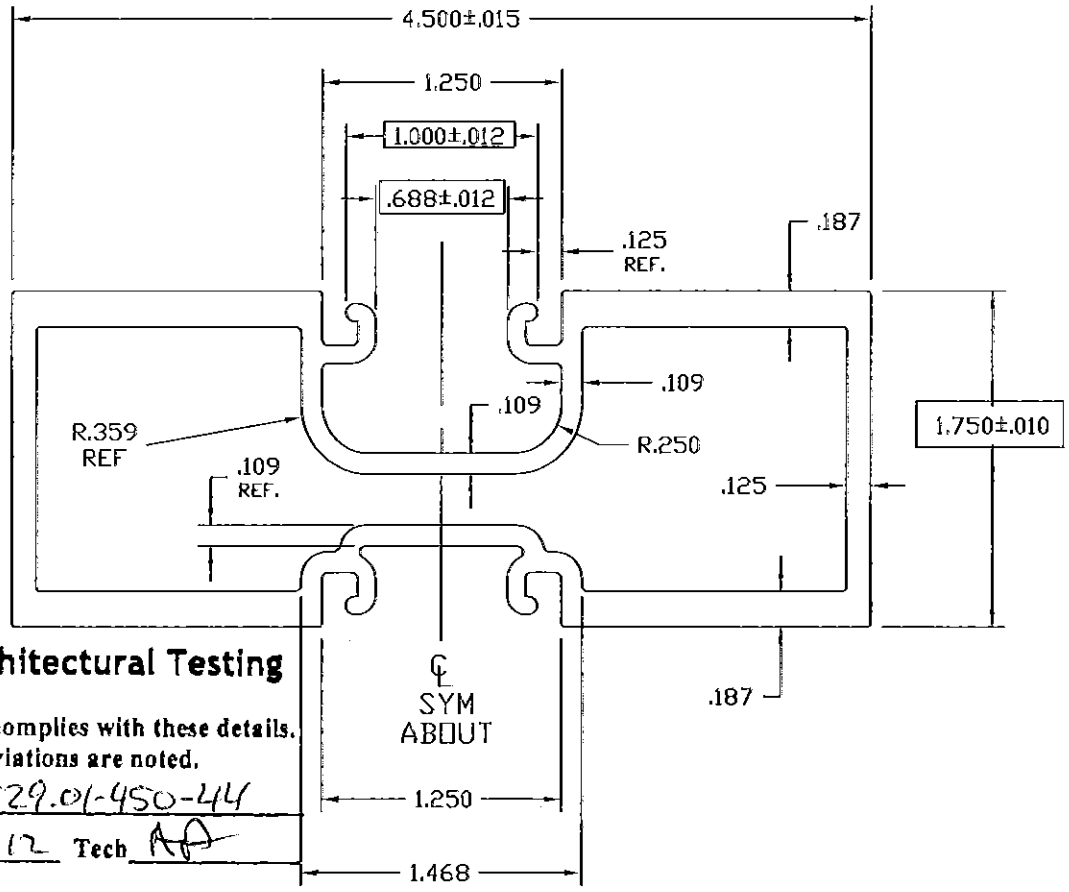
WALL THK. .080	SECTION CLASS S	MAT'L 6063-T5	RATIO 1651
PERIMETER OUT (TOTAL) 8.341		AREA .334	WGT/FT .393
FACTOR 21	CIRCLE SIZE 3.688		INFILL VOLUME N/A

RXX 1.156	SXX .242	IXX .447	CXX 1.844
RYY .054	SYY .004	IYY .001	CYY .255

FLAT SNAP-IN FILLER
E4500 STOREFRONT

DRAWN BY LS	DRWG DATE 10/22/85	APPV'D BY	DATE APPV'D
DWG SCALE FULL	PRODUCT CODE 160	E4543	REV

E4552

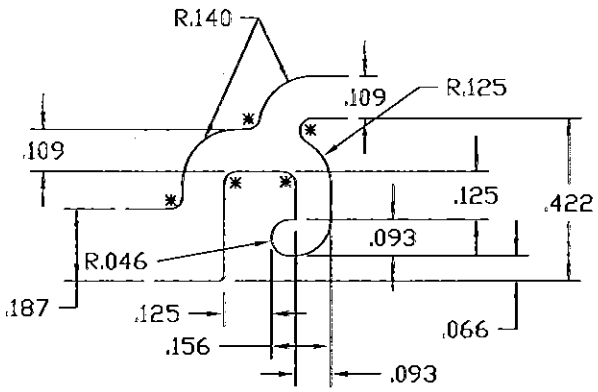


Architectural Testing

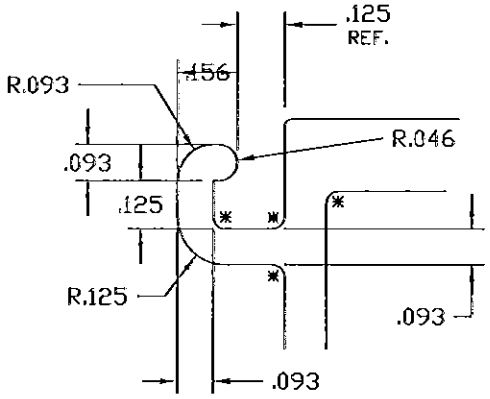
Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AD



TWO TIMES SIZE



TWO TIMES SIZE

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
X	XX/XX/XX	XXXXXXXXXXXXX	XXX

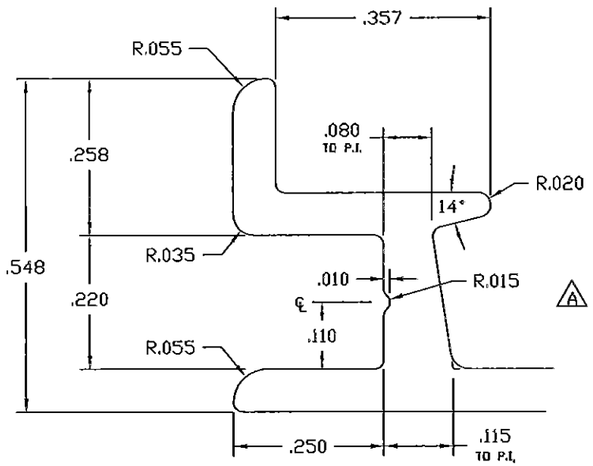
WALL THK. NOTED	SECTION CLASS H	MAT'L 6063-T5	RATIO 25:1
PERIMETER OUT (TOTAL) 17.776(30.606)		AREA 2.180	WGT/FT 2.564
FACTOR 12	CIRCLE SIZE 4.800		INFILL VOLUME N/A

RXX 1.449	SXX 2.033	IXX 4.574	CXX 2.250
RYY .654	SYY 1.54	IYY .933	CYY .885

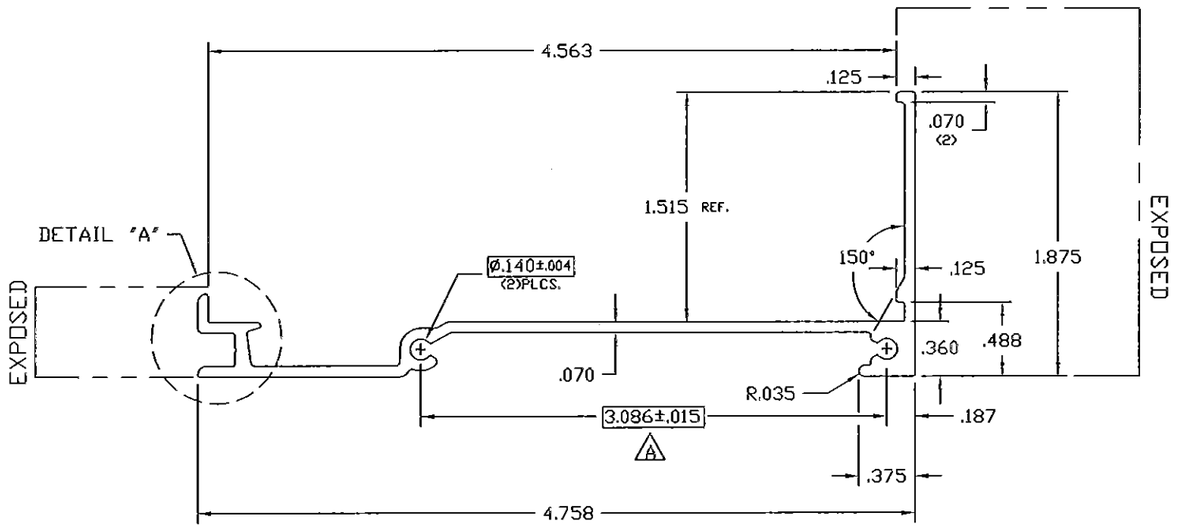
DOOR JAMB 1 3/4" X 4 1/2"
E4500 STOREFRONT

DRAWN BY LS	DRWG DATE 02/13/85	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 160	E4552	REV

E14059



DETAIL "A"
FOUR TIMES SIZE



FULL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # CTS29.01-450-44

Date 10/26/12 Tech: AA

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
	01/08/10	WAS E14159 REV A	CRH

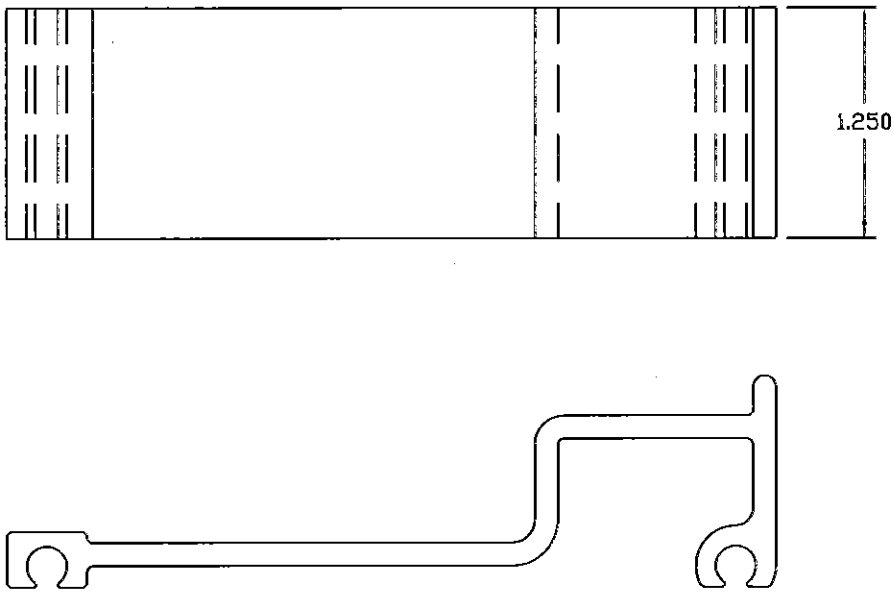
WALL THK. .070	SECTION CLASS S	MAT'L 6063-T5	RATIO 9:1
PERIMETER OUT (TOTAL) 16.039		AREA .610	WGT/FT .717
FACTOR 23	CIRCLE SIZE 5.105		INFILL VOLUME N/A

RXX 1.724	SXX .641	IXX 1.811	CXX 2.824
RYY .418	SYY .072	IYY .107	CYY 1.483

SILL FLASHING
E14000 NON THERMAL STOREFRONT

DRAWN BY CRH	DRVG DATE 01/08/10	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14059		REV

P531



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AH

CUT TO LENGTH FROM E4517
FOR CATALOG USE ONLY

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

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

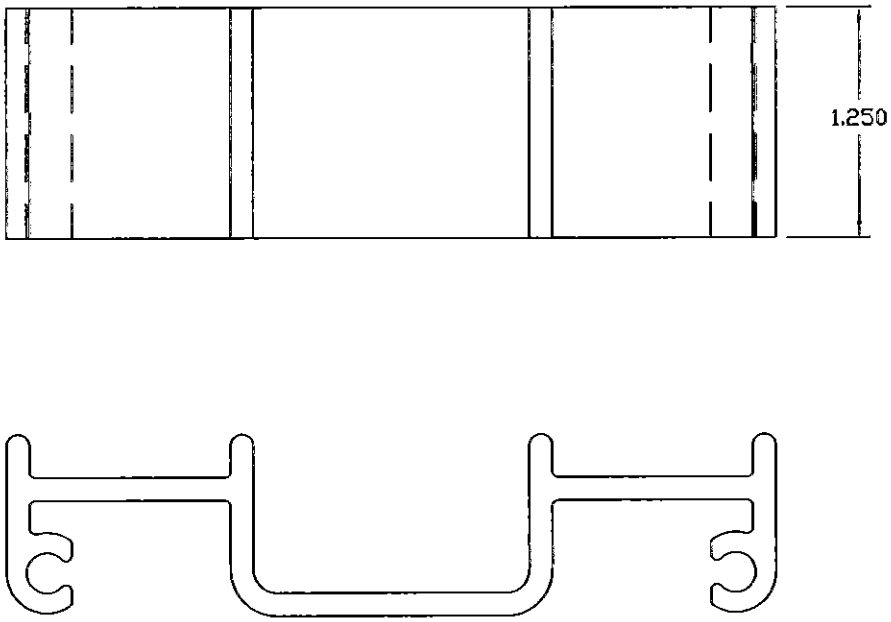
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	XX/XX/XX	XXXXXXXXXXXXXXXX	XXX

FRAME CLIP TO USE WITH
E4503, E4519, AND E4523
E4500 STOREFRONT

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
PJ	01/04/71			
DRWG SCALE FULL	PRODUCT CODE 160	P531		

P532



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AA

CUT TO LENGTH FROM E4516
CATALOG USE ONLY

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

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

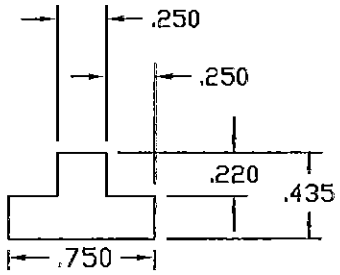
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	XX/XX/XX	XXXXXXXXXXXXXXXXX	XXX

FRAME CLIP TO USE WITH E4500, E4501, E4512, E4521, E4522, AND E4524
E4500 STOREFRONT

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D
FULL	03/25/02		
DRVG SCALE FULL	PRODUCT CODE 160	P532	REV

P575 A



FULL SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 **Tech** AA

SUPPLIER - RYADON INC.

MATERIAL - EPDM 85-90 DUROMETER

SETTING BLOCK IS 4" IN LENGTH

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

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

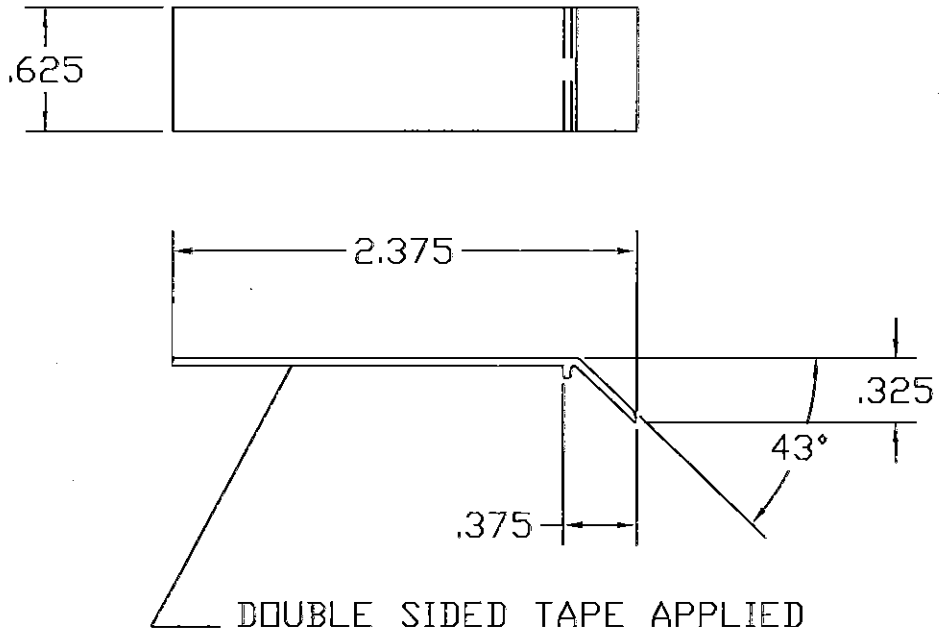
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	10/30/06	RELEASED FOR PRODUCTION	NIK
A	01/20/11	Revised dwg to reflect part	IT

SETTING BLOCK FOR 1/4" GLASS
4500 SERIES STOREFRONT

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
SRD	10/11/06			
DRWG SCALE FULL	PRODUCT CODE 160	P575		A

P878



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AB

MATERIAL: 80 DUROMETER BLACK RIGID PVC WITH DOUBLE SIDED TAPE APPLIED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

[ ] DENOTES CRITICAL DIMENSION

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

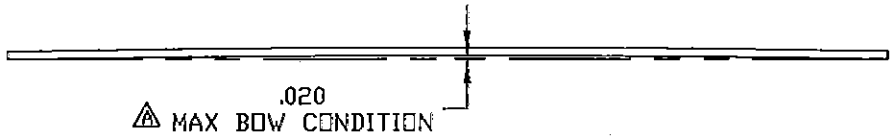
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

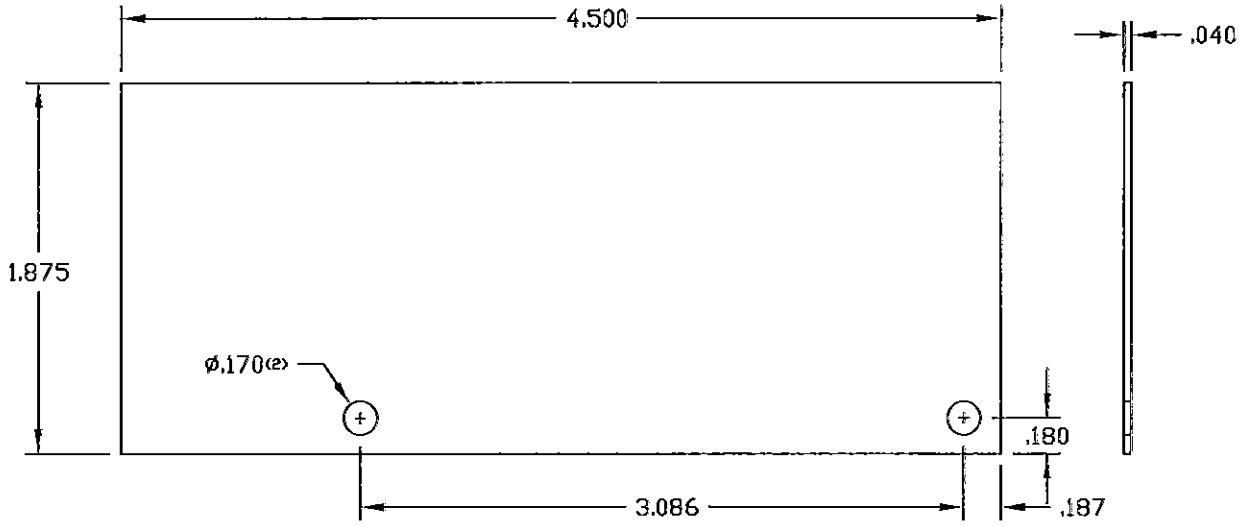
REV	DATE	DESCRIPTION	INTL
X	XXXXXXXX	XXXXXX	XXX

WATER DIVERTER
4500 SERIES STOREFRONT

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
JWC	10/16/09			
DRWG SCALE ACTUAL	PRODUCT CODE 180	P878		

P1153 A





NO EXPOSED SURFACES

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 10/26/12 Tech AD

MATERIAL - .040 ALUMINUM SHEET
PART TO HAVE MINIMUM BURR CONDITION
TO BE SOLD IN PACKAGES OF 20

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	01/20/10	RELEASED FOR PRODUCTION	CRH
A	02/24/10	ADDED MAX BOW CONDITION NOTE	CRH

SCREW APPL'D END DAM
14000 SERIES
USE WITH E/T14055, 14259 AND E14059

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
CRH	9/9/09			
DRWG SCALE FULL	PRODUCT CODE 180	P1153		A

P1745 A

PART No.	CUT LENGTH
P-1745	6"

OPERATION:

1. CUT TO LENGTH FROM E-4543

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-14

Date 10/26/12 Tech AH

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

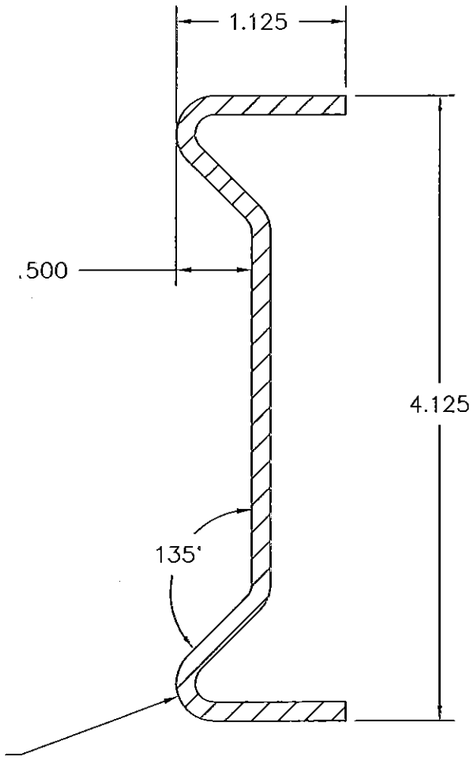
REV	DATE	DESCRIPTION	INTL
	07/21/94	Release to Production per ED 1929	TPB
	12/01/94	Revise from 4" to 6" and Release to production per ED 1977	KVH
A	12/12/02	Updated to P-Part Titleblock	DMT

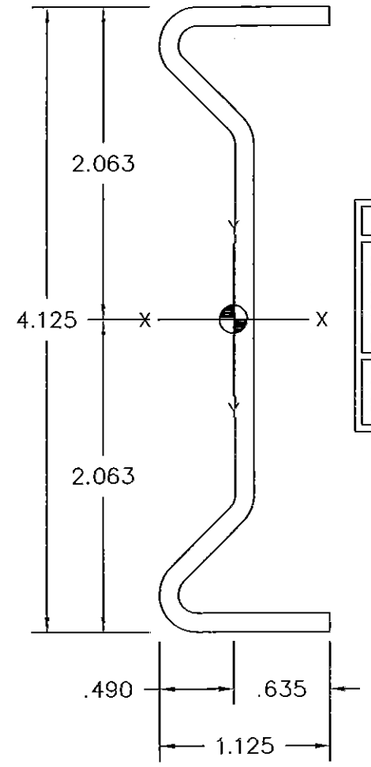
Snap In Anchor Support

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D
TB	07/21/94		

DRWG SCALE	PRODUCT CODE		REV
None	110	P1745	A

P1437 C





P1437

SECTION PROPERTIES					
Ixx	1.754	in^4	Iyy	.047	in^4
Sxx(max)	.850	in^3	Syy(max)	.096	in^3
Sxx(min)	.850	in^3	Syy(min)	.074	in^3
rxx	1.487	in	ryy	.244	in
Area	.793	in^2	Weight	2.694	lbs/ft
Perim.	12.942	in	Wall Thk.	0	in

STEEL Ixx 5.0866

Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-44
Date 10/29/12 **Tech** AO

1/8" Hot Rolled Steel x 12 ft Long
Two Coats of Zinc Chromate Primer

ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
▭ DENOTES CRITICAL DIMENSION

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

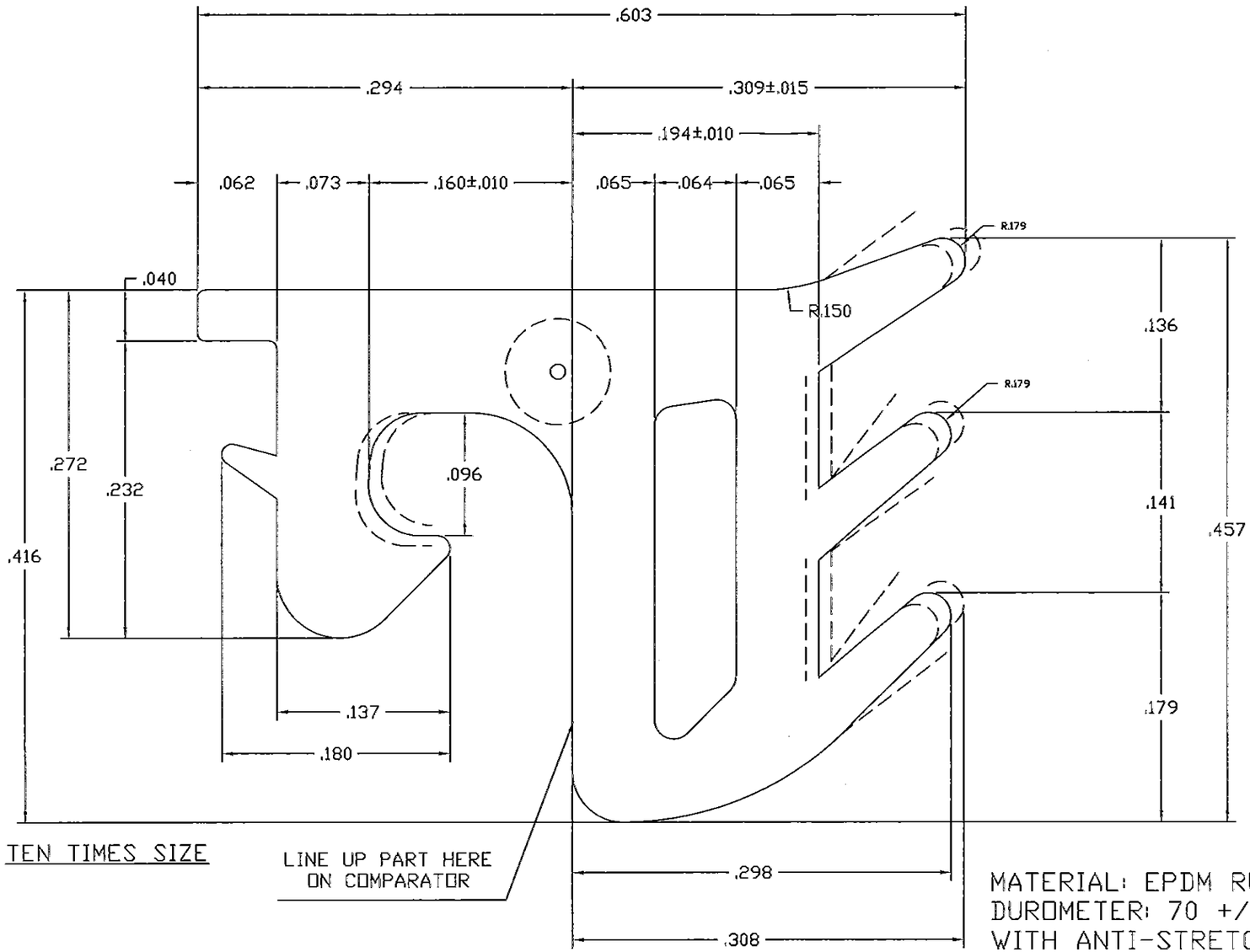
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	01/12/87	Release to Production per EO 688	
B	01/22/87	Redrawn for CAD	
C	06/17/02	Redrawn for CAD	DMT

Steel Reinforcing for E4541 &
E4544 Mullion with E4541 Snap in

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
Lentz	12/22/86			
DRWG SCALE Full	PRODUCT CODE 380	P1437		C

P2728



TEN TIMES SIZE

LINE UP PART HERE ON COMPARATOR

Architectural Testing

Test sample complies with these details.
Deviations are noted.
Report # C1529.01-450-44
Date 10/26/12 Tech

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	NSJ

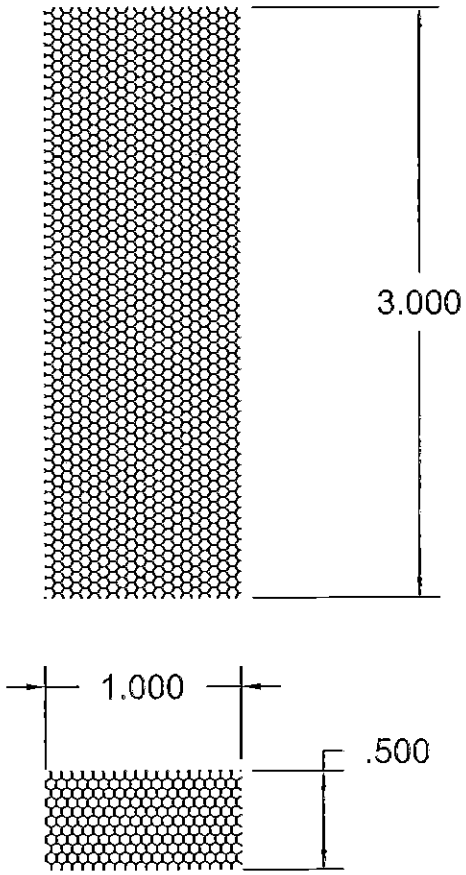
TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

ROLL-IN GLAZING GASKET
14000 AND 4500 STOREFRONT SYSTEMS

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

PTB42 A



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-460-44

Date 10/26/12 Tech [illegible]

Material:
Open Cell Air Baffle, 30 PPI Charcoal
Protector II with Germicide

CUT TWO (2) PIECES FROM P1291

A

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

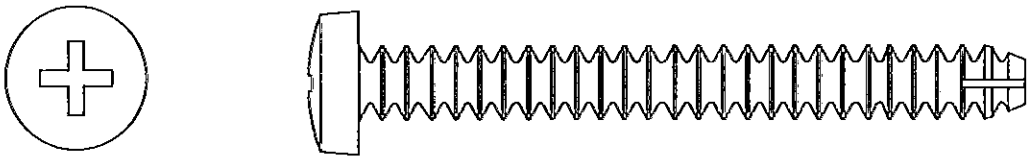
REV	DATE	DESCRIPTION	INTL
A	06/10/02	FORMERLY PURCHASED - ER-060205	SRD

OPEN CELL WEEP BAFFLE
1/2" X 1" X 3"
SLOPEWALL

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
SRD	06/11/02			
DRWG SCALE FULL	PRODUCT CODE 300	PTB42		A

S009 B

#10-24 X 1 3/4" TYPE F
(A) PHILLIPS PAN HEAD, SELF TAPPING



TWO TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # C1529.01-450-44

Date 01/26/12 Tech AA

(B)

MATERIAL: ZINC PLATED STEEL
FINISH: OR
REQUIREMENTS: MUST MEET ASME B18.6.4, SAE J933

FULL SIZE

ALL UNSPECIFIED RADII .015
✖ INDICATES .031 RADIUS
▭ DENOTES CRITICAL DIMENSION

TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

4878 MACKINAW TRAIL
REED CITY, MICHIGAN 49677

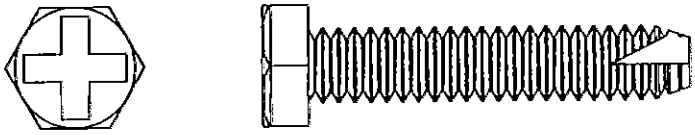
REV	DATE	DESCRIPTION	INTL
A	02/23/10	CORRECTING DESCRPT: F WAS TYE B, ADD REQ. NOTES	TT
B	06/18/12	UPDATED MATERIAL	JEM

4500,14650, AND 14000- SHEER CLIP-HOR.
14000 I/O- SHEER CLIP TO VERTICAL
VERSATHERM- SHEER CLIP ATTACHMENT

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D	
JEM	01/10/06			
DRVG SCALE: FULL	PRODUCT CODE	S009		REV B

S202 A

UNC #10-24 X 1" TYPE 23, #2 PHILLIPS INDENT HEX HEAD



TWO TIMES SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

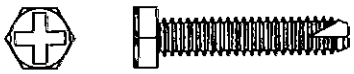
Report # C1529.01-450-44

Date 10/26/12 **Tech** AD

REQUIREMENTS: MUST MEET ASME B18.6.4, SAE J933

MATERIAL: 1022 STEEL, ZINC PLATED - CLASS 5, CASE HARDENING.

FINISH: OR



FULL SIZE

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

REV	DATE	DESCRIPTION	INTL
A	03/01/10	CORRECTION MATERIAL	TT

TUBELITE
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

4878 MACKINAW TRAIL
REED CITY, MICHIGAN 49677

4500, 14000, AND 14000 I/O SERIES
SCREW SPLINE FASTENER

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D	REV
JEM	01/11/06			A
DRVG SCALE FULL	PRODUCT CODE	S202		

APPENDIX E:
Photographs
1 PAGE

Photograph #1
Sealant At Glazing Gasket Joints

Alteration Log

Alteration #	Date	Cause for Alteration	Remedial Action Taken
1	N/A	N/A	No alterations were required.

Revision Log

Rev. #	Date	Page(s)	Section #	Revision(s)
0	10/26/12	N/A	N/A	Original report issued.