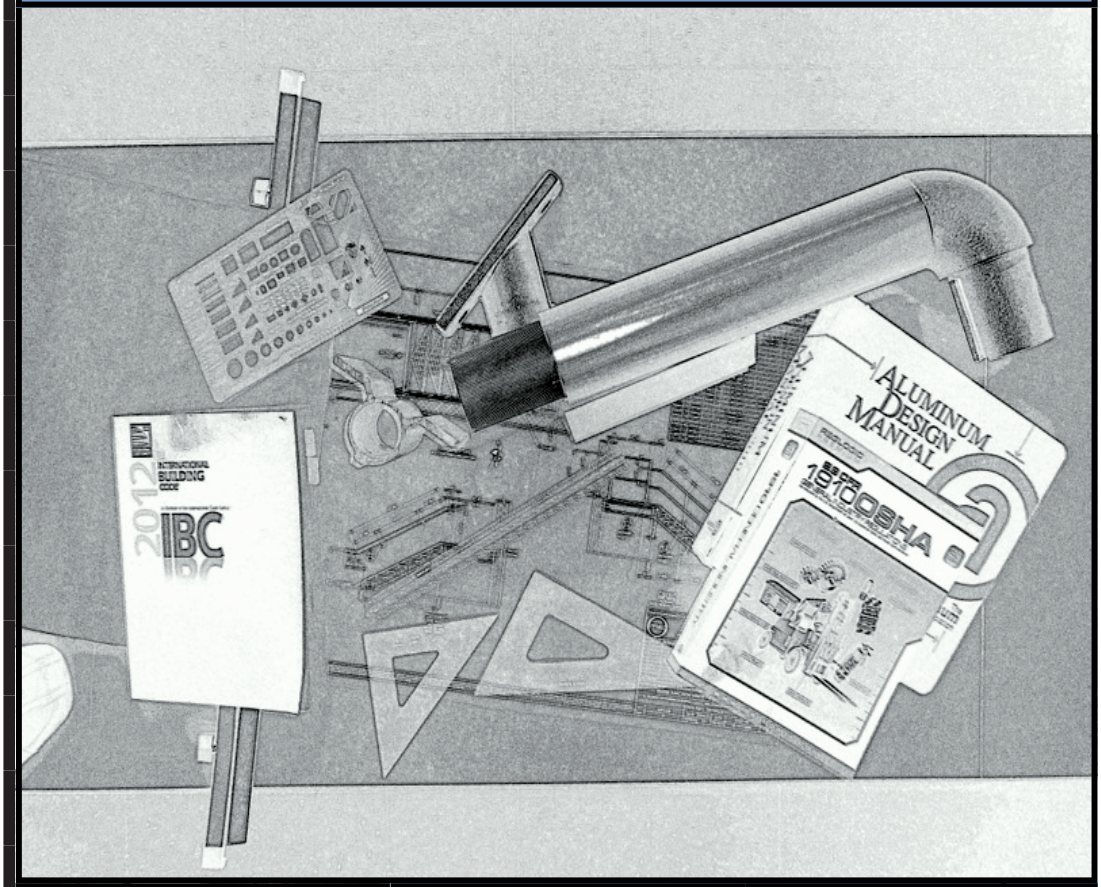
PMWI

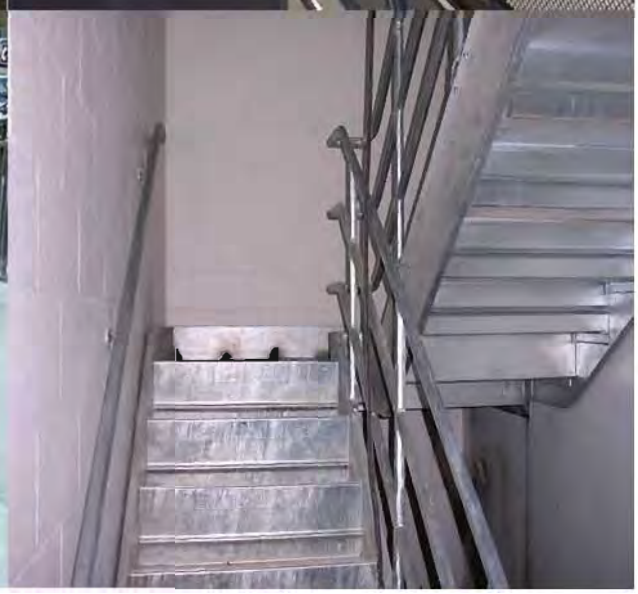
Handrail Brochure



Pleasant Mount Welding, INC.
45 Dundaff Street
Carbondale PA 18407-1801
(570)282-6164 Fax: (570)282-7917





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PMWI MECHANICAL ALUMINUM RAILING SYSTEM

Pleasant Mount Welding, Inc. has spent many years of research, engineering, testing and manufacturing to develop the best railing systems in the marketplace.

PMWI mechanical aluminum railing systems are designed to be used in highly corrosive environments such as water and wastewater treatment facilities or chemical plants. But because the mechanical railings are so aesthetically attractive they can be used everywhere including educational facilities, commercial or industrial facilities or any commercial establishment.

PMWI mechanical aluminum railing systems are simply the best available. We use no pop-rivets, sheet metal screws or adhesives. Our system uses stainless steel bolts, which means the railings can be tightened if loose or disassembled for temporary construction or used elsewhere.

Railings have been designed to meet the loading requirements of International Building Code or any of the building codes such as OSHA.

PMWI railing systems have been verified, tested and approved by an independent testing laboratory and test results are available at the end of this brochure.

Aluminum railings are fabricated from anodized aluminum. Cast aluminum/magnesium fittings manufactured by The Hollaender Manufacturing Company and stainless steel hardware insure rock solid performance.

Aluminum is an excellent choice because of ease of maintenance, corrosive resistance and an attractive appearance.

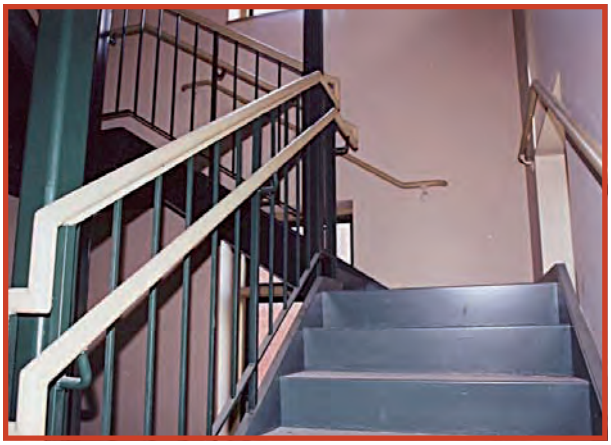
HOW TO SPECIFY HANDRAILS

All mechanical aluminum handrails as shown on architectural drawings shall be PMWI MECHANICAL ALUMINUM HANDRAIL SYSTEMS as manufactured by Pleasant Mount Welding, Inc., 45 Dundaff Street, Carbondale, PA. 18407. All post shall be aluminum 6061-T6 fabricated from 1 1/2 diameter schedule 80 pipe. All handrails and intermediates rails shall be aluminum 6063-T6 fabricated from 1 1/2 diameter-schedule 40 pipe. All connector fittings shall be cast primary grade aluminum/magnesium alloy. They shall be an internal double tang type activated by single 3/8-16 in. diameter stainless steel knurled cup socket setscrew. Fittings shall be externally connected to pipe by means of an anodized aluminum tubular nut and stainless steel socket head cap screw. Fittings shall be equivalent to INTERNA-RAIL as manufactured by the Hollaender Manufacturing Company. Pop rivets, sheet metal screws and adhesives shall not be acceptable. All handrails shall be clear anodized coating.

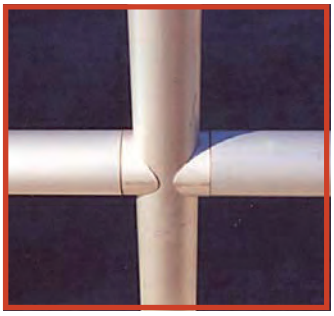
PMWI WELDED RAILING SYSTEMS

PMWI has a complete line of welded handrail systems. We offer welded aluminum, stainless steel and steel. Numerous coatings, colors and finishes are available. Railings have been designed to meet the loading requirements of the International Building Code or any of the building codes such as OSHA.

PMWI railing systems have been verified, tested and approved by an independent testing laboratory.



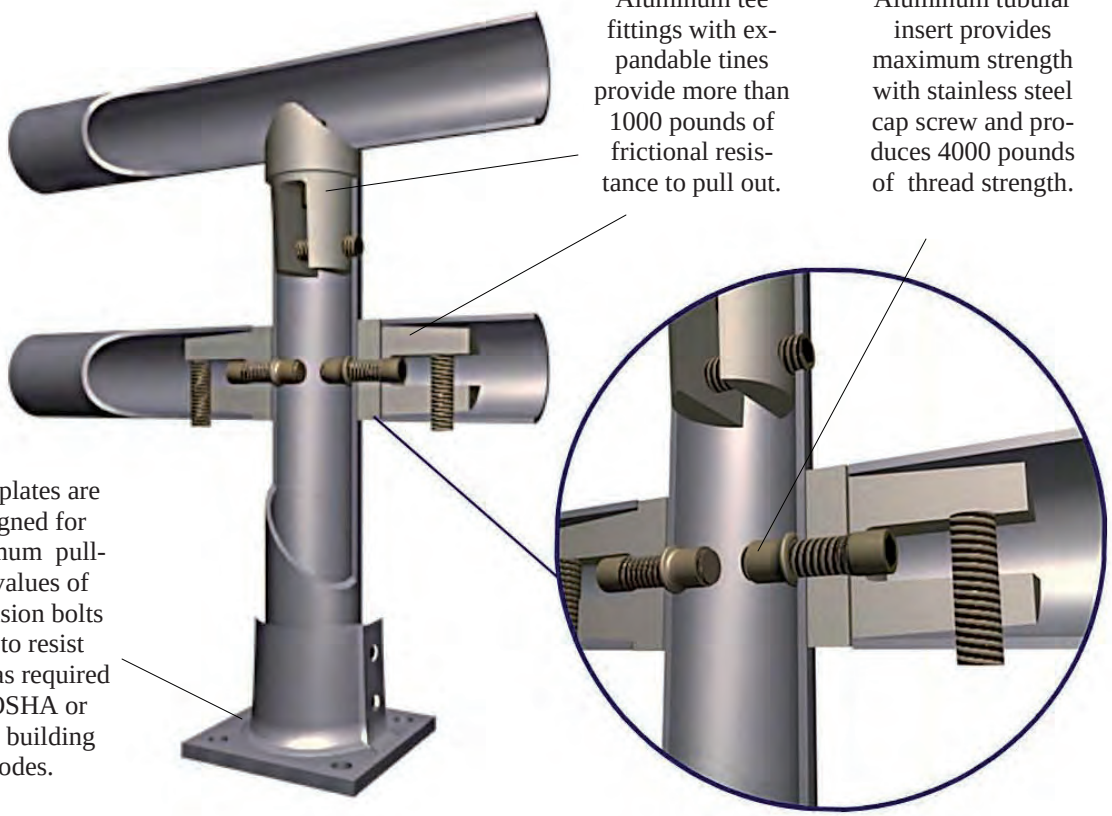
PMWI MECHANICAL ALUMINUM RAILING SYSTEM





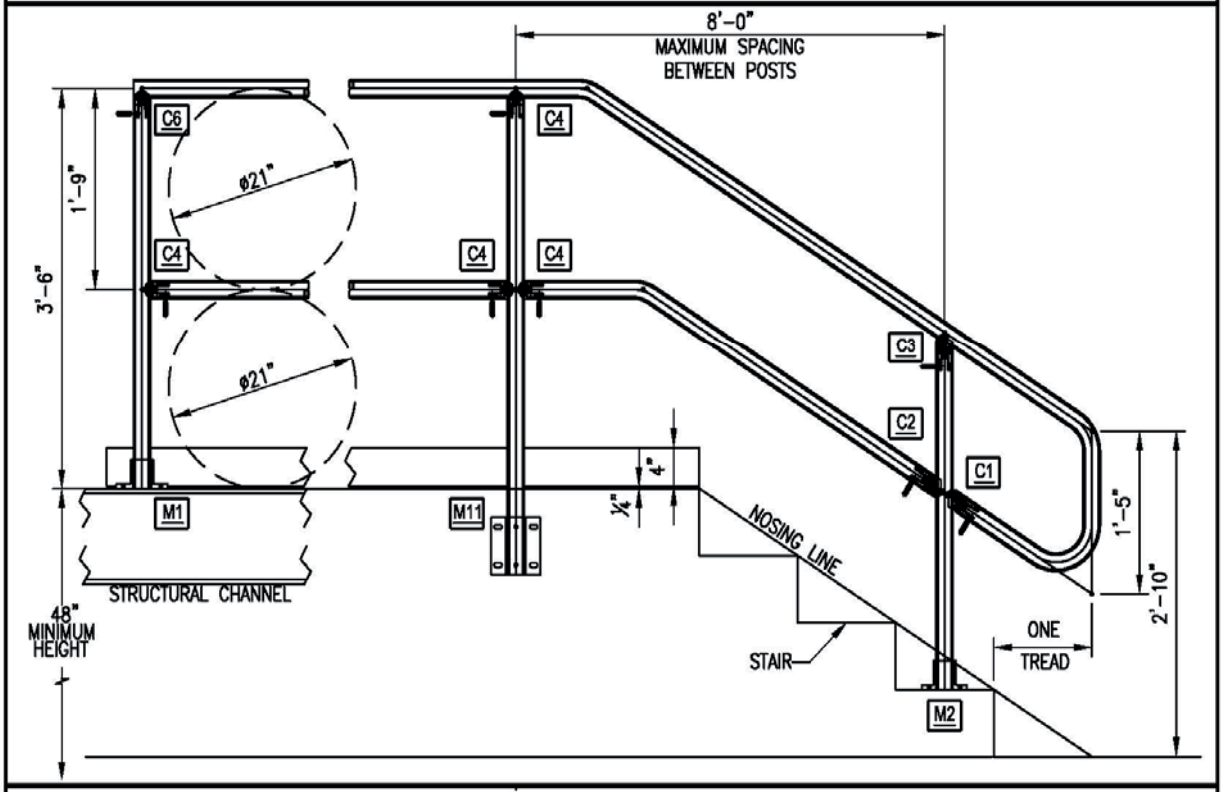

Aluminum tee fittings with expandable tines provide more than 1000 pounds of frictional resistance to pull out.

Aluminum tubular insert provides maximum strength with stainless steel cap screw and produces 4000 pounds of thread strength.

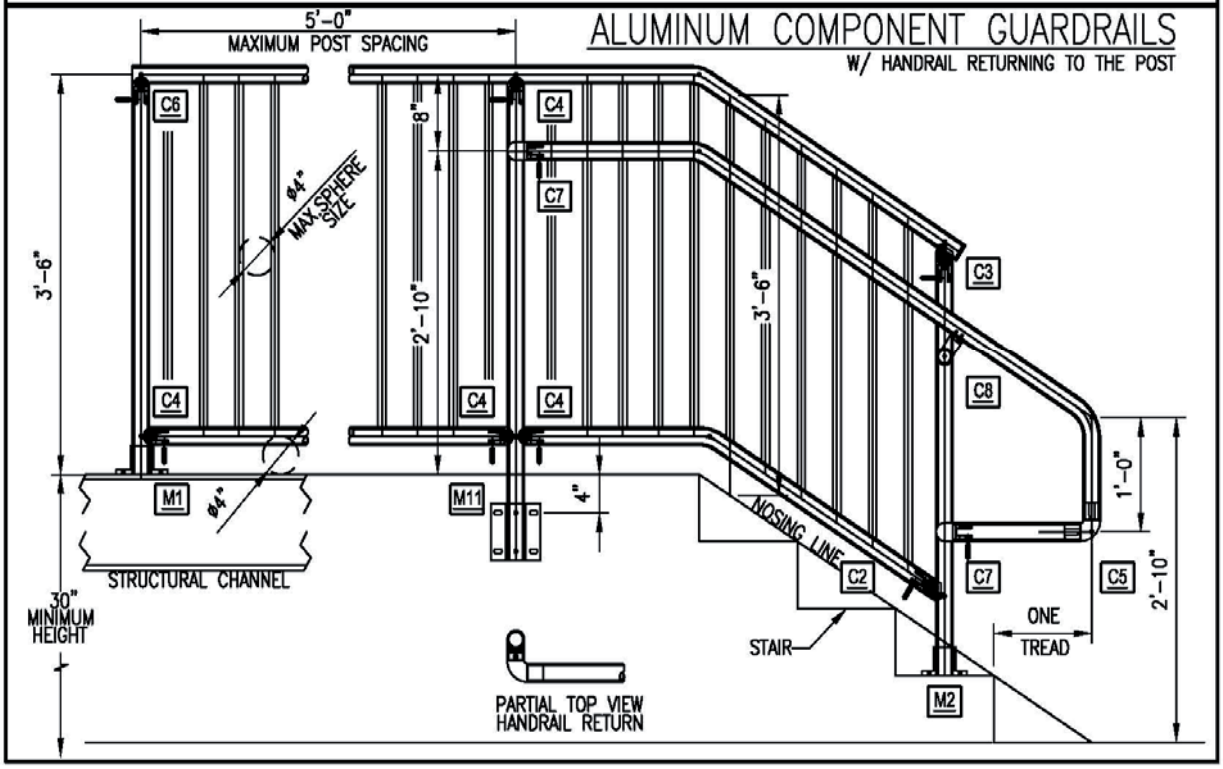


Base plates are designed for maximum pull-out values of expansion bolts and to resist loads as required by OSHA or other building codes.

O.S.H.A. COMPLIANT ALUMINUM COMPONENT HANDRAILS



INTERNATIONAL BUILDING CODE AREAS OPEN TO THE PUBLIC



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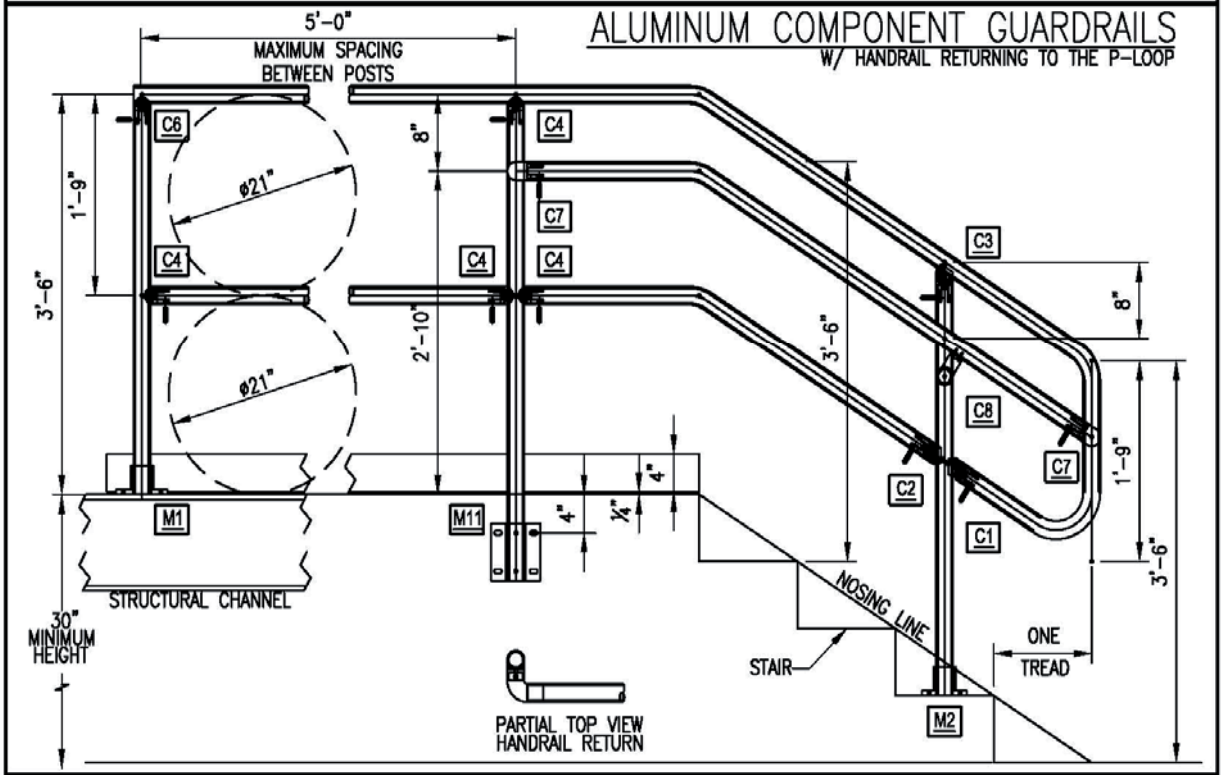
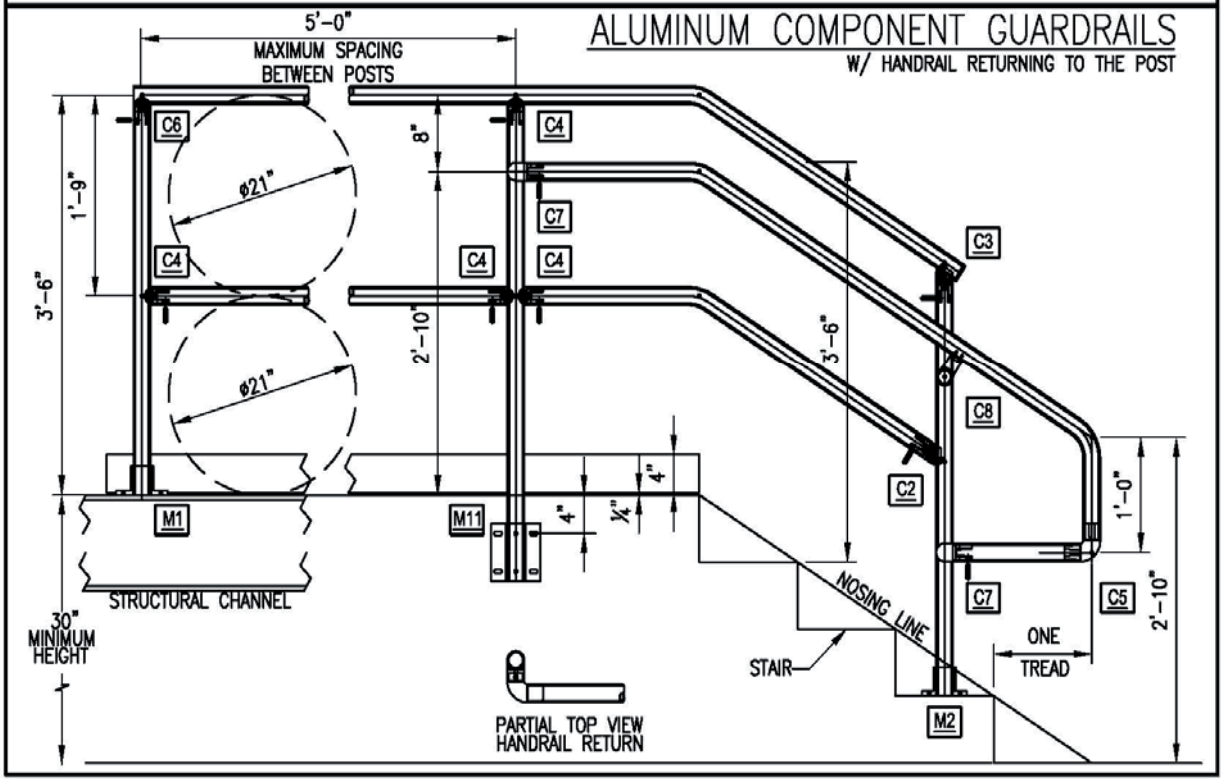
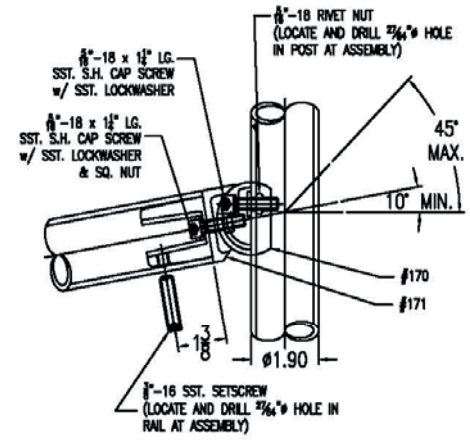


INTERNATIONAL BUILDING CODE AREAS NOT OPEN TO THE PUBLIC

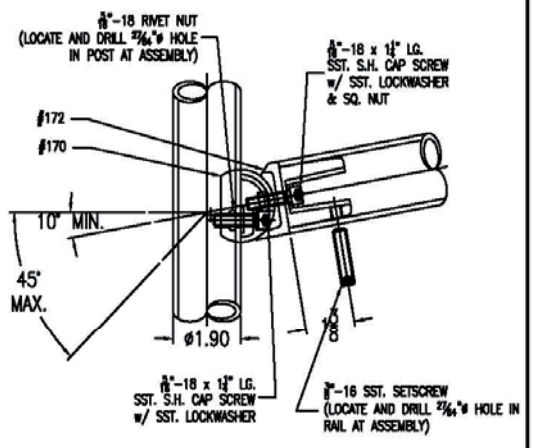


Pleasant Mount Welding, INC. Aluminum Component Handrails



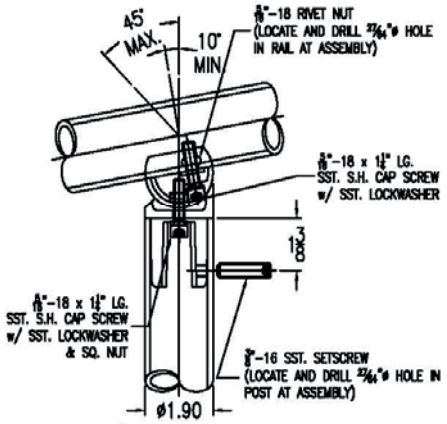
C1

#170F-8 TRUNION
#171F-8 ACUTE TEE



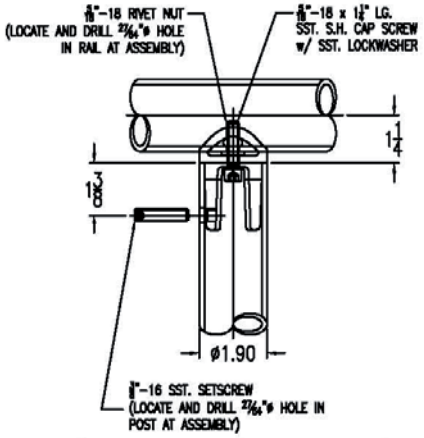
C2

#170F-8 TRUNION
#172F-8 OBTUSE TEE



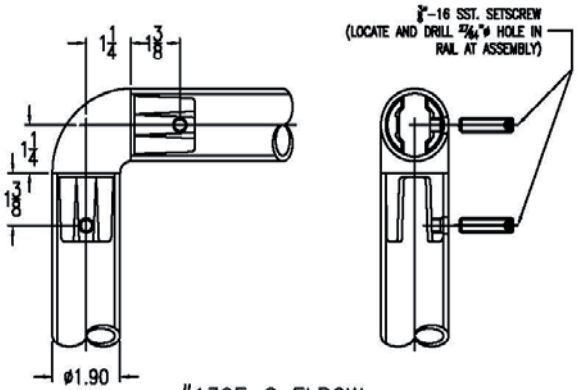
C3

#170F-8 TRUNION
#176F-8 OBTUSE TEE



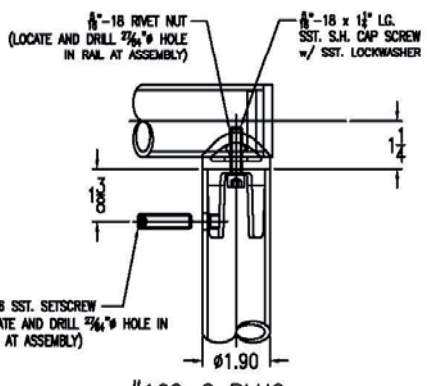
C4

#155F-8 TEE (Sch.40 Pipe)
#158F-8 TEE (Sch.80 Pipe)



C5

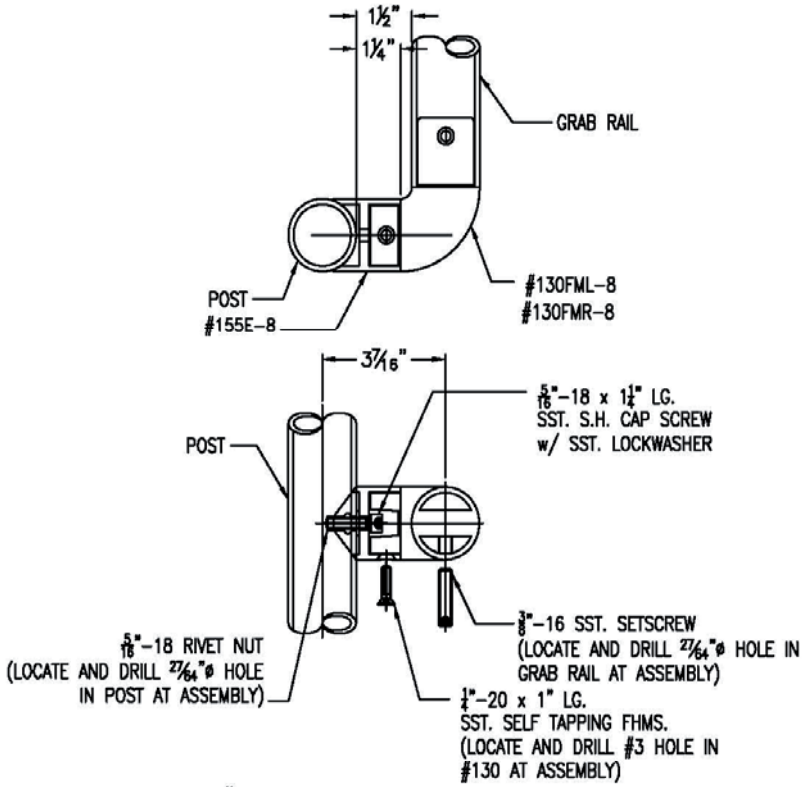
#130F-8 ELBOW



C6

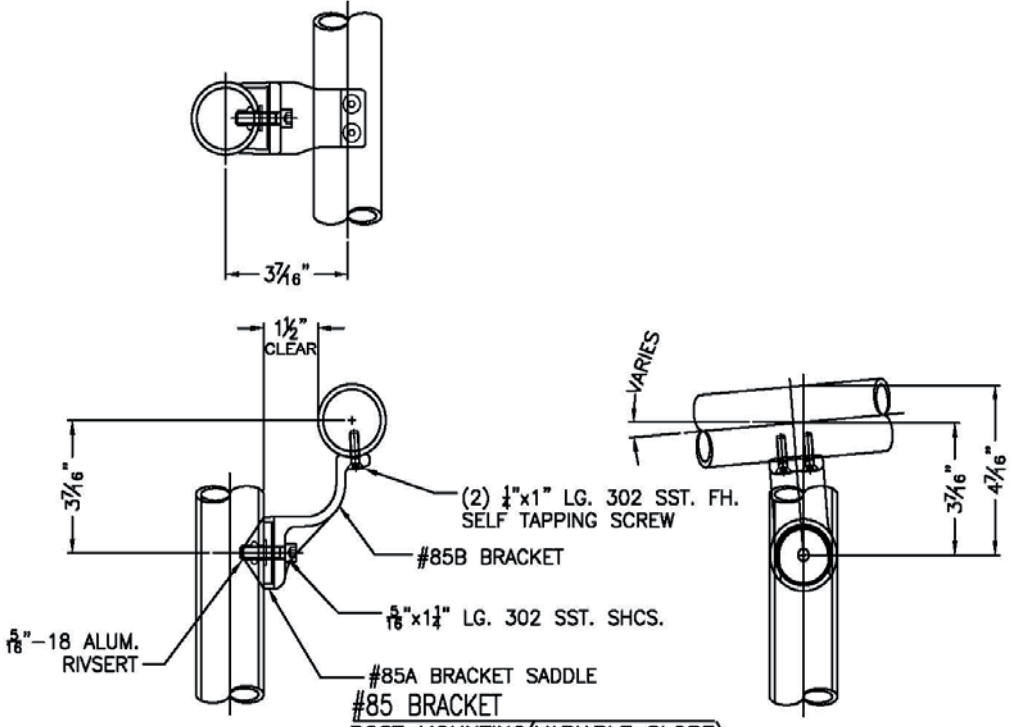
#162-8 PLUG

Pleasant Mount Welding, INC. Aluminum Component Handrails



C7

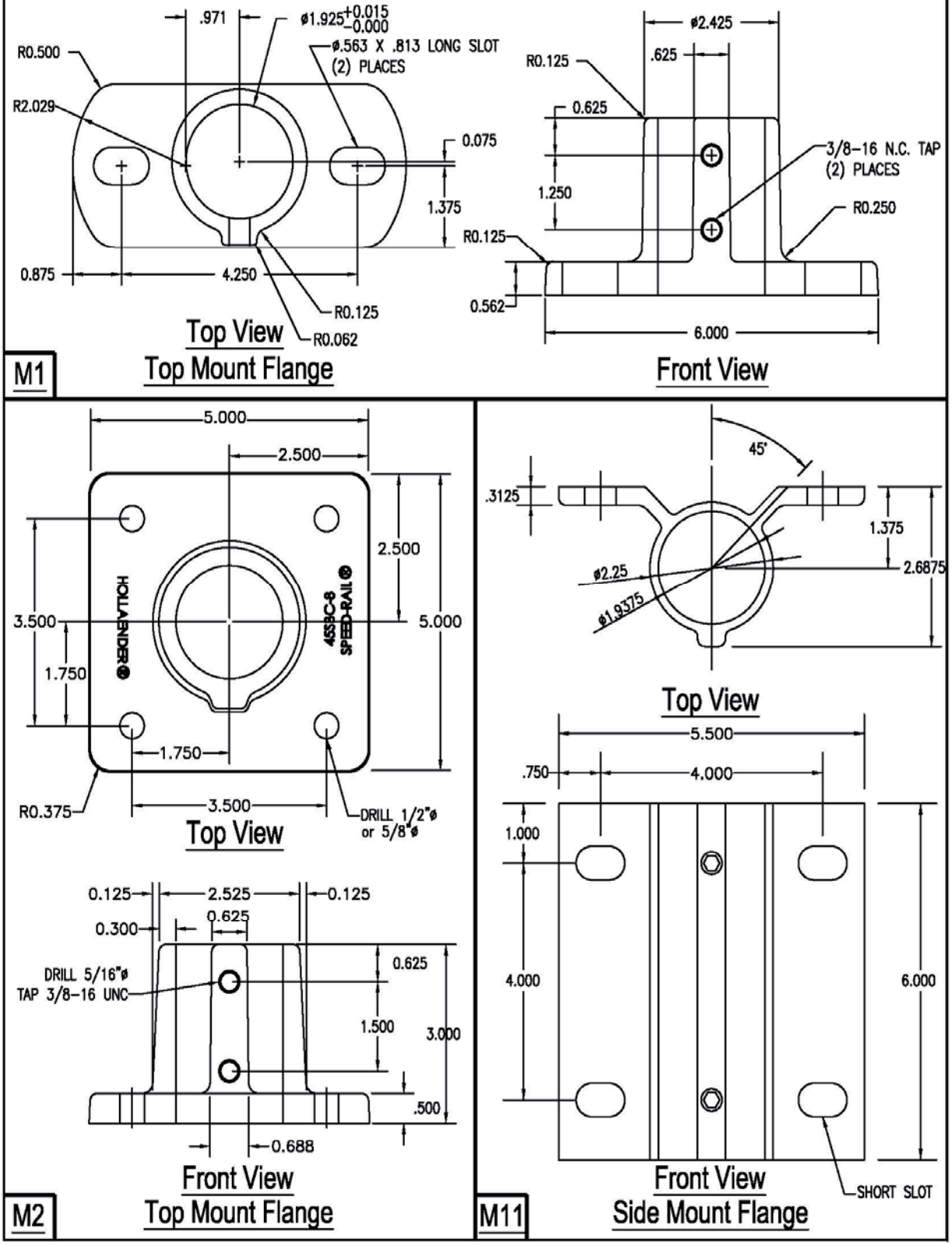
#185F-8 GRAB RAIL RETURN
LH SHOWN,RH OPPOSITE



C8

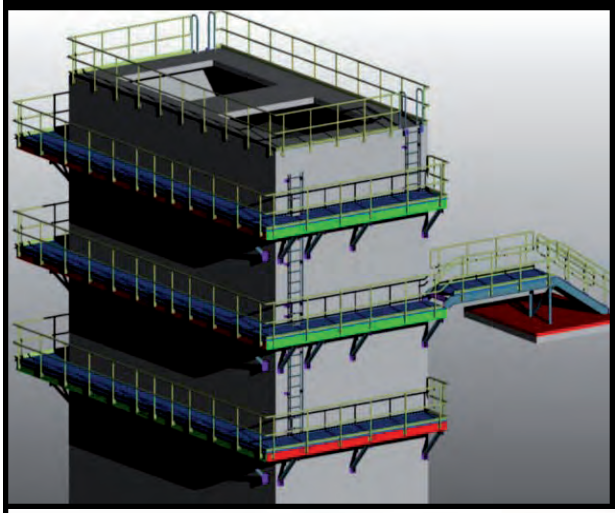
#85 BRACKET
POST MOUNTING(VARIABLE SLOPE)

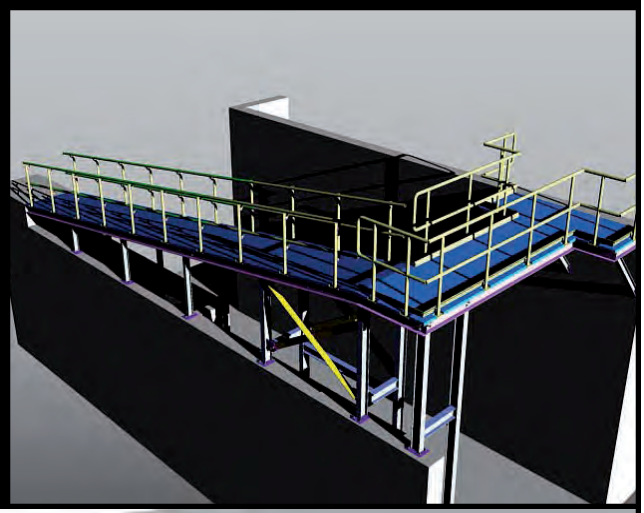
Examples of Common Aluminum Handrail Mounts

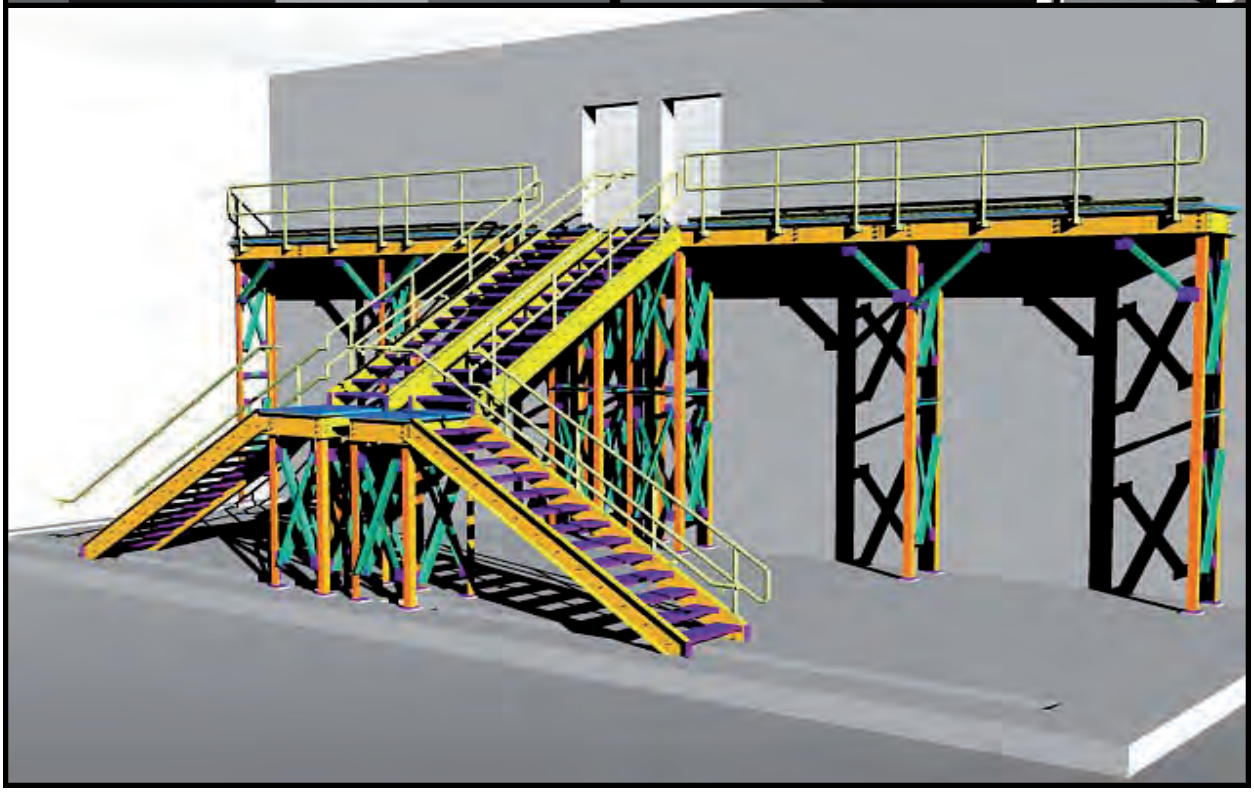


Pleasant Mount Welding Inc.
continues to advance into the
future by now offering drawings in
3D modeling software

ADVANCE STEEL







OSHA Design Specifications

International Building Codes- ***see notes***

The handrail shall be made of pipes joined together with component fittings. Components that are pop-riveted or glued at the joints will not be acceptable. All components must be mechanically fastened with stainless steel hardware.

Railings shall be 1 ½" Schedule 40 aluminum pipe alloy 6063-T6, ASTM-B-429 or ASTM –B-221. Posts shall be 1 ½" Schedule 80 aluminum pipe. Post spacing shall be a maximum of 8'0"- meeting OSHA standards. (Varies per condition per IBC)

Railing shall be shop assembled in lengths not to exceed 24 feet for field erection. Guardrails and Handrails shall be designed to withstand a 200lb concentrated load applied in any direction and at any point on the top rail.

Intermediate railings shall be provided such that a 21-inch diameter sphere cannot pass through any opening.

Posts shall not interrupt the continuation of the top rail at any point along the railing, including corners and end terminations (OSHA 1910.23). The top surface of the top railing shall be smooth and shall not be interrupted by projected fittings.

The Mid-rail at a corner return shall be able to withstand a 200lb load without loosening. The manufacturer is to determine this dimension for their system and provide physical tests from a laboratory to confirm compliance. Concrete anchors shall be stainless steel type 316 or 304 wedge anchors and shall be furnished by the handrail manufacturer. The anchor design shall include the appropriate reduction factors for spacing and edge distances in accordance with the manufacturers published data.

Toeboard shall conform to OSHA standards. Toeboard shall be a minimum of 4" high and shall be an extrusion that attaches to the posts with clamps that will allow for expansion and contraction between posts. Toeboard shall be set ¼" above the walking surface. Toeboard shall be provided on handrails as required by OSHA and /or as shown on drawings. Toeboard shall be shipped in stock lengths for field installation.

Safety chains will be used unless otherwise shown on the drawings.

Finish shall be Aluminum Association M10-C22-A41 (215-R10).

Aluminum surfaces in contact with concrete, grout or dissimilar metals shall be protected with a coat of bituminous paint.

The manufacturer shall submit calculations for approval at the request of the Engineer. Testing of base castings or base extrusions by an independent lab or manufacturer's lab (If manufacturer's lab meets the requirements of the Aluminum Association) will be an acceptable substitute for calculations.

***Occupant Load No Greater Than 50**

Guardrails and Handrails shall be designed to withstand a 200lb Concentrated load applied in any direction and at any point on the top rail. Guardrails and Handrails shall also be designed to withstand a uniform load of 20 lb/ft applied horizontally to the top rail. Uniform loads are not to be applied simultaneously with the concentrated loads.

***Occupant Load Greater Than 50**

Guardrails and Handrails shall be designed to withstand a 200lb Concentrated load applied in any direction and at any point on the top rail. Guardrails and Handrails shall also be designed to withstand a uniform load of 50 lb/ft applied horizontally to the top rail. Uniform loads are not to be applied simultaneously with the concentrated loads.

***Public Access**

Pickets and intermediate railings shall be provided such that a 4" diameter sphere cannot pass through any opening up to a height of 34". From a height of 34" to 42" above the adjacent walking surface, a sphere 8" in diameter shall not pass. The triangular openings formed by the riser, tread and bottom rail at the open side of a stairway shall be of a maximum size such that a sphere of 6" in diameter cannot pass through the opening.

Pickets and intermediate railings shall be designed to withstand a horizontally applied normal load of 50 lb on an area not to exceed one square foot including openings and spaces between rails.

ASTM INTERNATIONAL MEMBER

The systems were evaluated in accordance with the following ASTM standards:

ASTM E 935-00 (Reapproved 2006), Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings

ASTM E 985-00 (Reapproved 2006), Standard Specification for Permanent Metals Railing Systems and Rails for Buildings

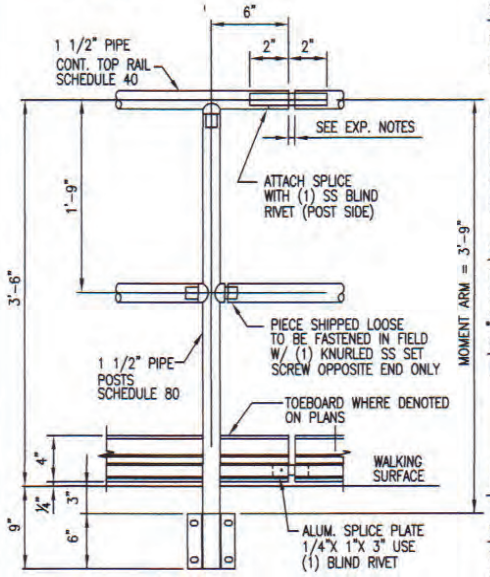
PLEASANT MOUNT WELDING,INC.

45 Dundaff Street
Carbondale, PA.

P.M.W.I. Job Name: Handrail Brochure
Sheet Number. ____ of ____
Calculated By: B.Purvis Date: 2/1/13
Checked By: G.Smith Date: 2/1/13

POST DESIGN – (UNWELDED)SIDE MOUNT

1-1/2" DIAMETER SCHEDULE 80 6061-T6 ALUMINUM



TYP. SPACING/EXP. JOINT
[UNLESS NOTED]

SECTION PROPERTIES (2010 ADM – Table 22)

t :=0.200in d :=1.900in Ag :=1.07in*2 I :=0.391in*4
E :=10100 ksi d1 :=1.500in S :=0.412in*3 r :=0.605in Rbt :=4.3

Concentratated Load Applied In Any Direction:	P:= 200 lb.
Distributed Load Applied:	w:= 50 plf.
Maximum Trib to Post:	L:= 52 in.
Height of Post:	Hp:= 51 in.
Height of Insert:	h1:= not required

Note: Calculations Per 2010 Aluminum Design Manual
w = 50 lb.ft. x Spacing or 200 lb. Whichever is Greater
50 lb.ft. x 4'-4" = 217 lb.
∴ w = 217 lb.

CHECK POST
M=PL
=217 lb. x 45"
=9765 in./lb.

s req'd $= \frac{9765}{24000} = 0.406in^3$

s supplied = $.412in^3$ > s req'd = $0.406in^3$

HANDRAIL DESIGN

1-1/2" DIAMETER SCHEDULE 40 6063-T6 ALUMINUM

SECTION PROPERTIES (2010 ADM – Table 22)

t :=0.145in d :=1.900in Ag :=0.799in*2 I :=0.310in*4
E :=10100 ksi d1 :=1.610in S :=0.326in*3 r :=0.623in Rbt :=6.1

Note: Calculations Per 2010 Aluminum Design Manual

CHECK HANDRAIL:

(UNIFORM LOAD) 50 lb.ft. x 4'-4" = 216.65 lbs.

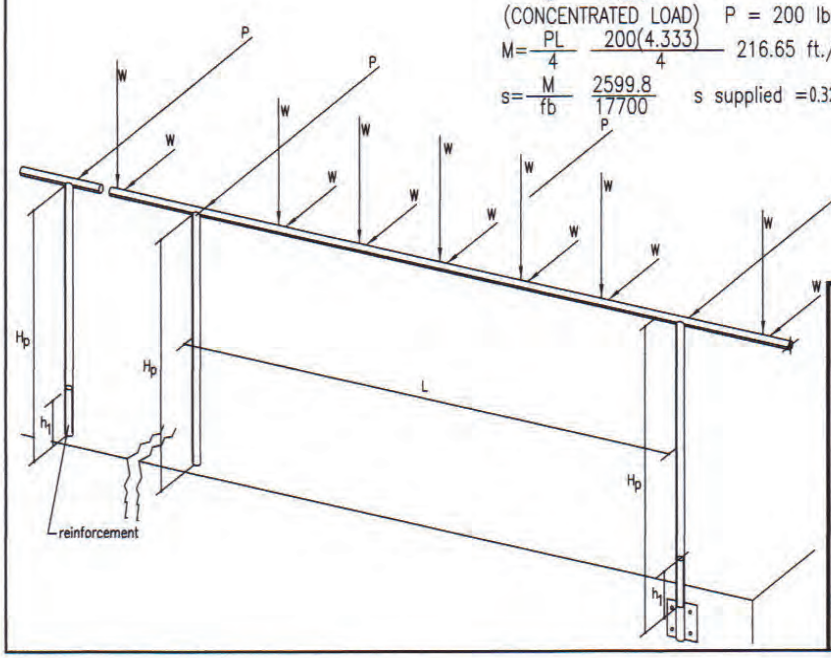
$M = \frac{wL^2}{8}$ $\frac{50(18.7748)}{8}$ =117.34 ft./lbs. or 1408.11 in./lbs.

$s = \frac{M}{fb}$ $\frac{1408.11}{17700}$ s supplied = $0.326in^3$ > s req'd = $0.079in^3$

(CONCENTRATED LOAD) P = 200 lbs.

$M = \frac{PL}{4}$ $\frac{200(4.333)}{4}$ 216.65 ft./lbs. or 2599.8 in./lbs.

$s = \frac{M}{fb}$ $\frac{2599.8}{17700}$ s supplied = $0.326in^3$ > s req'd = $0.146in^3$



COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
GERARD R. SMITH
PE 029234E
2/1/13

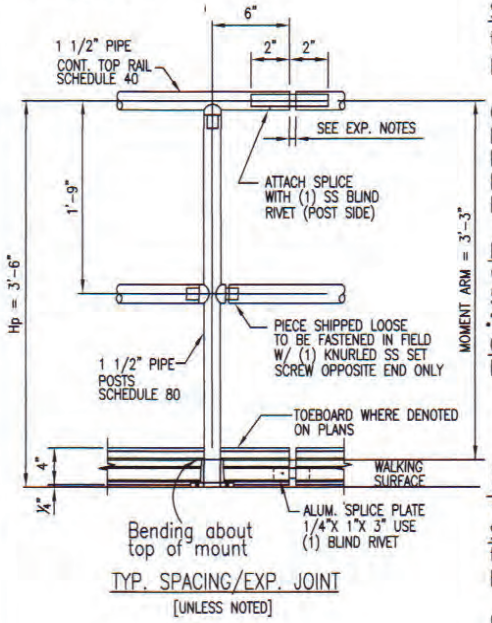
PLEASANT MOUNT WELDING, INC.

45 Dundaff Street
Carbondale, PA.

P.M.W.I. Job Name: Handrail Brochure
Sheet Number. ____ of ____
Calculated By: B.Purvis Date: 2/1/13
Checked By: G.Smith Date: 2/1/13

POST DESIGN – (UNWELDED)TOP MOUNT

1-1/2" DIAMETER SCHEDULE 80 6061-T6 ALUMINUM



TYP. SPACING/EXP. JOINT
[UNLESS NOTED]

SECTION PROPERTIES (2010 ADM – Table 22)

t :=0.200in d :=1.900in Ag :=1.07in*2 I :=0.391in*4
E :=10100 ksi d1 :=1.500in S :=0.412in*3 r :=0.605in Rbt :=4.3

Concentratated Load Applied In Any Direction:	P:= 200 lb.
Distributed Load Applied:	w:= 50 plf.
Maximum Trib to Post:	L:= 60 in.
Height of Post:	Hp:= 42 in.
Height of Insert:	h1:= not required

Note: Calculations Per 2010 Aluminum Design Manual
w = 50 lb.ft. x Spacing or 200 lb. Whichever is Greater
50 lb.ft. x 5'-0" = 250 lb.
∴ w = 250 lb.

CHECK POST

M=PL
=250 lb. x 39"
=9750 in./lb.

s req'd $= \frac{9750}{24000} = 0.406in^3$

s supplied = $.412in^3$ > s req'd = $0.406in^3$

HANDRAIL DESIGN

1-1/2" DIAMETER SCHEDULE 40 6063-T6 ALUMINUM

SECTION PROPERTIES (2010 ADM – Table 22)

t :=0.145in d :=1.900in Ag :=0.799in*2 I :=0.310in*4
E :=10100 ksi d1 :=1.610in S :=0.326in*3 r :=0.623in Rbt :=6.1

Note: Calculations Per 2010 Aluminum Design Manual

CHECK HANDRAIL:

(UNIFORM LOAD) 50 lb.ft. x 5'-0" = 250 lbs.

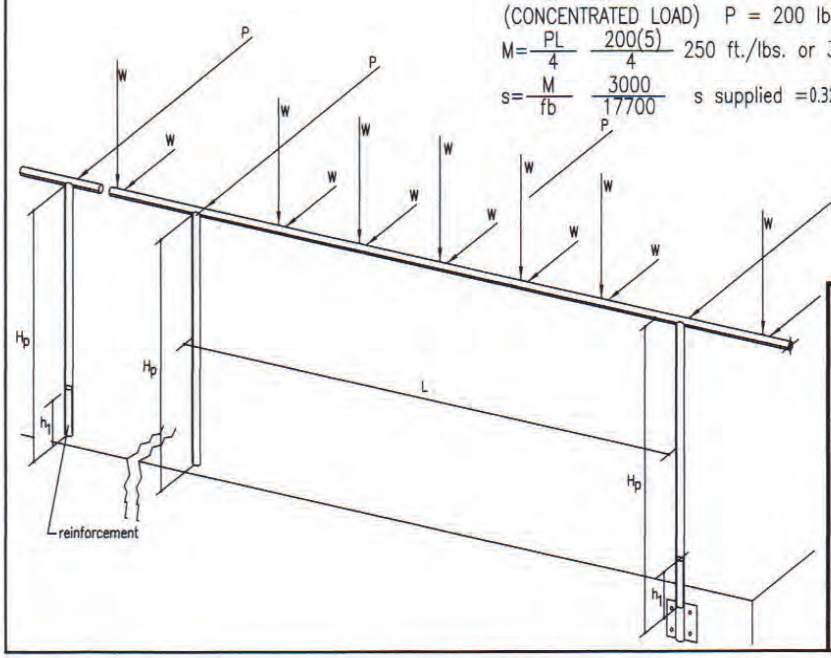
$M = \frac{wL^2}{8}$ $\frac{50(25)}{8}$ =156.25 ft./lbs. or 1875 in./lbs.

$s = \frac{M}{fb}$ $\frac{1875}{17700}$ s supplied = $0.326in^3$ > s req'd = $0.105in^3$

(CONCENTRATED LOAD) P = 200 lbs.

$M = \frac{PL}{4}$ $\frac{200(5)}{4}$ 250 ft./lbs. or 3000 in./lbs.

$s = \frac{M}{fb}$ $\frac{3000}{17700}$ s supplied = $0.326in^3$ > s req'd = $0.169in^3$

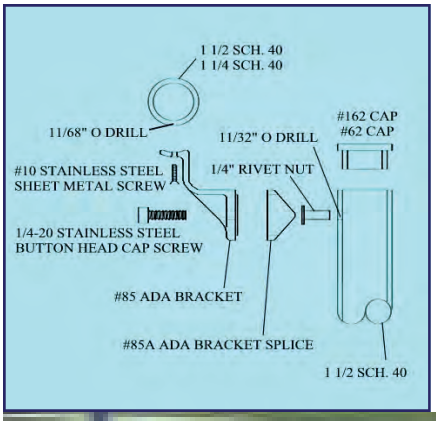


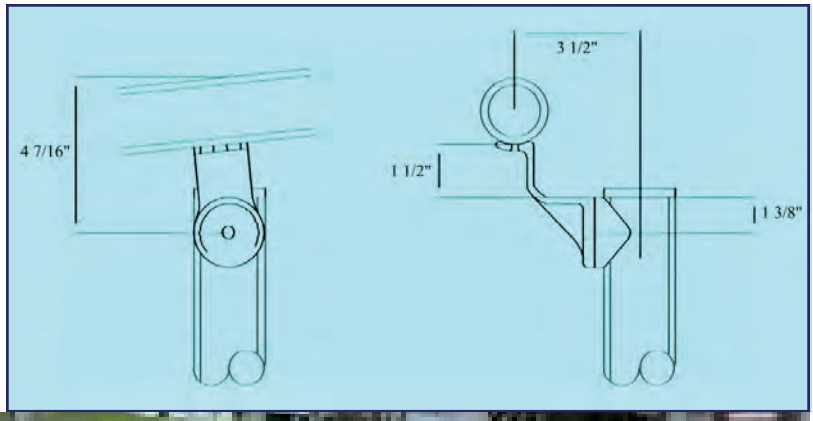
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
GERARD F. SMITH
ENGINEER
PE 029234E
2/1/13

PMWI ADA RAILING SYSTEM

The PMWI A.D.A. handrail meets all the requirements of the Americans with Disabilities Act. The handrail makes it easy to comply with the A.D.A. regulations and offers an excellent aesthetic appearance.

The structural strength will withstand 250 pounds of force applied to the system in any direction.





Architectural Testing

TEST REPORT

Rendered to:

PLEASANT MOUNT WELDING, INC.

For:

PMWI Mechanical Level Guardrail System
Utilizing the 45SBC Hollander Flange Mount and PMWI Side Mount

Report No: B9565.01-119-19
Report Date: 09/12/12
Revision 1: 09/13/12

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

Architectural Testing

TEST REPORT

B9565.01-119-19
September 12, 2012
Revision 1: September 13, 2012

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Architectural Testing

TEST REPORT

Rendered to:

PLEASANT MOUNT WELDING, INC.
45 Dundaff Street
Carbondale, Pennsylvania 18407

Report No.:	B9565.01-119-19
Test Date Started:	07/17/12
Test Date Completed:	07/19/12
Report Date:	09/12/12
Revision 1:	09/13/12

1.0 General Information

1.1 Product

PMWI Mechanical Level Guardrail System Utilizing the 45SBC Hollander Flange Mount and PMWI Side Mount

1.2 Project Description

Architectural Testing was contracted by Pleasant Mount Welding, Inc. to conduct structural performance tests on their 192 in long *PMWI Mechanical Level Guardrail System* utilizing the 45SBC Hollander Flange Mount and PMWI Side Mount. The systems were evaluated in accordance with the following ASTM standards:

ASTM E 935-00 (Reapproved 2006), *Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings*

ASTM E 985-00 (Reapproved 2006), *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*

1.3 Limitations

All tests performed were to evaluate structural performance of the guardrail assembly to carry and transfer imposed loads to the supporting structure. The test specimens evaluated included the rails, rail connections and support posts. Anchorage of support posts to the supporting structure is not included in the scope of this testing and would need to be evaluated separately.

1.4 Limitations

Architectural Testing has demonstrated compliance with ANSI/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc.

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

1.5 Product Description

Pleasant Mount Welding, Inc. provided the assembled test specimens with the following details:

Rails: Nominal 1-1/2 in diameter by 192 in long, 6063-T6 aluminum extrusion SCH 40 tube stock

Posts: Nominal 1-1/2 in diameter by 40-3/4 in long, 6061-T6 aluminum extrusion SCH 80 tube stock

Post Attachment Brackets:

- 45SBC Hollander Flange Mount

  5 in square by 1/2 in thick 535 aluminum-magnesium sand casting with a 2-1/2 in high tapered female socket portion to capture the post at one end using two set screws. The mount included four 5/8 in diameter holes located 3/4 in from each edge and 3-1/2 in apart on-center.

- PMWI Side Mount:

- 6 in high by 5-1/2 in wide by 5/16 in thick 6063-T6 aluminum extrusion with a female socket portion to capture the post at one end using two set screws. The mount included four 5/8 in high by 7/8 in wide slotted holes located 3/4 in from each edge and 4 in apart on-center.

See drawings in Appendix A for additional details.

1.6 Fastening Schedule

Connection	Fastener
Posts and Bottom Rail to Interna-Rail® Fitting	One 3/8-16 x 1-3/8" stainless steel set screw
Interna-Rail® Fitting to Posts and Top Rail	One 5/16-18 x 1-1/4" stainless steel socket head cap screw with stainless steel lock washer
45SBC Hollander Flange Mount and PMWI Side Mount to Post	Two 3/8-16 x 7/16" stainless steel set screws
45SBC Hollander Flange Mount and PMWI Side Mount to Rigid Steel Channel (Simulated Concrete)	Four 1/2-13 x 2" hex head steel bolts with nuts and washers

2.0 Structural Performance Testing of Assembled Railing Systems

2.1 Scope

Six total specimens comprised of two rails and three support posts each were tested according to two of the four test methods described in ASTM E 935 in a laboratory set to maintain temperature in the range of 68 ± 4°F and a range of 50 + 5% for relative humidity. Three specimens were tested with the 45SBC Hollander Flange mount and the other three specimens utilized the PMWI Side Mount.

2.2 Test Load and Deflection Criteria

The test load criteria for rail and post members were 300 lb vertical concentrated load and 365 lb horizontal concentrated load to address the worse case end-use category loading defined in ASTM E 985, Section 7.1. The deflection criteria for the top rail and post were as defined in ASTM E 985, Section 7.2.

2.3 Test Equipment

The guardrail assemblies were tested on a self-contained rigid steel test fixture designed to accommodate anchorage of the rail assembly and application of the required test loads. The specimens were loaded using an electric winch mounted to a rigid steel test frame. High strength steel cables, nylon straps, and a spreader beam were used to impose test loads on the specimens. Applied load was measured using an electronic load cell located in-line with the loading system. Electronic linear displacement transducers were used to measure deflections. Deflections and load values were electronically recorded continuously throughout the loading process.

2.4 Test Setup

Each test specimen was inspected prior to testing to verify size and general condition of the materials, assembly and installation. No potentially compromising defects were observed prior to testing. Each *PMWI Mechanical Level Guardrail System* utilizing 45SBC Hollander Flange Mount was a 192 in long by 43 in high assembly consisting of three 40-3/4 in high aluminum posts and two nominal 1-1/2 in diameter by 192 in long hollow aluminum rails. Each *PMWI Mechanical Level Guardrail System* utilizing PMWI Side Mount was a 192 in long by 52 in high assembly consisting of three 49-3/4 in high aluminum posts and two nominal 1-1/2 in diameter by 192 in long hollow aluminum handrails. Anchorage of posts was accomplished by bolting to rigid steel channels (i.e. simulated concrete) with 1/2-13 x 2" hex head steel bolts with nuts and washers. Transducers mounted to independent reference frames were located to record guardrail system deflection at the point(s) of loading. See photographs in Appendix B for individual test setups.

2.5 Test Procedure

Test procedures were conducted according to the referenced standards and are further defined below.

2.5.1 Test Methods A and B

Method A - *Application of Horizontal Static Load to Top Rail*
Method B - *Application of Vertical Static Load to Top Rail*

- A preload of 50% of test load was applied and then released
- A load of 25% of test load was applied and deflection readings were zeroed
- Load was increased to 40% of test load and maintained for at least 2 minutes
- Load was increased to 55% of test load and maintained for at least 2 minutes
- Load was increased to 70% of test load and maintained for at least 2 minutes
- Load was increased to 85% of test load and maintained for at least 2 minutes
- Load was increased to the full test load and maintained for at least 2 minutes
- Load was decreased to 25% of test load and deflections recorded
- Deflections were also recorded at the conclusion of each 2 minute hold period

2.5.2 Test Sequence

Test Specimen 1

Method A - Horizontal concentrated load on top rail adjacent to end post
Method B - Vertical concentrated load on top rail adjacent to end post
Method B - Vertical concentrated load at both top rail mid-spans

Test Specimens 2 and 3

Method A - Horizontal concentrated load at both top rail mid-spans
Method B - Vertical concentrated load on top rail adjacent to end post
Method B - Vertical concentrated load at both top rail mid-spans

Note for Specimen 3, Method A testing is to be a repeat of the "weaker" of Specimen 1 or 2 per ASTM E 935, Section 13.1; which was determined by deflection results to be Specimen 1.

2.6 Test Results

The following tests were performed on the test specimens in accordance with the test load requirements of the referenced standards.

Key to Test Results Tables:

Load Level: Target test load expressed as percent of test load criterion and (lb)

Applied Load: Actual applied load - Where more than one value is reported, the applied load was the range (min. - max.) that was held during the time indicated for the test

Elapsed Time (E.T.): The length of time into the test with zero established at the beginning of the loading procedure - Where more than one value is reported, the time was the range (start-end) that the applied load was maintained

Displacement: Total specimen displacement measured at or adjacent to point of load unless noted otherwise

Test Series No. 1
192 in by 43 in *PMWI Mechanical Level Guardrail System*
Utilizing the 45SBC Hollander Flange Mount
Specimen No. 1 of 3

Test Method A **365 lb Horizontal Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/17/12**			
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**
0% (0 lb)	0	00:00	-----
50% (183 lb)	185	00:42	-----
25% (91 lb)	93	01:22	0.00
40% (146 lb)	146 – 150	01:46 – 03:48	0.42
55% (201 lb)	201 – 205	04:13 – 06:19	0.84
70% (256 lb)	256 – 262	06:43 – 08:49	1.31
85% (310 lb)		09:18 – 11:29	1.80
100% (365 lb)	365 – 368	11:56 – 13:59	**2.27**
25% (91 lb)	91	15:51	**0.27**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load: $\frac{h}{12} = \frac{43}{12} = 3.58 > 2.27 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load:

$$20\% \times \left(\frac{h}{12}\right) = 0.2 \times \left(\frac{43}{12}\right) = 0.72 > 0.27 \therefore ok \quad \text{or} \quad 1/2 \text{ in} > 0.27 \therefore ok$$

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 1 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/17/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	152	00:44
25% (75 lb)	77	01:38
40% (120 lb)	120 – 124	02:03 – 04:04
55% (165 lb)	165 – 174	04:24 – 06:25
70% (210 lb)	210 – 217	06:40 – 08:40
85% (255 lb)	257 – 263	09:08 – 11:13
100% (300 lb)	300 – 306	11:25 – 13:28
25% (75 lb)	75	14:55

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 1 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/17/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	150	00:54	-----	-----
25% (75 lb)	77	02:00	0.00	0.00
40% (120 lb)	120 – 124	02:31 – 04:36	0.04	0.05
55% (165 lb)	165 – 168	05:02 – 07:04	0.08	0.10
70% (210 lb)	210 – 216	07:27 – 09:31	0.12	0.16
85% (255 lb)	255 – 264	09:51 – 11:57	0.17	0.22
100% (300 lb)	300 – 311	12:12 – 14:16	**0.21**	**0.27**
25% (75 lb)	76	15:47	**0.00**	**0.00**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.21 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.27 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 2 of 3

Test Method A **365 lb Horizontal Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/17/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (183 lb)	183	01:01	-----	-----
25% (91 lb)	97	02:08	0.00	0.00
40% (146 lb)	147 – 150	02:33 – 04:39	0.30	0.29
55% (201 lb)	201 – 206	05:04 – 07:14	0.63	0.62
70% (256 lb)	256 – 259	07:33 – 09:40	0.94	0.93
85% (310 lb)	310 – 314	10:06 – 12:08	1.26	1.25
100% (365 lb)	365 – 370	12:35 – 14:37	**1.56**	**1.57**
25% (91 lb)	92	16:21	**0.09**	**0.09**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1: $\frac{h}{24}+\frac{l}{96}=\frac{43}{24}+\frac{96}{96}=2.79>1.56 \therefore ok$

Maximum Allowable Deflection at Test Load #2: $\frac{h}{24}+\frac{l}{96}=\frac{43}{24}+\frac{96}{96}=2.79>1.57 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load at Test Load #1:

$20\%\times\left(\frac{h}{24}+\frac{l}{96}\right)=0.2\times 2.79=0.56>0.09 \therefore ok$ or 1/2 in > 0.09 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load at Test Load #2:

$20\%\times\left(\frac{h}{24}+\frac{l}{96}\right)=0.2\times 2.79=0.56>0.09 \therefore ok$ or 1/2 in > 0.09 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 2 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/17/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	155	00:31
25% (75 lb)	75	01:12
40% (120 lb)	120 – 133	01:38 – 03:40
55% (165 lb)	166 – 174	04:00 – 06:10
70% (210 lb)	211 – 216	06:33 – 08:37
85% (255 lb)	255 – 260	09:01 – 11:05
100% (300 lb)	300 – 306	11:30 – 13:30
25% (75 lb)	76	14:39

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 2 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/18/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	151	00:40	-----	-----
25% (75 lb)	77	01:15	0.00	0.00
40% (120 lb)	120 – 126	01:39 – 03:42	0.02	0.04
55% (165 lb)	165 – 170	04:02 – 06:10	0.06	0.09
70% (210 lb)	210 – 218	06:34 – 08:37	0.10	0.13
85% (255 lb)	255 – 265	08:59 – 11:06	0.14	0.17
100% (300 lb)	301 – 308	11:26 – 13:29	**0.17**	**0.20**
25% (75 lb)	78	14:25	**0.01**	**0.00**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.17 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.20 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load #1:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.01 \therefore ok$ or 1/2 in > 0.01 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load #2:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 3 of 3

Test Method A **365 lb Horizontal Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/18/12**			
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**
0% (0 lb)	0	00:00	-----
50% (183 lb)	186	00:44	-----
25% (91 lb)	96	01:33	0.00
40% (146 lb)	146 – 151	01:55 – 04:00	0.42
55% (201 lb)	201 – 205	04:21 – 06:22	0.87
70% (256 lb)	256 – 261	06:49 – 08:55	1.34
85% (310 lb)	9	09:18 – 11:23	1.84
100% (365 lb)	366 – 370	11:51 – 13:53	**2.28**
25% (91 lb)	91	15:08	**0.28**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load: $\frac{h}{12} = \frac{43}{12} = 3.58 > 2.28 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load:

$$20\% \times \left(\frac{h}{12}\right) = 0.2 \times \left(\frac{43}{12}\right) = 0.72 > 0.28 \therefore ok \quad \text{or} \quad 1/2 \text{ in} > 0.28 \therefore ok$$

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 3 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/18/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	150	00:25
25% (75 lb)	81	01:04
40% (120 lb)	120 – 126	01:20 – 03:21
55% (165 lb)	166 – 173	03:48 – 05:53
70% (210 lb)	210 – 218	06:19 – 08:21
85% (255 lb)	255 – 260	08:40 – 10:44
100% (300 lb)	302 – 310	11:19 – 13:21
25% (75 lb)	78	14:21

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 1 (Continued)
Specimen No. 3 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/18/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	153	00:41	-----	-----
25% (75 lb)	76	01:22	0.00	0.00
40% (120 lb)	120 – 128	01:52 – 02:53	0.04	0.06
55% (165 lb)	166 – 171	03:16 – 05:19	0.08	0.11
70% (210 lb)	210 – 215	05:36 – 07:36	0.13	0.16
85% (255 lb)	255 – 261	07:53 – 09:53	0.18	0.21
100% (300 lb)	300 – 308	10:11 – 13:12	**0.22**	**0.27**
25% (75 lb)	76	14:20	**0.00**	**0.00**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.22 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.27 \therefore ok$

Maximum Allowable Residual Deflection at 25% Loads #1 and #2:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 2
192 in by 52 in *PMWI Mechanical Level Guardrail System*
Utilizing the PMWI Side Mount
Specimen No. 1 of 3

Test Method A **365 lb Horizontal Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/18/12**			
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**
0% (0 lb)	0	00:00	-----
50% (183 lb)	184	00:36	-----
25% (91 lb)	95	01:20	0.00
40% (146 lb)	146 – 150	01:44 – 03:48	0.67
55% (201 lb)	201 – 205	04:12 – 06:17	1.32
70% (256 lb)	257 – 262	06:38 – 08:41	2.03
85% (310 lb)	315	09:06 – 11:08	2.73
100% (365 lb)	365 – 369	11:33 – 13:35	**3.46**
25% (91 lb)	92	14:56	**0.23**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load: $\frac{h}{12} = \frac{47^{1}}{12} = 3.92 > 3.46 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load:

$$20\% \times \left(\frac{h}{12}\right) = 0.2 \times \left(\frac{47^{1}}{12}\right) = 0.78 > 0.23 \therefore ok \quad \text{or} \quad 1/2 \text{ in} > 0.23 \therefore ok$$

[1] *The effective post height used to calculate the maximum allowable deflection is based on the distance from the top of the top rail to the first point of fastener connection to the supporting construction.*

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 1 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/18/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	154	00:24
25% (75 lb)	83	01:00
40% (120 lb)	120 – 127	01:18 – 03:18
55% (165 lb)	165 – 170	03:37 – 05:40
70% (210 lb)	210 – 215	05:53 – 07:56
85% (255 lb)	255 – 260	08:12 – 10:14
100% (300 lb)	300 – 308	10:26 – 12:28
25% (75 lb)	76	13:24

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 1 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/18/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	151	00:51	-----	-----
25% (75 lb)	76	01:51	0.00	0.00
40% (120 lb)	120 – 127	02:11 – 04:14	0.04	0.05
55% (165 lb)	165 – 170	04:31 – 06:34	0.08	0.09
70% (210 lb)	210 – 216	06:51 – 08:53	0.12	0.14
85% (255 lb)	255 – 262	09:08 – 11:14	0.17	0.19
100% (300 lb)	300 – 318	11:29 – 13:29	**0.22**	**0.24**
25% (75 lb)	75	14:46	**0.00**	**0.00**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.22 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.24 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load #1:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load #2:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 2 of 3

Test Method A **365 lb Horizontal Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/19/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (183 lb)	185	01:02	-----	-----
25% (91 lb)	93	02:44	0.00	0.00
40% (146 lb)	146 – 150	03:05 – 05:05	0.31	0.32
55% (201 lb)	201 – 206	05:26 – 07:29	0.62	0.64
70% (256 lb)	256 – 261	07:49 – 09:51	0.94	0.97
85% (310 lb)	311 – 315	10:11 – 12:14	1.26	1.30
100% (365 lb)	365 – 369	12:43 – 14:43	**1.58**	**1.64**
25% (91 lb)	93	16:33	**0.04**	**0.05**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1: $\frac{h}{24}+\frac{l}{96}=\frac{52}{24}+\frac{96}{96}=3.17>1.58 \therefore ok$

Maximum Allowable Deflection at Test Load #2: $\frac{h}{24}+\frac{l}{96}=\frac{52}{24}+\frac{96}{96}=3.17>1.64 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load at Test Load #1:

$20\%\times\left(\frac{h}{24}+\frac{l}{96}\right)=0.2\times 3.17=0.63>0.04 \therefore ok$ or 1/2 in > 0.04 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load at Test Load #2:

$20\%\times\left(\frac{h}{24}+\frac{l}{96}\right)=0.2\times 3.17=0.63>0.05 \therefore ok$ or 1/2 in > 0.05 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 2 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/19/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	151	00:21
25% (75 lb)	79	01:01
40% (120 lb)	120 – 126	01:22 – 03:22
55% (165 lb)	165 – 170	03:41 – 05:44
70% (210 lb)	210 – 216	05:57 – 07:58
85% (255 lb)	255 – 261	08:17 – 10:21
100% (300 lb)	300 – 306	10:45 – 12:49
25% (75 lb)	77	13:56

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 2 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/19/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	150	00:43	-----	-----
25% (75 lb)	75	01:21	0.00	0.00
40% (120 lb)	121 – 127	01:43 – 03:45	0.04	0.06
55% (165 lb)	165 – 175	04:15 – 06:17	0.09	0.09
70% (210 lb)	210 – 214	06:38 – 08:39	0.13	0.13
85% (255 lb)	255 – 262	09:05 – 11:05	0.17	0.18
100% (300 lb)	300 – 306	11:24 – 13:24	**0.22**	**0.23**
25% (75 lb)	75	14:40	**0.00**	**0.01**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.22 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.23 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load #1:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load #2:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.01 \therefore ok$ or 1/2 in > 0.01 $\therefore ok$

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 3 of 3

Test Method A **365 lb Horizontal Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/19/12**			
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**
0% (0 lb)	0	00:00	-----
50% (183 lb)	183	00:38	-----
25% (91 lb)	94	01:36	0.00
40% (146 lb)	146 – 151	01:59 – 04:01	0.69
55% (201 lb)	201 – 205	04:22 – 06:25	1.31
70% (256 lb)	256 – 260	06:51 – 08:55	2.01
85% (310 lb)	5	09:18 – 11:22	2.71
100% (365 lb)	365 – 369	11:52 – 13:55	**3.41**
25% (91 lb)	93	15:21	**0.17**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load: $\frac{h}{12} = \frac{47^{1}}{12} = 3.92 > 3.41 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load:

$$20\% \times \left(\frac{h}{12}\right) = 0.2 \times \left(\frac{47^{1}}{12}\right) = 0.78 > 0.17 \therefore ok \quad \text{or} \quad 1/2 \text{ in} > 0.17 \therefore ok$$

[1] *The effective post height used to calculate the maximum allowable deflection is based on the distance from the top of the top rail to the first point of fastener connection to the supporting construction.*

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 3 of 3 (Continued)

Test Method B [1] **300 lb Vertical Concentrated Load on Top Rail Adjacent to End Post** **Test Date: 07/19/12**		
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**
0% (0 lb)	0	00:00
50% (150 lb)	151	00:32
25% (75 lb)	80	01:00
40% (120 lb)	120 – 137	01:15 – 03:15
55% (165 lb)	166 – 170	03:30 – 05:35
70% (210 lb)	210 – 214	06:01 – 08:02
85% (255 lb)	255 – 259	08:27 – 10:29
100% (300 lb)	300 – 306	11:01 – 13:02
25% (75 lb)	78	14:23

[1] *There is no deflection criterion for Test Method B when loading adjacent to a post.*

2.6 Test Results (Continued)

Test Series No. 2 (Continued)
Specimen No. 3 of 3 (Continued)

Test Method B **300 lb Vertical Concentrated Load at Both Top Rail Mid-Spans** **Test Date: 07/19/12**				
Load Level	**Applied Load (lb)**	**E.T. (min:sec)**	**Displacement (in)**	
			@ Load #1	**@ Load #2**
0% (0 lb)	0	00:00	-----	-----
50% (150 lb)	153	00:38	-----	-----
25% (75 lb)	75	01:19	0.00	0.00
40% (120 lb)	121 – 128	01:38 – 03:39	0.05	0.05
55% (165 lb)	165 – 170	04:08 – 06:11	0.09	0.09
70% (210 lb)	210 – 216	06:39 – 08:41	0.14	0.14
85% (255 lb)	255 – 261	09:06 – 11:07	0.19	0.17
100% (300 lb)	300 – 313	11:32 – 13:39	**0.24**	**0.24**
25% (75 lb)	75	15:09	**0.00**	**0.01**

Deflection Criteria per Section 7.2 of ASTM E 985:

Maximum Allowable Deflection at Test Load #1 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.24 \therefore ok$

Maximum Allowable Deflection at Test Load #2 : $\frac{l}{96} = \frac{96}{96} = 1.00 > 0.24 \therefore ok$

Maximum Allowable Residual Deflection at 25% Load #1:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.00 \therefore ok$ or 1/2 in > 0.00 $\therefore ok$

Maximum Allowable Residual Deflection at 25% Load #2:

$20\% \times \left(\frac{l}{96}\right) = 0.2 \times \left(\frac{96}{96}\right) = 0.20 > 0.01 \therefore ok$ or 1/2 in > 0.01 $\therefore ok$

3.0 Summary and Conclusions

The 192 in long by 43 in high *PMWI Mechanical Level Guardrail System* utilizing the 45SBC Hollander Flange Mount and the 192 in long by 52 in high *PMWI Mechanical Level Guardrail System* utilizing the PMWI Side Mount tested and reported herein met all of the load and deflection criteria of the referenced standards.

4.0 Closing Statement

Detailed drawings, data sheets, representative samples of test specimens, a copy of this test report, and all other supporting evidence will be retained by Architectural Testing for a period of four years from the original test date. At the end of this retention period, said materials shall be discarded without notice, and the service life of this report by Architectural Testing shall expire. Results obtained are tested values and were secured using the designated test methods. This report neither constitutes certification of this product nor expresses an opinion or endorsement by this laboratory; it is the exclusive property of the client so named herein and relates only to the tested specimens. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING:

Digitally Signed by: Kyle Evans

Kyle J. Evans
Technician II
Structural Systems Testing

Digitally Signed by: Travis Hoover

Travis A. Hoover
Program Manager
Structural Systems Testing

KJE:kjc/tah

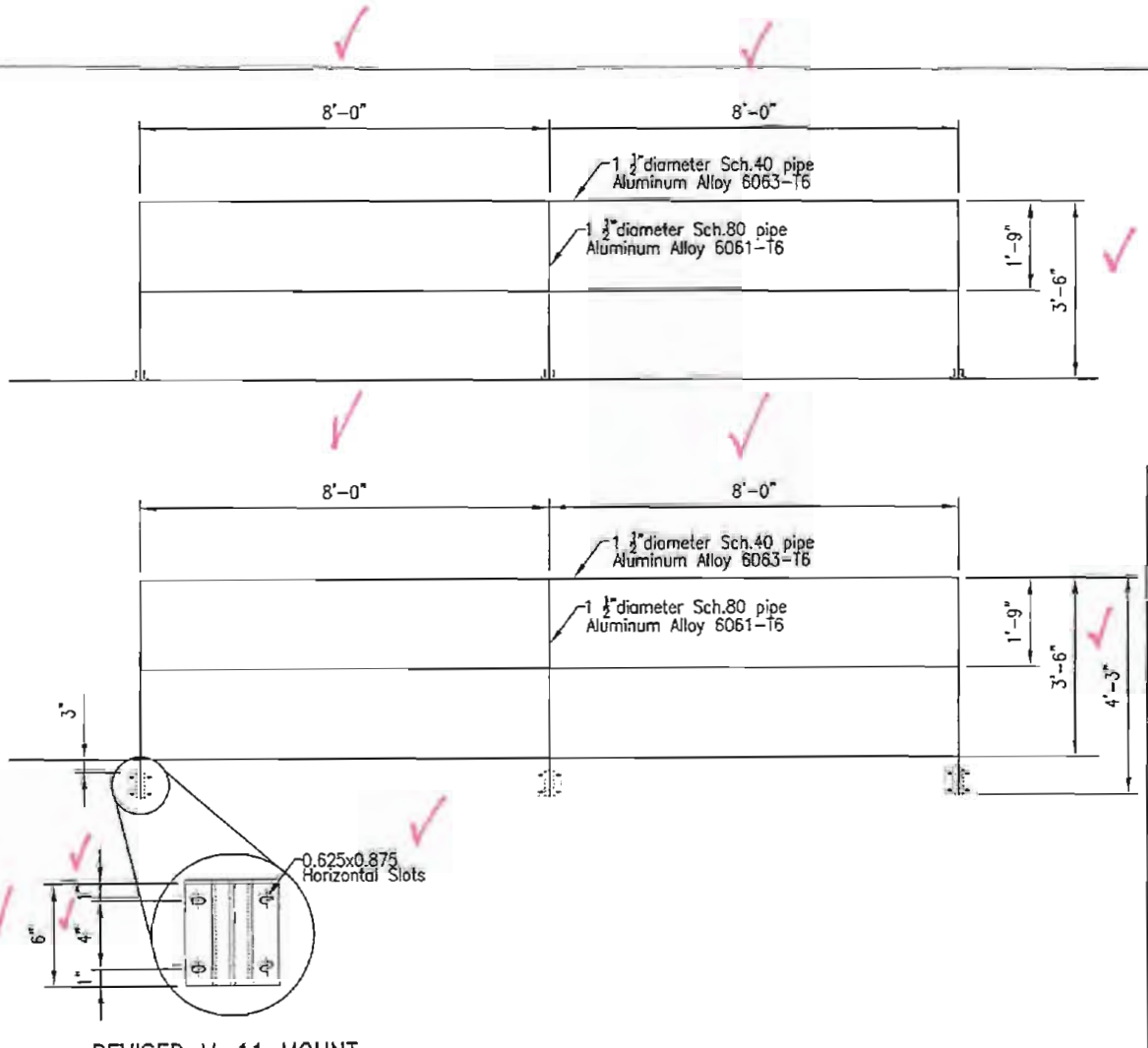
Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A - Drawings (4)
Appendix B - Photographs (5)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	09/12/12	N/A	Original report issue
1	09/13/12	All	Changed product name from PMWA of PMW1

APPENDIX A

Drawings



REVISED M-11 MOUNT

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # B9565.01-119-19

Date 9/11/12 Tech KJE

PMWI BILLING CODE: TEST

PLEASANT MOUNT WELDING, INC.
45 DUNDAFF STREET
CARBONDALE, PA. 18407
PHONE: (570) 282-6164 FAX: (570) 281-5931
VISIT US ON THE WEB @ www.pmwi.net

#	DATE	REVISIONS & NOTES	BY	CHK
	05/30/12	RELEASED AS PER EMAIL FROM BRYAN PURVIS, 5/30/12.	JW	

PROJECT: W/ GENERAL CONTRACTOR

ARCHITECTURAL TESTING

SHEET TITLE: TEST RAILS REF. CTRACT DWG. -

TOP & SIDE MOUNT RAIL ELEVATION

TEAM	DETAILER	DATE	CHKD BY	DATE	SCALE	SHEET NO.	REV
TEAM	ED	05/21/12	X	X	NONE	AT-TEST-0001	

PLEASANT MOUNT WELDING,INC.

45 Dundaff Street
Carbondale, PA.

P.M.W.I. Job # TESTING
P.M.W.I. Job Name: ARCHITECTURAL TESTING
Sheet Number. C of 1
Calculated By: _____ Date: _____
Checked By: _____ Date: _____

Aluminum–Extruded Alloy 6063–T6 Mount 18.0 ksi

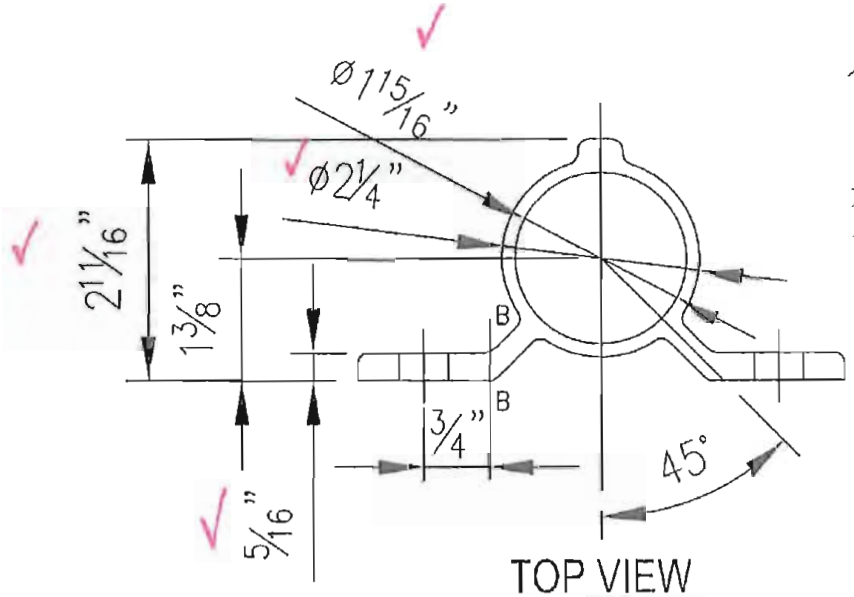
Pleasant Mount Weldings Mount # M11

Architectural Testing

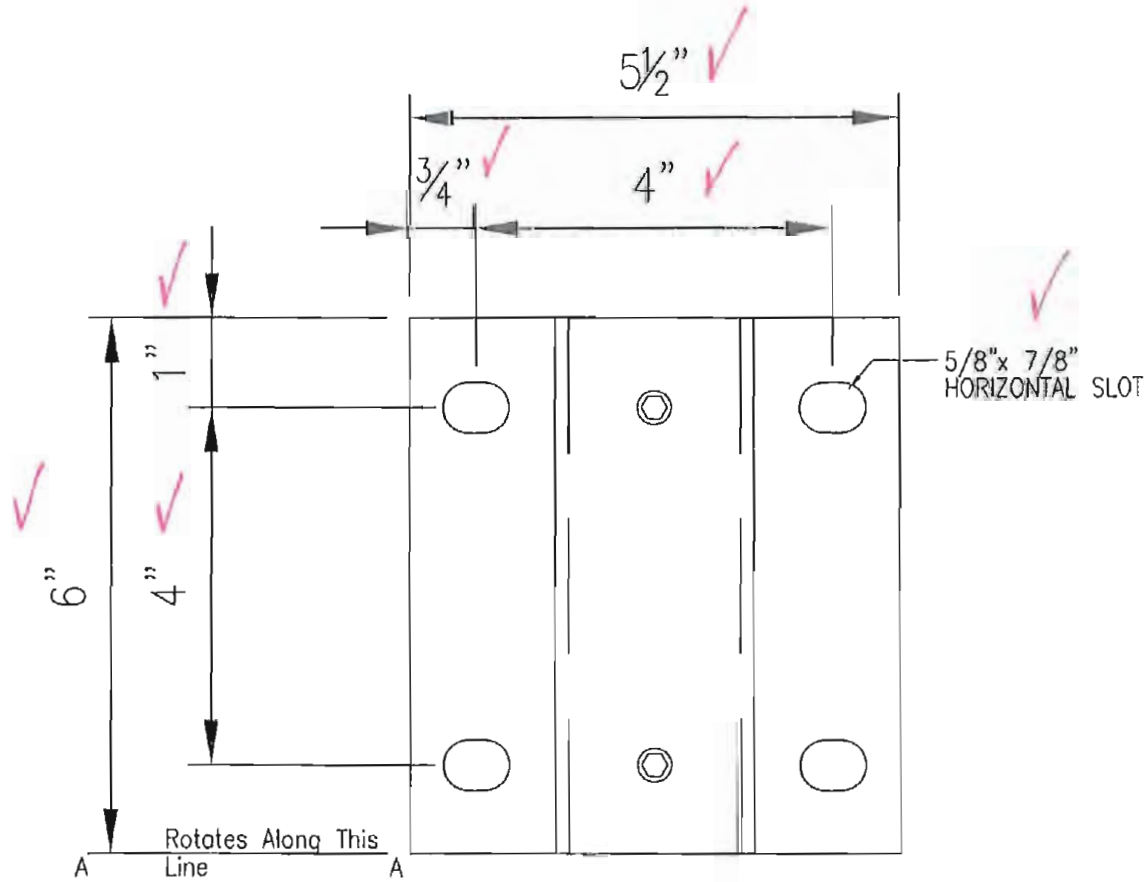
Test sample complies with these details.
Deviations are noted.

Report # B9565.01-119-19

Date 9/11/12 Tech KJB



TOP VIEW



FRONT VIEW

PLEASANT MOUNT WELDING,INC.

45 Dundaff Street
Carbondale, PA.

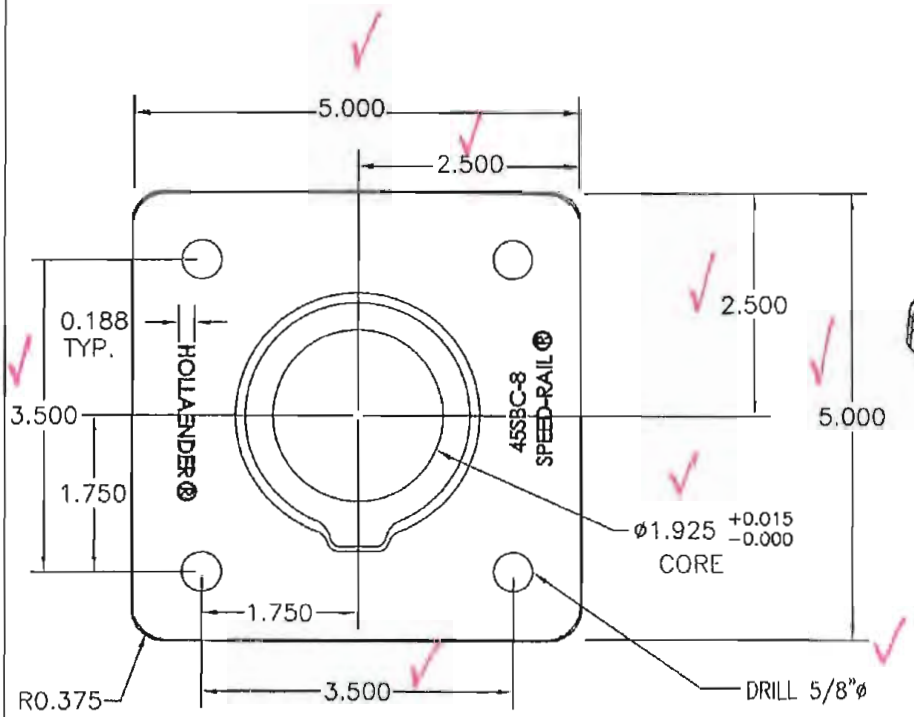
P.M.W.I. Job # TESTING
P.M.W.I. Job Name: ARCHITECTURAL TESTING
Sheet Number. C of 1
Calculated By: _____ Date: _____
Checked By: _____ Date: _____

Aluminum–Magnesium Alloy 535.0 Sand Casted Mount

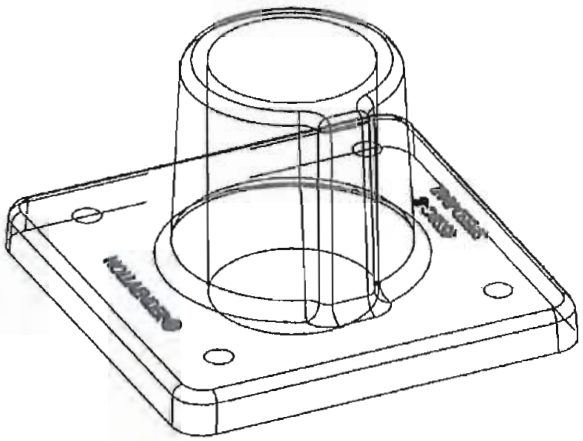
Pleasant Mount Weldings Mount # M2

Typical Mechanical Properties

Temper	Ultimate Strength	Yield Strength	Elongation (% in 2 in.)	Shear Strength	Compressive Yield Strength	Brinell Hardness	Endurance Limit
F	(ksi) 40	(ksi) 20	13	(ksi) 27.45	(ksi) 23.5	70 (70 min.)	(ksi) 10 ASTM B26-98



TOP VIEW



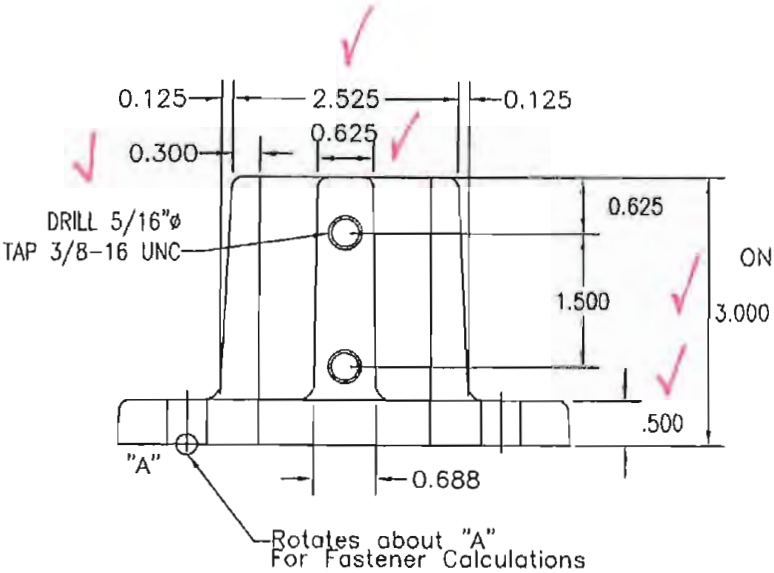
ISOMETRIC VIEW

Architectural Testing

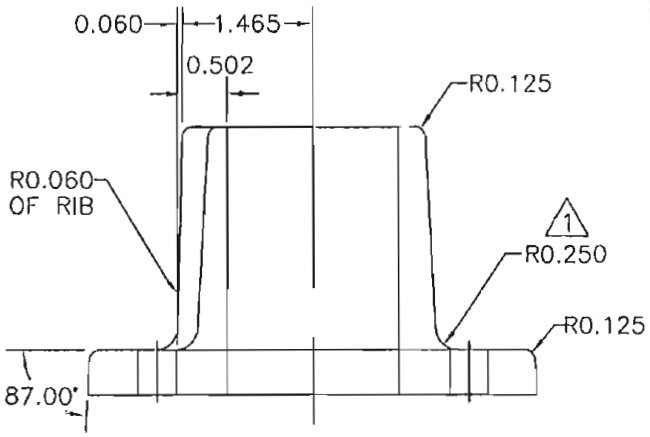
Test sample complies with these details.
Deviations are noted.

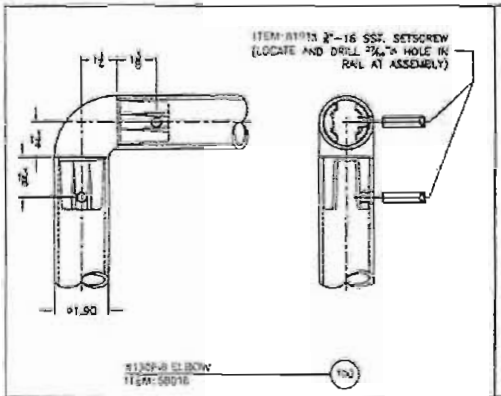
Report # B9525.01-119-19

Date 9/11/12 Tech KJE

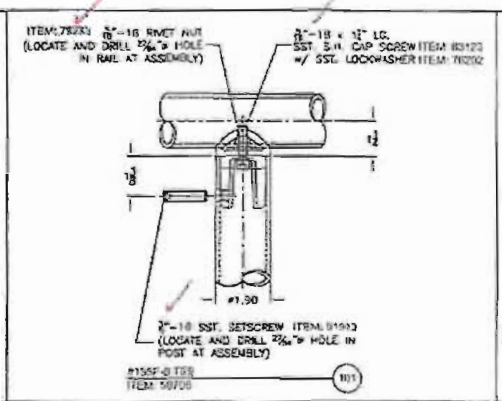


FRONT VIEW

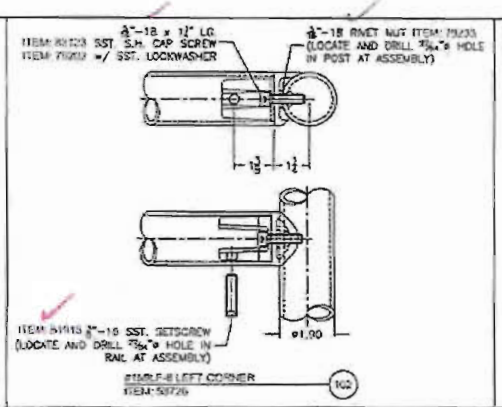




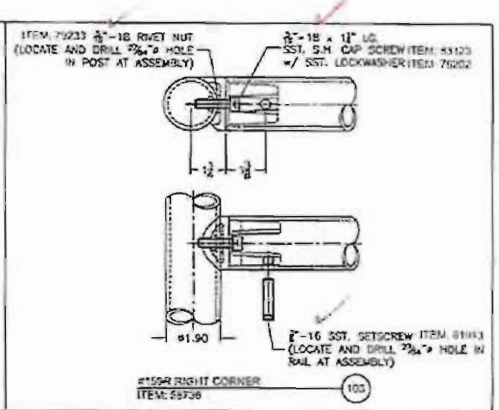
#135F-S ELBOW ITEM: 58018 (102)



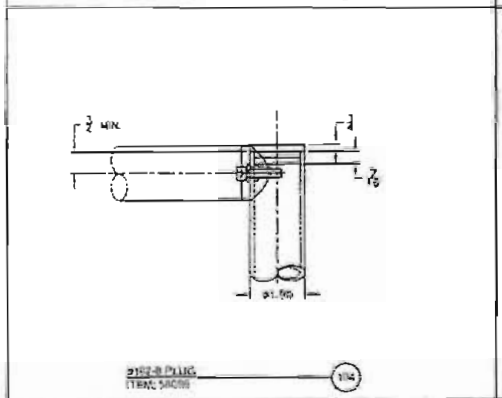
#135F-S TEE ITEM: 58706 (101)



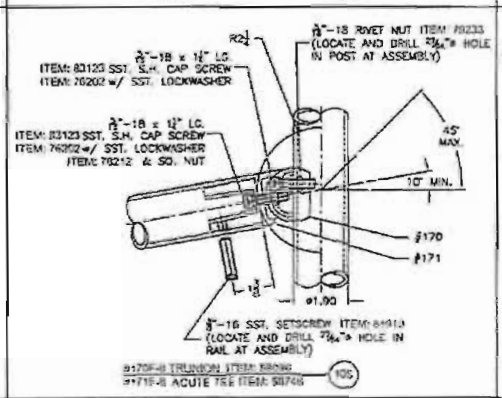
#135F-S LEFT CORNER ITEM: 58726 (102)



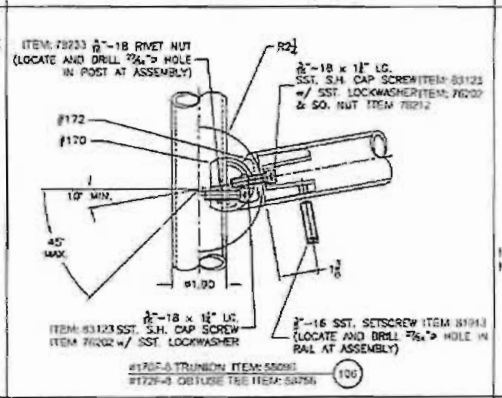
#135R RIGHT CORNER ITEM: 58736 (103)



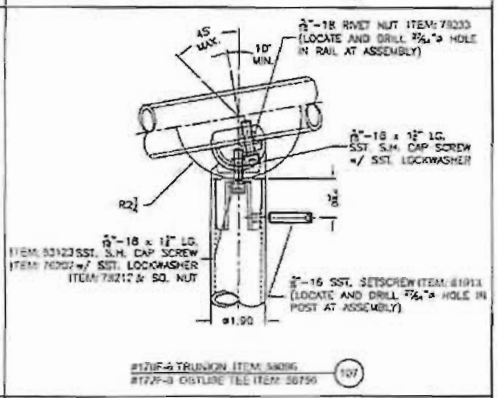
#182-S PLUG ITEM: 58099 (104)



#170F-S TRUNION ITEM: 58096
#171F-S ACUTE TEE ITEM: 58746 (105)



#170F-S TRUNION ITEM: 58096
#172F-S OBTUSE TEE ITEM: 58756 (106)



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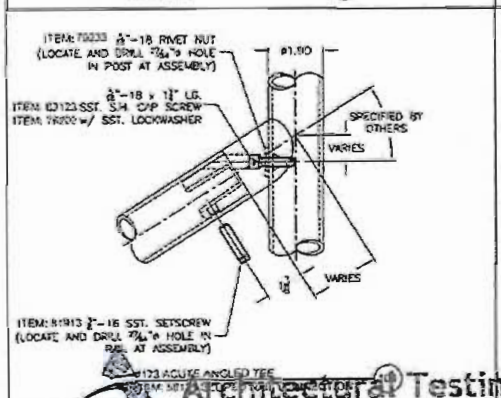
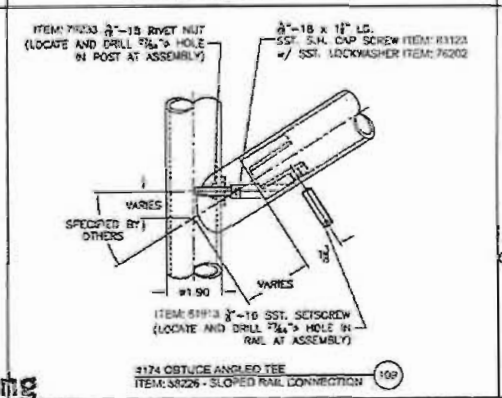
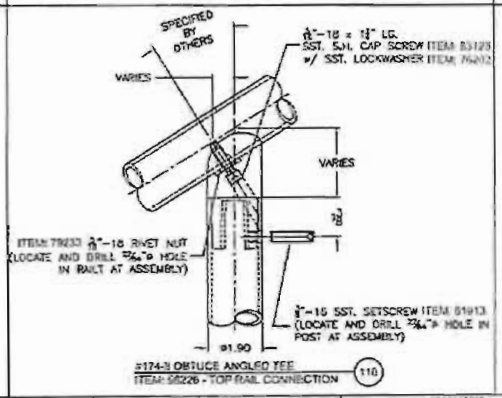
#172F-S OBTUSE TEE ITEM: 58756 (107)



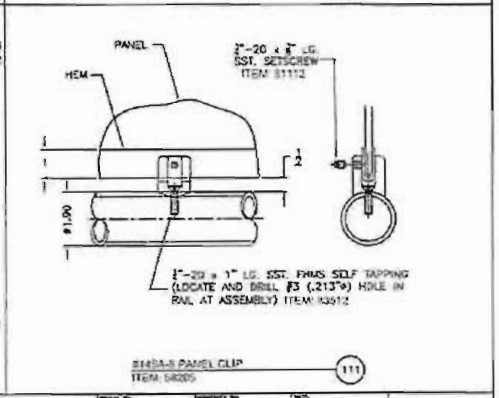
#173 ACUTE ANGLED TEE ITEM: 58106 (108)



#174 OBTUSE ANGLED TEE ITEM: 58226 - SLOPED RAIL CONNECTION (109)



#174-S OBTUSE ANGLED TEE ITEM: 58226 - TOP RAIL CONNECTION (110)



#148A-S PANEL CLIP ITEM: 58205 (111)

Architectural Testing

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NO.	REVISIONS	DATE	APPROVED

as submitted complies with these details.
Deviations are noted.

Report # 81565.01-119-19

Date 9/12/12 Tech KJE

Hollaender®
STRUCTURAL ENGINEERING GROUP
10285 WAYNE AVENUE
CINCINNATI, OH 45215-6399
PHONE: (800) 772-8800 FAX: (800) 772-8866
WWW.HOLLAENDER.COM

PROJECT	CUSTOMER	DESCRIPTION
INTERNA-RAIL FITTINGS	HOLLAENDER MANUFACTURING CINCINNATI, OH.	INSTALLATION/FABRICATION ASSEMBLY DRAWING

DRAWN BY: GG	APPROVED BY: BW	DATE: 1-6-11
PROJECT NO.: N/A		SCALE: NTS
MATERIAL: SEE NOTES		DRAWING NO.: 5953-S
FINISH: SEE NOTES		SHEET 1 OF 1

APPENDIX B

Photographs

Photo No. 1
Horizontal Concentrated Load on Top Rail Adjacent to End Post

Photo No. 2
Horizontal Concentrated Load at Both Top Rail Mid-Spans

Photo No. 3
Vertical Concentrated Load on Top Rail End Adjacent to End Post

Photo No. 4
Vertical Concentrated Load at Mid-Span of Both Top Rails

Photo No. 5
Bottom Rail to Interna-Rail® Fitting Connection

Photo No. 6
Interna-Rail® Fitting to Top Rail Connection

Photo No. 7
45SBC Hollander Flange Mount Connection (Simulated Concrete)

In 1994 PMWI relocated to a 40,000 sq.ft. facility in Carbondale, PA. Our commitment to excellence has fostered tremendous growth, and we have recently (2007) purchased an additional 80,000 sq.ft. manufacturing facility within minutes of our main office.

ENGINEERING FIRMS

PMWI HAS COMPLETED MISCELLANEOUS METALS CONTRACTS FOR WASTE-WATER OR WATER PROJECTS DESIGNED BY THE FOLLOWING ENGINEERS.

KARAM ASSOCIATES
CLARK ENGINEERS
GANNETT FLEMING, INC.
BRINJAC KAMBIC & ASSOCIATES
CHARLES MANGANARO CONSULTING ENGINEERS
GLACE ASSOCIATES
BCM ENGINEERS & SCIENTISTS
KILLAM ASSOCIATES
CLOUGH HARBOUR ASSOCIATES
MILNES ENGINEERING
RIELLY ASSOCIATES
DELAWARE ENGINEERING
T & M ASSOCIATES
LANC & TULLY ENGINEERING, INC
STEARNS & WHELER, INC.
C.T. CONSULTANTS, INC.
WHITMAN, REQUARDT & ASSOCIATES
ROY F. WESTON ENGINEERS
HAVENS & EMERSON, INC.
POST, BUCKELY, SCHUH & JERNIGAN, INC.
HAZEN & SAWYER, INC.
ACER ENGINEERS & CONSULTANTS
O'BRIEN & GERE ENGINEERS, INC.
GSEE ENVIROMENTAL CONSULTANTS
SYSTEMS DESIGN ENGINEERING, INC.
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
GIBSON THOMAS ENGINEERING
SCHOOR ENGINEERING, INC.
GEORGE, MILES & BUHR
ARCHITECT & ENGINEERS
L. ROBERT KIMBALL & ASSOCIATES
EUSTANCE & HOROWITZ, P.C.
THE EADS GROUP
BLACK & VEATCH ENGINEERING
M.S. CONSULTANTS, INC.
NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
MALCOLM PIRNIE, INC.
LAMONT VAN DEVALK ENGINEERING
THE PORT AUTHORITY OF NY & NJ
ENTECH ENGINEERING, INC.
FORCIER ALDRICH & ASSOCIATES
BASKERVILLE DONOVAN, INC.
WRIGHT PIERCE
WEBSTER MARTIN CONSULTING ENGINEERS
GWIN DOBSON & FOREMAN, INC.
CABE ASSOCIATES, INC.
C.F.M. ASSOCIATES
KELLEY ENGINEERING
MAST ENGINEERING
RETTEW ASSOCIATES
THE QUAD THREE GROUP
TAYLOR, WISEMAN & TAYLOR CONSULTING ENGINEERS
BUCK, SEIFERT & JOST, INC.
R.K.R. HESS ASSOCIATES
ALFRED BENESCH & COMPANY CONSULTING ENGINEERS
DAY ENGINEERING
F.X. BROWNE ASSOCIATES
BIPIN GANDHI, PC.
CET ENGINEERING SERVICES
McGOEY, HAUSER & EDSALL CONSULTING ENGINEERS
F & M ASSOCIATES
THE CHESTER ENGINEERS
METCALF & EDDY, INC.
RODHE & SOYKA
BUCHART HORN, INC.
EBASCO SERVICES, INC.
CAMP DRESSER & McKEE
U.S. ARMY CORPS OF ENGINEERS
CH2M HILL
NUSSBAUMER & CLARKE, INC.
K.L.H. ENGINEERS, INC.
MORRIS ASSOCIATES
J.P.W. ENGINEERING
RUMMEL, KLEPPER & KAHL CONSULTING ENGINEERS
KEYSTONE CONSULTING ENGINEERS
LOUREIRO ENGINEERING ASSOCIATES
TATMAN LEE ASSOCIATES, INC.
EDM CONSULTANTS, INC.
PENNONI ASSOCIATES
RICHARD A. ALAIMO ASSOCIATES
LEE T. PURCELL ASSOCIATES
THE NEW YORK CITY TRANSIT AUTHORITY
EARTHTECH, INC.
CECO ASSOCIATES, INC.
THE McGUIRE GROUP
MONTGOMERY WATSON, INC.
FINKBEINER PETTIS & STOUT, INC.
BRINNIER & LARIOS, P.C.
WATER MANAGEMENT SERVICES
UNI-TECH CONSULTING ENGINEERS

CUSTOMER TESTIMONIALS

" I have been in this business for many years and have never seen shop drawings of this caliber. I am very pleased with the presentation, assemblies, accuracy and details. Keep up the good work."

Michael Roy, C.H. Nickerson

" When we receive metals from P.M.W.I. the quality, customer service and on time deliveries are exceptional. the years of experience that P.M.W.I. has in water and wastewater treatment plants is invaluable."

Dominic Ruggiero, Michael F. Ronca and Sons, Inc.

"We have purchased all of the miscellaneous metals on our last four large wastewater treatment plants from pleasant mount welding. Not only is their pricing competitive, but the time and detail that they put into the production of their shop drawings ensures that the final product received at the jobsite fits without costly field modifications."

Rob Knapke, Peterson Construction Company

" Over the past ten years, I have worked with P.M.W.I. on various water and wastewater treatment plants involving challenging metal work. P.M.W.I. Has consistently provided outstanding customer service with a high level of attention to detail, accuracy and quality metal fabrications for projects with aggressive schedules.

Robert T. Huie, Pizzagalli Construction Company

Pleasant Mount Welding, Inc.

45 Dundaff Street, Carbondale, PA 18407
Phone 570.282.6164

Estimating Fax 570.282.7917 email: Sales@PMWI.net
Drafting Fax 570.281.5931 email: Submittal@PMWI.net
Mfg Fax 570.282.7920 email: Delivery@PMWI.net