

MID AMERICA TESTING LABORATORY, INC.

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DATE OF REPORT: March 24, 2006

LOCATION OF TESTING: Mid America Testing Laboratory, Inc.

DATES OF ERECTION: October 10 – 21, 2005

DATES OF TESING: November 8 – March 11, 2006

PRODUCT NAME: T14000 Center Series

JOB NUMBER: 05107L-Center-TH0

CLIENT: Tubelite

The following were present for all or portions of the specimen erection and testing:

Mr. Steve DeYoung	Tubelite
Mr. Les Olds	Tubelite
Mr. Eric Kraus	St. Charles Glass
Mr. Travis Swisshelm	Mid America Testing Laboratory
Ms. Cindy Barrow	Mid America Testing Laboratory
Mr. Rick Heitmann	Mid America Testing Laboratory

INTRODUCTION

As requested Mid America Testing Laboratory provided a structural chamber for purposes of weatherization, structural and thermal testing on the Tubelite center system. The test unit was erected on site by St. Charles Glass and Glazing under the direction of Tubelite.

UNIT DESCRIPTION

The test unit was identified as a Tubelite T14000 Center Series and measured a nominal 8' wide X 8' high. A total of four (4) lites of glass were incorporated into the test specimen with the overall depth of the thermally broken system measuring 4 ½" deep. The depth was equally created with the interior and exterior extrusions.

The glass was 1" insulated comprised of a ¼" clear annealed exterior unit, ½" air space and a ¼" interior annealed unit. The spacer was a dual silicone seal standard aluminum desiccant filled. The exterior set, upper lite of glass set on two (2) setting blocks with the typical blocks measuring 6" in length X 1-1/2" deep X 9/16" high, identified as part # P1132. The interior set upper lite also set on two (2) blocks. These blocks were 6" long X 1 ¼" deep X ¼" high. These blocks were identified as part #P2400. The sill blocks were both the #1132 with the interior set opening utilizing the modified version. All blocks were directly set onto the extrusions. The blocks were dry set and had a nominal Shore A durometer reading of 85.

The Center system allowed glazing from both the interior and exterior. The glazing was completed with dual wedge hook gaskets. The gaskets had the ability to be preset for glazing options. The conventional glazing utilized lineal gaskets for both the interior and exterior. Both the interior and exterior gaskets were identified as part number P2528 and had a Shore A durometer reading of 45. The gaskets were set in sealant at the corners.

The glazing pockets were weeped to the exterior via diverters at the verticals. The diverters were identified as part #P1138. Water was diverted into the sill receptor and then weeped to the exterior. Two (2) weeps per daylight opening were used at the face of the sill receptor. The sill weeps were ¼" diameter baffled with 30 PPI reticulated foam baffles. The baffles were set in silicone and identified as part #PTB42. End dams were used at the sill to control water. The aluminum end dams were fully sealed with silicone as was the interior leg of the receptor sealed to the glazing frame member with silicone.

Horizontal to verticals were fastened with two (2) #10-24 X1", Type 23 self tapping phillips hex head fasteners. Horizontal to vertical joinery was sealed with silicone.

The specimen was anchored into the chamber steel at the head and sill only. Five (5) fasteners were used at each condition with the fasteners being set 6" in and a nominal 18" on center.

Items not specifically referenced in this description may be found in the "as built" drawings provided by Tubelite and referenced as sheets T913-1 thru T913-5.

PRETESTING

Prior to formal testing the unit was subjected to a static water infiltration test to check for any workmanship or system type errors. All pretesting was performed at 10.0 PSF. Two (2) leaks were noted during the pretest both dealing with missed seals. The first was the seal at the sill receptor to sill frame and the second was simply the horizontal to vertical joinery. Both were resealed with silicone.

This system also experienced problems with compression and hence the heavier gaskets referenced in the unit description were installed on both the interior and exterior.

FORMAL TESTING

All tests were performed utilizing the base guidelines provided by Tubelite incorporating the appropriate procedures outlined by AAMA and ASTM as referenced below:

1. **PRELOAD** +15.0 PSF static pressure (50% of the positive design load for ten (10) seconds).

ALLOWED: No failure of the system

RESULTS: No failure of the system

The above result constitutes an acceptable performance.

2. **STATIC AIR INFILTRATION** (ASTM E283) at 6.24 PSF (50 MPH wind and 1.2" H₂O).

ALLOWED: 3.8 CFM gross leakage or .06 CFM per square foot.

RESULTS: 3.0 CFM gross leakage or .047 CFM per square foot.

The above results constitute an acceptable performance.

3. **STATIC WATER INFILTRATION** (ASTM E331) at 10.0 PSF (63 MPH wind and 1.92" H₂O) with a water spray rate of five (5) gallons per hour per square foot minimum for fifteen (15) minutes.

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The above result constitutes an acceptable performance.

4. **DYNAMIC WATER INFILTRATION** (AAMA 501.1) with a 100 MPH wind velocity at the prop creating a slip stream wind speed at the face of the wall of 63 MPH at the wall equivalent to 10.0 PSF. Water was applied at a rate of five (5) gallons per hour per square foot for fifteen (15) minutes.

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The above result constitutes an acceptable performance.

5. **STRUCTURAL DESIGN LOADING** (ASTM E330) with each load being held for a duration of ten (10) seconds.

+15.0 PSF (50% Positive Design Load)
+30.0 PSF (100% Positive Design Load)
-15.0 PSF (50% Negative Design Load)
-30.0 PSF (100% Negative Design Load)

ALLOWED: No member shall have deflection greater than L/175 of its span or .37" vertically a .25" horizontally.

RESULTS: No member exceeded the allowable deflection criteria with the maximum vertical deflection of .33" and maximum horizontal deflection of .15".

The above results constitute an acceptable performance.

6. **CONDENSATION RESISTANCE** (AAMA 1503.1) with the temperatures being held for a period of two (2) hours after stabilization. Eight (8) sets of reading were taken at fifteen (15) minute intervals with averages used to calculate the CRF value. The following were the base conditions:

Warm side ambient temperature:	68 degrees Fahrenheit
Cold side ambient temperature:	0 degrees Fahrenheit
Interior humidity:	35%
Exterior wind speed:	15 miles per hour
Calculated CRF Value:	56

7. **STATIC AIR INFILTRATION** (ASTM E283) at 6.24 PSF (50 MPH wind and 1.2” H₂O).

ALLOWED: 3.8 CFM gross leakage or .06 CFM per square foot.

RESULTS: There was no measurable change in the air infiltration as a result of the thermal testing.

The above results constitute an acceptable performance.

8. **STATIC WATER INFILTRATION** (ASTM E331) at 10.0 PSF (63 MPH wind and 1.92” H₂O) with a water spray rate of five (5) gallons per hour per square foot minimum for fifteen (15) minutes.

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The above result constitutes an acceptable performance.

9. **DYNAMIC WATER INFILTRATION** (AAMA 501.1) with a 100 MPH wind velocity at the prop creating a slip stream wind speed at the face of the wall of 63 MPH at the wall equivalent to 10.0 PSF. Water was applied at a rate of five (5) gallons per hour per square foot for fifteen (15) minutes.

ALLOWED: No uncontrolled water infiltration to the room side.

RESULTS: No uncontrolled water infiltration to the room side.

The above result constitutes an acceptable performance.

10. **STRUCTURAL PROOF LOADING** (ASTM E330) with each load being held for a duration of ten (10) seconds.

+22.5 PSF (75% Positive Design Load)
+45.0 PSF (150% Positive Design Load)
-22.5 PSF (75% Negative Design Load)
-45.0 PSF (150% Negative Design Load)

ALLOWED:

No member shall have permanent set in excess of .2% of its span or shall there be any failure of the system.

RESULTS:

No member exceeded the allowable permanent set or was there any failure of the system.

The above results constitute an acceptable performance.

SUMMARY:

The Tubelite T14000 Center system has met the desired levels of performance as directed by the client.

Should you have any questions regarding the information contained in this report please feel free to contact the laboratory.

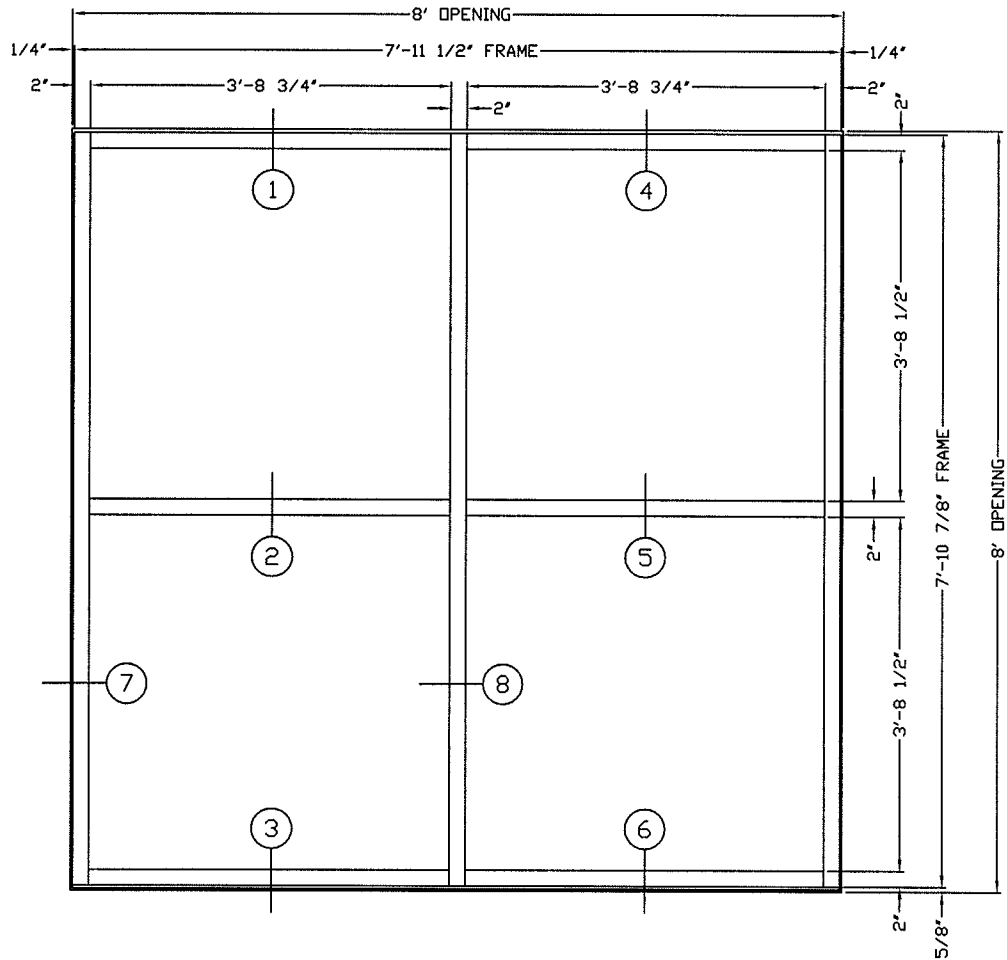
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Respectfully Submitted,

MID AMERICA TESTING LABORATORY



Rick A. Heitmann
President



PERFORMANCE TEST ELEVATION
T14000 SERIES

14000 Series Performance Tests

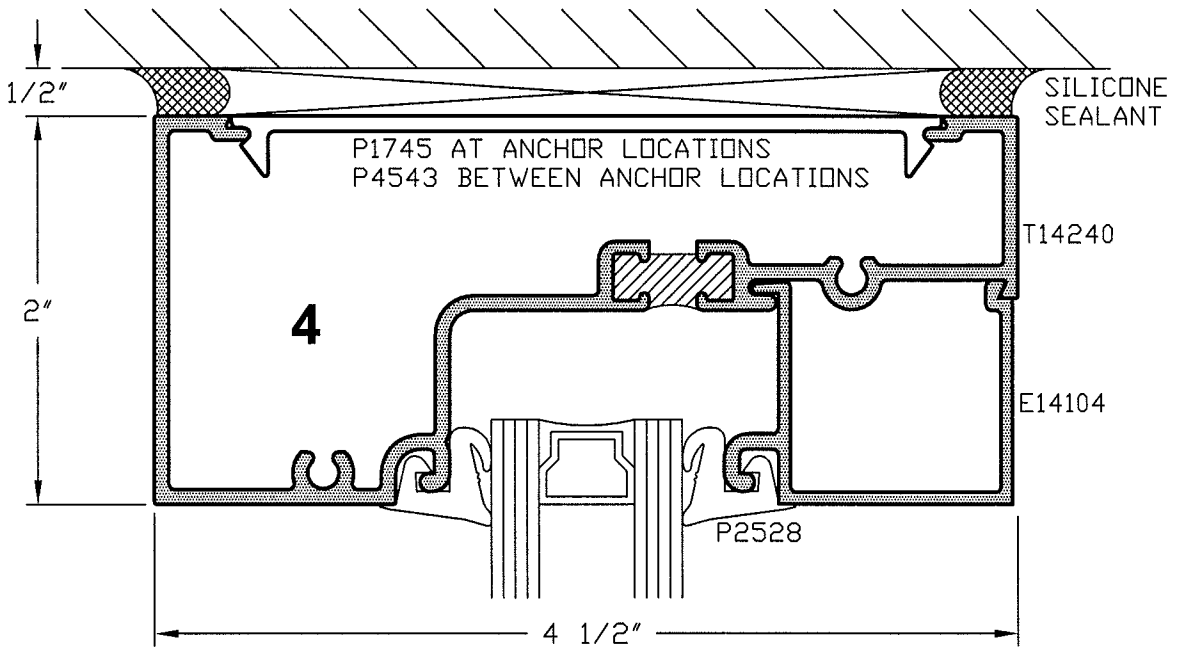
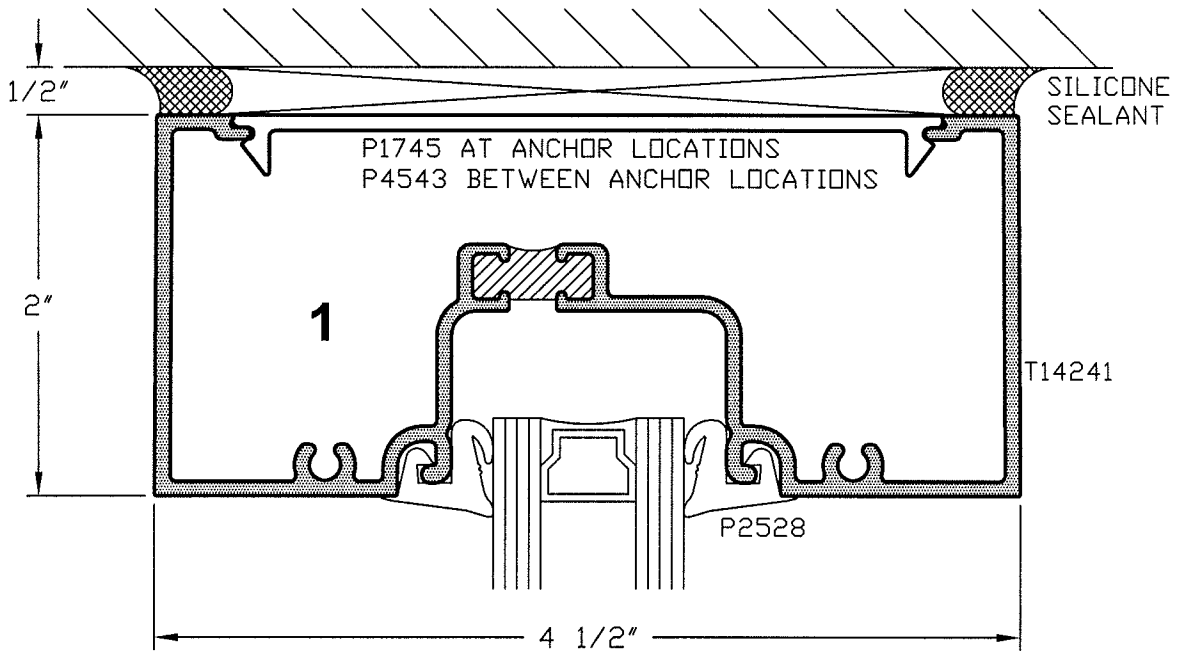
- Preload @ 50% Design Pressure
- Air Infiltration Per ASTM E283-91
- Static Water Penetration Per ASTM E331-93
- Dynamic Water Penetration Per AAMA 501.1-94
- Structural Performance Per ASTM E330-96
- Repeat Air Infiltration
- Repeat Static Water Penetration
- Thermal Cycle Per AAMA 501.5-98
- Repeat Air Infiltration
- Repeat Static Water Penetration
- Repeat Dynamic Water Penetration
- Preload @ 75% Design Pressure
- Structural Overload Per ASTM E330-96

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& ENTRANCE SYSTEMS
DEPENDABLE

T14000 SERIES
 PERFORMANCE TEST
 ELEVATION

DRAWN BY SRD	DRWG DATE 7/28/05	APPV'D BY	DATE APPV'D
DRWG SCALE 1/2"=1'	PRODUCT CODE 180	T913-1	
			REV

T913-2

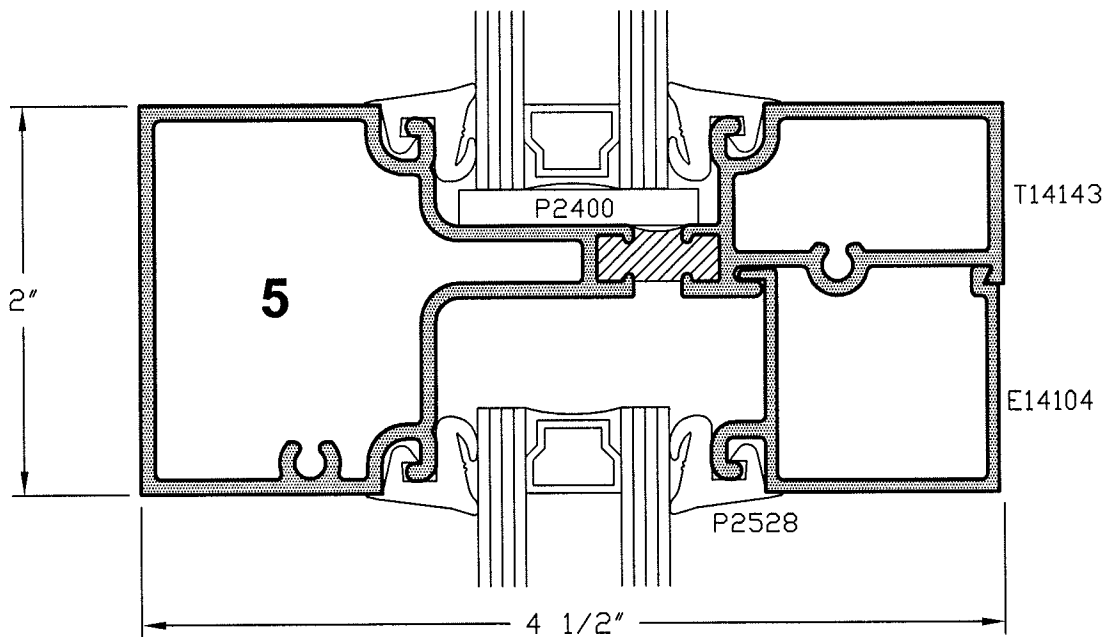
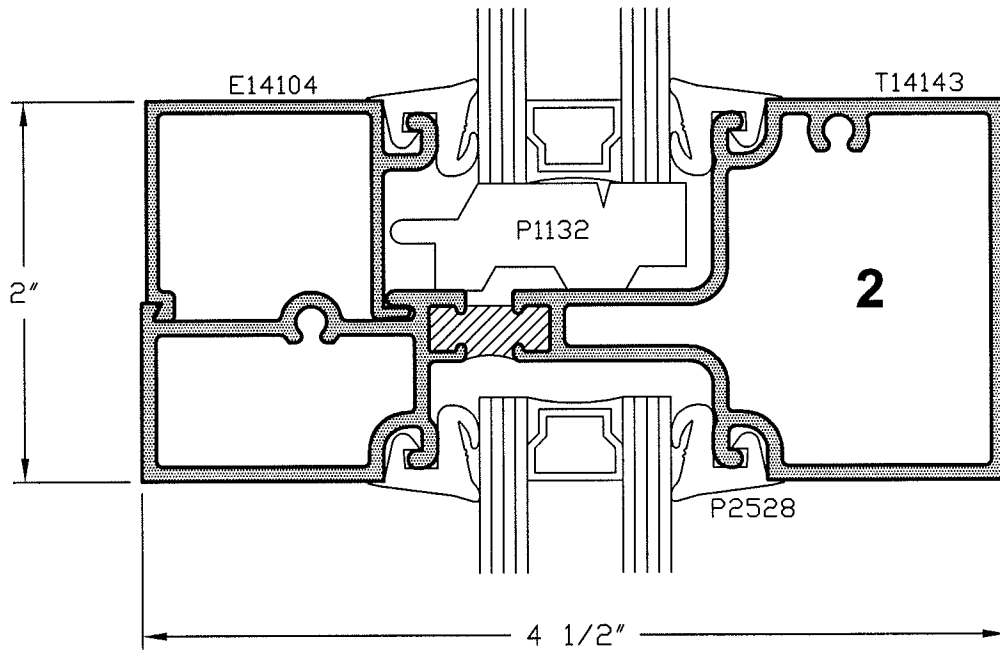


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T14000 SERIES
 PERFORMANCE TEST
 HEAD DETAILS

DRAWN BY SRD	DRWG DATE XXXXXX	APPV'D BY	DATE APPV'D	REV
DRWG SCALE 1"=1"	PRODUCT CODE 180	T913-2		

T913-3

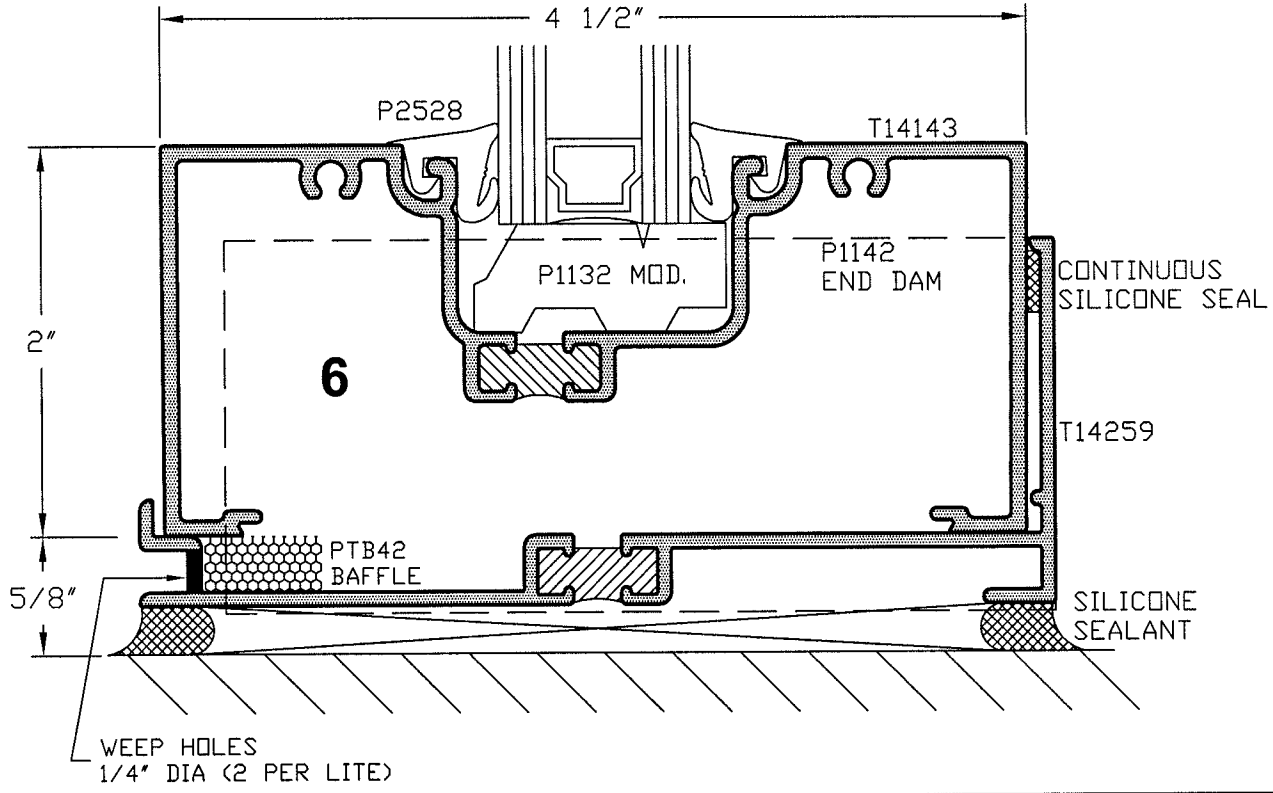
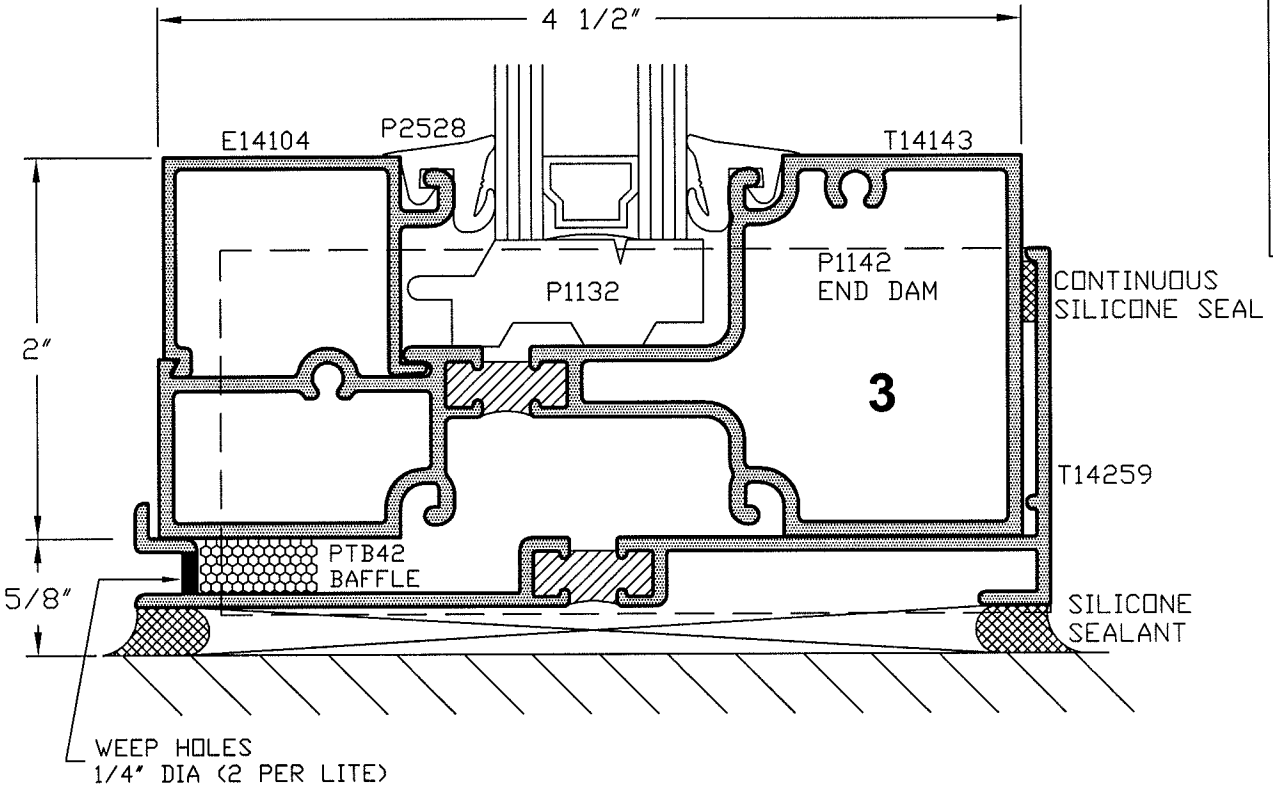


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T14000 SERIES
 PERFORMANCE TEST
 INTERMEDIATE HORIZONTAL DETAILS

DRAWN BY	SRD	DRWG DATE	7/28/05	APPV.D BY	DATE APPV'D
DRWG SCALE	1"=1"	PRODUCT CODE	180	T913-3	REV

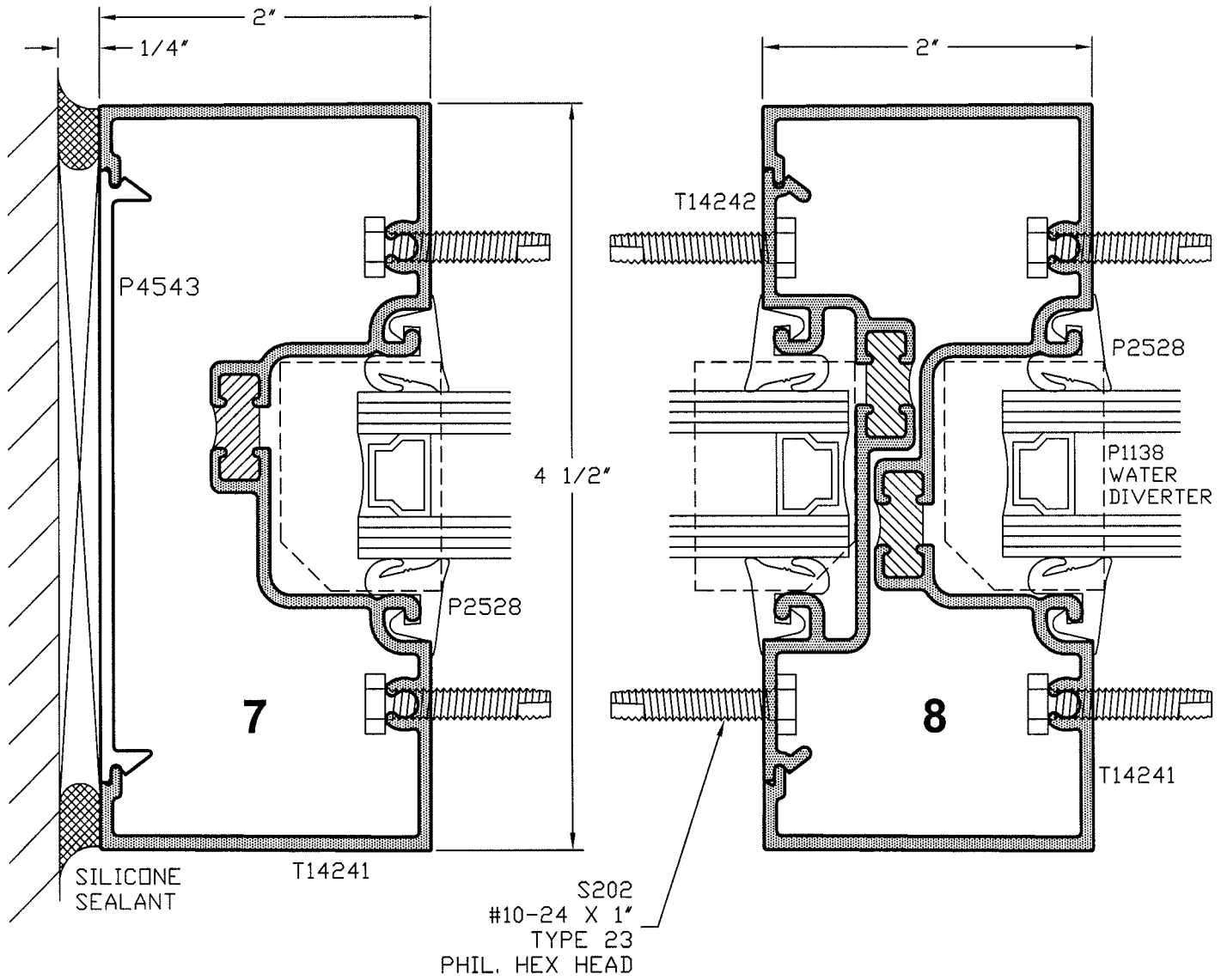
T913-4



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T14000 SERIES
 PERFORMANCE TEST
 SILL DETAILS

DRAWN BY	SRD	DRWG DATE	7/28/05	APPV'D BY	DATE APPV'D	REV
DRWG SCALE	1"=1"	PRODUCT CODE	180	T913-4		



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T14000 SERIES
 PERFORMANCE TEST
 JAMB/INTERMEDIATE VERTICAL DETAILS

DRAWN BY	SRD	DRWG DATE	7/28/05	APPV'D BY	DATE APPV'D	REV
DRWG SCALE	1"=1"	PRODUCT CODE	180	T913-5		