



# EVANS ENGINEERING, INC. CONSULTING ENGINEERS

**Civil Engineering**  
Land Development  
Hydrology  
Permitting  
**Structural Engineering**  
Building Structural Design  
**Transportation**  
**Surveying**

2793 Old Post Road, Harrisburg, PA. 17110 • (717) 541-1580 Fax: (717) 541-1583 • [evanseng@evanseng.com](mailto:evanseng@evanseng.com)

December 13, 2018

Re-issued April 24, 2020

Brundy Pursley  
Piazza Stone, LLC  
3817 Martinez Blvd  
Augusta, Georgia 30802

Re: Self-drill screw capacity supporting cast stone elements in various thin metal gages.

Dear Brundy

Upon your request, Evans Engineering, Inc. (EEI) is responding to the strength capacity of self-drilling screws (#12-14) in various metal gages for supporting the cast stone elements. The support system considered in this analysis is the PTLB track and support tabs. The wind, seismic and ice loading to be used for this analysis will be in accordance to the International Building Code 2015 / ASCE 7-10.

Evans Engineering has attached an Excel spreadsheet that shows the results of the screw capacity needed to attach the PTLB track to the main wall. For the purposes of this proposal we used metal studs spaced at 16" on center with exterior sheathing. The considerations indicated in this spreadsheet are in accordance to the Piazza Stoneworks, PTLB catalog sheet (Updated Version 7), developed by the *THE STEEL NETWORK (TSN)*. This catalog sheet is attached. It represents the cast stone parameters that work efficiently with the screw capacities as indicated on this technical sheet. These values and analysis serve as a guide for a third-party engineer associated with site specific projects.

Evans Engineering, Inc. determined, in all load cases, the screw capacities work for a wide range of loading if they are attached into 16 Gage (54 mil), 50 KSI material. 18 gage (43 Mil) metal proved less effective, and 20 Gage (33 mil) is highly infeasible for attachments supporting the stone elements. Metals with gages greater than 16 Gage will give improved performance of the screw attachment beyond this assessment. We neglected the capacity of the PTLB track since the screw attachment into metal stud substrates proved to be far less effective to support the cast stone.

EEI recommends for most cases, two clips be used to support the cast stone elements. A torsional analysis or test of the C-shape PTLB should be performed by TSN if using (1) clip on a cast stone element.

This information serves as a guide only. The third-party engineer shall be responsible for specific project engineering beyond this correspondence and attachments.



EVANS ENGINEERING, INC.  
CONSULTING ENGINEERS

---

Evans Engineering, Inc. appreciates the opportunity of working with Piazza Stone, LLC in this matter.

If you should have any questions or require further assistance, please contact us.

Respectfully,

**EVANS ENGINEERING, INC.**

A handwritten signature in blue ink that reads "Daniel S. Swartz". The signature is fluid and cursive.

Daniel S. Swartz  
Structural Project Engineer

Holly R. Evans, P.E.



April 24, 2020

**PTLB Track attachment to exterior metal stud walls using (2) #12-14 Self-drill screws at 16" o.c. in various metal gages.**

for

Piazza Stoneworks 3817- A Martinez Blvd Augusta, GA 301907

by

EVANS ENGINEERING, INC, 2793 Old Post Rd. Harrisburg, PA 17019

**Scope:**

Piazza PTLB track- Due to the overall strength and capacity of the track clip, considerations for this element will be neglected since the screw capacity will be the weak link for this empirical analysis. Various width tracks will be used to develop loading that will impose pullout and shear forces. Conditions for loading shall be in accordance with the Stone pieces and PTLB track cut sheet attached to this report and as modified by EEI

Connections to stone have been found to exceed the loading that metal connections can not achieve. The Hilti Kwik-Con II+ 3/16" x 1 1/4" (1" min. embedment) is tested by Applied Technical Services, Incorporated. The following reports were prepared by ATS for record and review:

Report D303276. dated October 31, 2018- Shear Test  
Report D303276-1. dated October 31, 2018- Tensile Test

**References:**

2012 NASPEC - AISI S100-2012  
Empirical Screw Data (as indicated in AISI Design Manual)

**Metal properties for substrate support (By others)**

AISI Grade 33, Fy = 33 KSI, Fu = 45 KSI.  
AISI Grade 50, Fy = 50 KSI, Fu = 65 KSI.

**Screw Loading capacities**

<b>SSMA Design thickness (inches, gage, mils)</b>	Allowable Shear (Fy / (Ω = 3.0)-LBS.		Allowable Tension (Fy / (Ω = 3.0)- LBS	
	Fy 33/Ω	Fy 50/Ω	Fy 33/Ω	Fy 50/Ω
0.0346 (20 gage; 33 mil)	188	NA	95	NA
0.0451 (18 gage; 43 mil)	280	NA	124	NA
0.0566 (16 gage; 54 mil)	393	570	156	225
0.0713 (14 gage; 68 mil)	497	717	196	283
0.1017 (12 Gage; 97 mil)	497	717	280	403

**PTLB tracks depth (d) Screw spacing in "d" 0.66 x d**

PTLB200	2"	1 1/4	0.825
PTLB400	4"	3 1/4	2.145
PTLB600	6"	5 1/4	3.465

Since the screw is not bearing directly on metal the bearing eccentricity will be 0.66 x d. This accounts for sheathing or installations or shims. (shims must be installed over the full width of the "d" spacing to be effective for the calculation)

**Single Clip Condition**

Cast stone projection (maximum 1'-0")  
Cast stone depth (maximum 1'-6")

Gravity load of element =	100	lbs	Screw pullout (Note 2 screws minimum at 16 inches on-center)= LBS.	Prying due to torsional rotation in PTLB track
			PTLB200 727.3	
			PTLB400 279.7	
			PTLB600 173.2	
Wind load (lateral):	30	PSF	Screw pullout ( Note: 2 screw minimum at 16 inches on-center)-LBS.	
	40	PSF	29.9	
	50	PSF	39.9	
	60	PSF	49.9	
	70	PSF	59.9	
	80	PSF	69.8	
	90	PSF	79.8	
			89.8	

Allowable loading using Various PTLB tracks in various gage studs.

PTLB200	0.0346 (20 gage; 33 mil)	V/ Va	T /Ta	Unity </= 1.0
		0.265957		
	30 PSF	7.970502	8.23646	
	40 PSF	8.075502	8.34146	
	50 PSF	8.180502	8.44646	
	60 PSF	8.285502	8.55146	
	70 PSF	8.390502	8.65646	
	80 PSF	8.495502	8.76146	
	90 PSF	8.600502	8.86646	
0.0451 (18 gage; 43 mil)		V/ Va	T /Ta	Unity </= 1.0
		0.178571		
	30 PSF	6.106433	6.285005	
	40 PSF	6.186877	6.365448	
	50 PSF	6.26732	6.445892	
	60 PSF	6.347764	6.526335	
	70 PSF	6.428207	6.606779	
	80 PSF	6.508651	6.687222	
	90 PSF	6.589095	6.767666	

**Note: PTLB200 and 400 tracks not practical for single clip application. Skip to 6" track for this application, try 16 gage minimum 50 KSI.**

PTLB600	0.0566 (16 gage; 54 mil) -50 KSI		V/ Va	T /Ta	Unity </= 1.0
			0.087719		
	30 PSF		0.902601		0.99032 OK for screw capacity to substrate. Torsional loading of PTLB track should be verified by THE STEEL NETWORK (TSN)
	40 PSF		0.946934		1.034653 NG

**Conclusion:**

Single clip application with 1'-0" max projection and 1'-6" profile height: PTLB 600 track must be used. (2) #12-14 self drill screws must be used in 16 gage, 50 KSI light-gage metal. Screws shall be placed at 16" o.c. maximum along PTLB track. The track should be verified it could take torsional moment by THE STEEL NETWORK (TSN)  
 Cast stone piece must not weight more than 100 pounds and wind loads should not exceed 30 PSF. (2) Clips are recommended in all cases due to torsional loading of track

**Double Track Condition** (2 tracks allow for minor roll out of the cast stone away from the wall and no torsional rotation in the PLTB track)

Cast stone projection (maximum 2'-0")  
 Cast stone depth (maximum 4'-0")  
 Gravity load of element = 200 lbs

**PTLB tracks Distance between tracks vertically in cast stone**

PTLB200	2'-0"
PTLB400	2'-0"
PTLB600	2'-0"

Prying force due to projection with Gravity load is the centroid at 12" divided by 2'-0". 200# x 1'-0" divided by 2'-0" = 100 lbs of pry at each track.

	Screw pullout ( Note: 4 screws at 16 inches on-center using 2 tracks)-LBS.	Total Tension on track + 50# for each screw to account for rollout
Wind load (lateral):	30 PSF 39.9	89.9
	40 PSF 53.2	103.2
	50 PSF 66.5	116.5
	60 PSF 79.8	129.8
	70 PSF 93.1	143.1
	80 PSF 106.4	156.4
	90 PSF 119.7	169.7

Allowable loading using 200, 400 and 600PTLB tracks in various gage studs.

PTLB	0.0346 (20 gage; 33 mil)		V/ Va	T /Ta	Unity </= 1.0
	30 PSF Fy =33 KSI		0.265957		
	30 PSF		0.946316		1.212273 Not feasible

**No good for 20 Gage metal connection substrates.**

0.0451 (18 gage; 43 mil)		V/ Va	T /Ta	Unity </= 1.0
		0.178571		
	30 PSF	0.725		0.903571
	40 PSF	0.832258		1.010829 No good
	50 PSF	0.939516		1.118088 No good

**Maximum load of 35 PSF wind load for 18 Gage connection substrates with PTLB tracks.**

0.0566 (16 gage; 54 mil)		V/ Va	T /Ta	Unity </= 1.0
	30 PSF Fy =33	0.127226	0.576282	0.703509
	Fy =50	0.087719	0.399556	0.487275
	40 PSF Fy=33 KSI	0.127226	0.661538	0.788765
	Fy=50 KSI	0.087719	0.458667	0.546386
	50 PSF Fy=33 KSI	0.127226	0.746795	0.874021
	Fy 50 KSI	0.087719	0.517778	0.605497
	60 PSF Fy 33 KSI	0.127226	0.832051	0.959278
	Fy 50 KSI	0.087719	0.576889	0.664608
	70 PSF Fy 33 KSI	0.127226	0.917308	1.044534 N.G. at 33 KSI
	Fy 50 KSI	0.087719	0.636	0.723719
	80 PSF Fy 33 KSI	0.127226	1.002564	1.129791 N.G. at 33 KSI
	Fy 50 KSI	0.087719	0.695111	0.78283
	90 PSF Fy 50 KSI	0.087719	0.754222	0.841942

**Conclusion:**

Double clip application with 2'-0" max projection and 4'-0" profile height: PTLB 200, 400 and 600 track can be used. They must be spaced 2'-0" apart minimum vertically and have (2) #12-14 self drill screws spaced at 16" o.c. The metal substrate need to 18 gage 33 KSI minimum for applications up to 35 PSF wind load. All applications the exceed 30 PSF must have metal substrates at 16 gage, 33 or 50 KSI up to wind loads of 60 PSF and 16 gage, 50 KSI for wind loads 65 PSF to 90 PSF.  
 Cast stone piece must not weight more than 200 pounds.

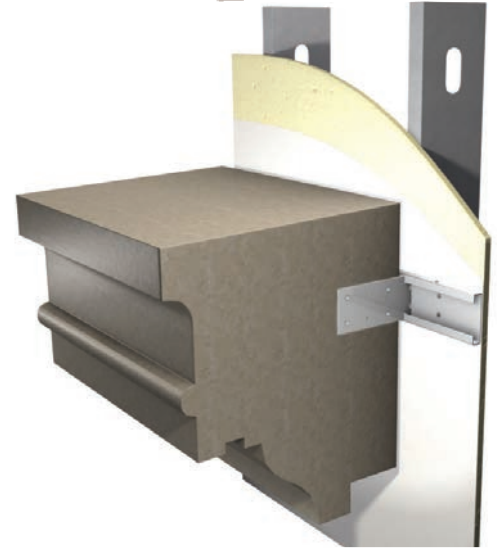
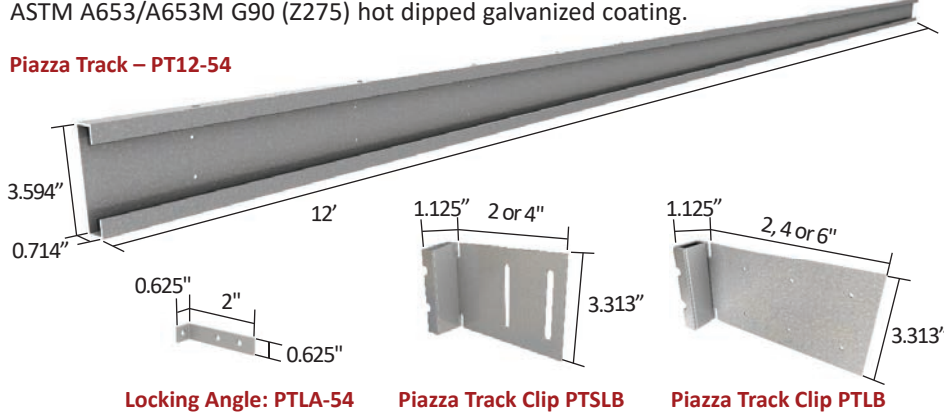
# Piazza Track System



## Material Composition

**Clip & Track Material:** ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength, 54mil minimum thickness (16 gauge, 0.0566" design thickness), with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating.

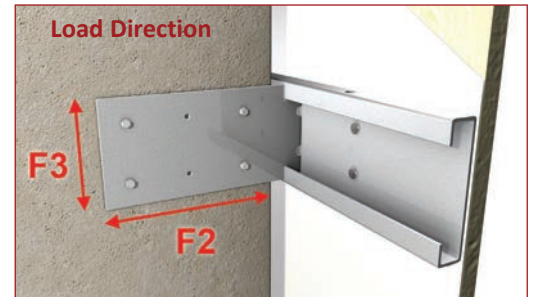
## Piazza Track – PT12-54



## Maximum ASD allowable Load Data

### Steel Clip & Track:

Piazza Track & Piazza Track Clip PTLB, Recommended Allowable Load (lbs): F2 & F3		
Clip	F2 Allowable Loads	F3 Allowable Loads
PTLB200	299	292
PTLB400	299	286
PTLB600	299	292
PTSLB200-54	299	-
PTSLB400-54	299	-



### Test Report 45-12:

Max. shear load per one fastener 167 lbs (Light Weight Stone)  
 Max. tensile load per one fastener 178 lbs (Light Weight Stone)

Fastener pattern and eccentric loading evaluation is the responsibility of the design professional.

### Fastener Attachment to Supporting Structure:

Attachment of steel track to structure is the responsibility of the design professional. Load rating would vary based on base material, project location, exposure, tributary area of the panels in the particular application.

### Nomenclature

Piazza Track comes in 12' lengths, and is designated *Piazza Track - PT12-54*.

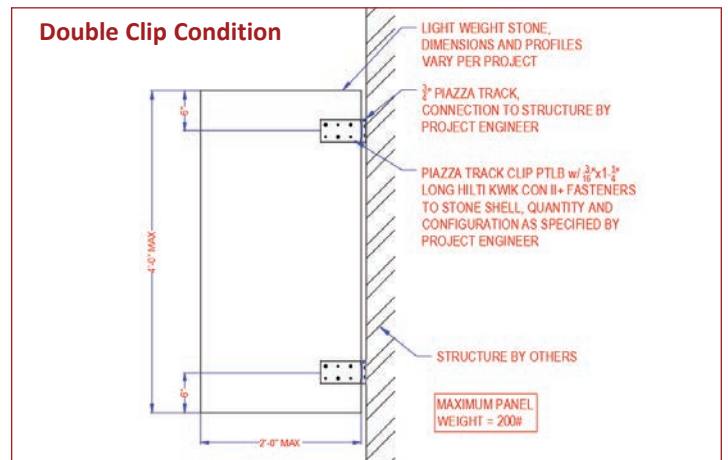
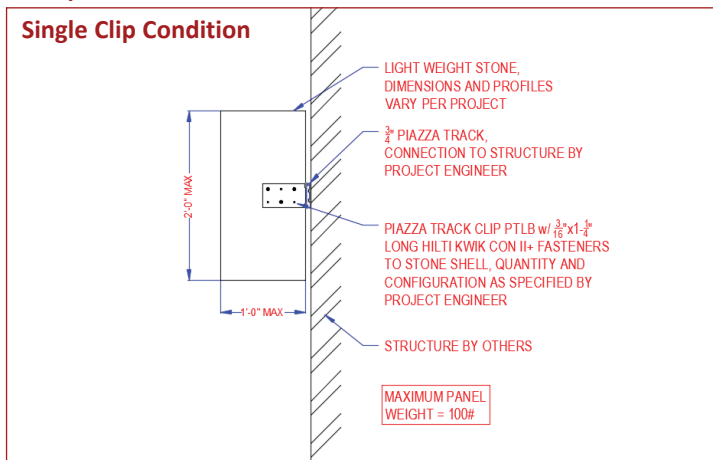
Piazza Track Clip PTLB and PTSLB are classified by multiplying clip length in inches by 100.

*Example:* 6" clip length

*Designate:* Piazza Track Clip PTLB600



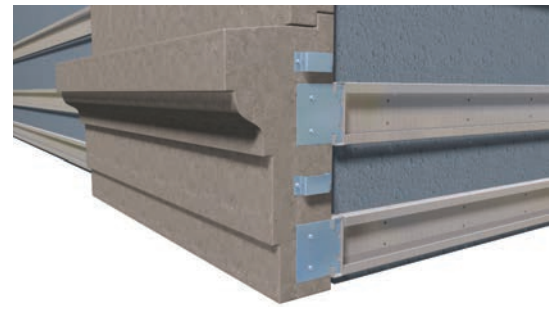
### Example Details



Piazza connectors can be used with the Piazza Track system or individually to secure lightweight stone to the exterior of structures.

**Material Composition**

ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength, 54mil minimum thickness (16 gauge, 0.0566" design thickness), 68mil minimum thickness (14 gauge, 0.0713" design thickness), or 97mil minimum thickness (12 gauge, 0.1017" design thickness), with ASTM A653/A653M G90 (Z275) hot dipped galvanized coating.

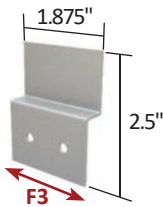


Piazza Connectors, Recommended Allowable Load (lbs): F2 & F3		
Clip	F2 Allowable Loads	F3 Allowable Loads
PT-1.875-68 & PR-2.0-68 System	N/A	116
PT-5.5-97 & PR-5.75-68 System	N/A	123
PZ-10-54	15	278
PZ-12-97 (L&R)	116	427
PZ-14-54	186	73
PZ-16-54	26	411
PZ-18-97	43	108
PZ-20-97	242	1,430
PTMC200-54	392	266
PUC225-54	392	105
PUC450-54	392	74

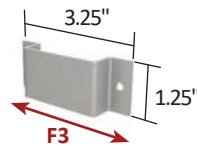
**Notes:**

- Allowable design loads have been developed for the clips based on AISI S100 Specification.
- Load data are for the steel clips only. The fastener pattern and eccentric loading evaluation on the fasteners is the responsibility of the design professional.
- Attachment of the clips to stone base material is the responsibility of the design professional.

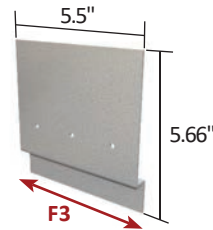
**PT-1.875-68**



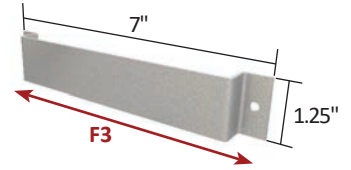
**PR-2.0-68**



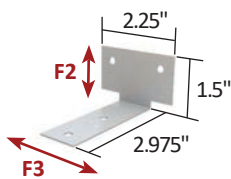
**PT-5.5-97**



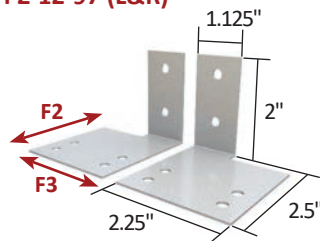
**PR-5.75-68**



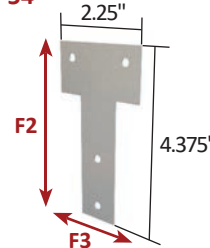
**PZ-10-54**



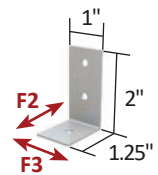
**PZ-12-97 (L&R)**



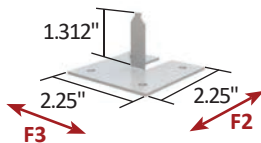
**PZ-14-54**



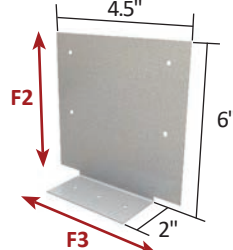
**PZ-16-54**



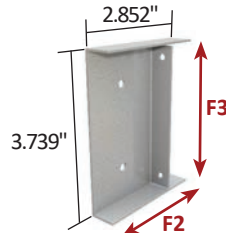
**PZ-18-97**



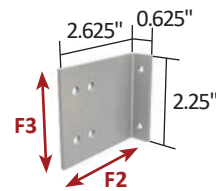
**PZ-20-97**



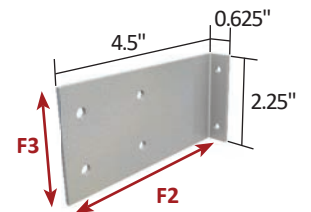
**PTMC200-54**



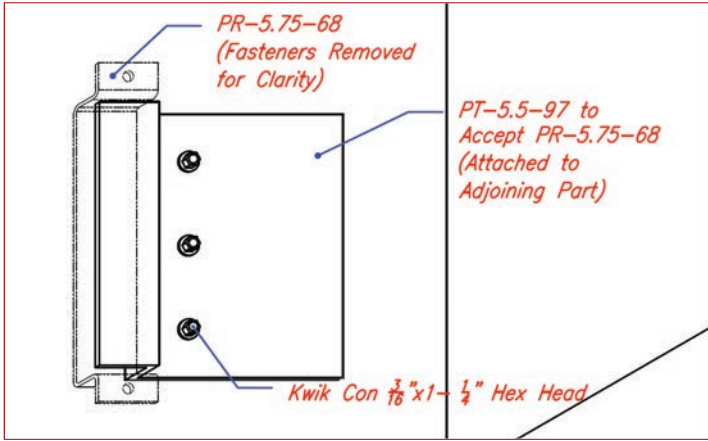
**PUC225-54**



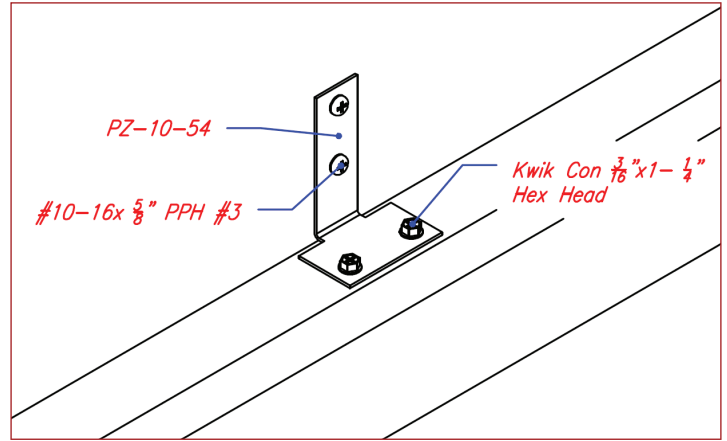
**PUC450-54**



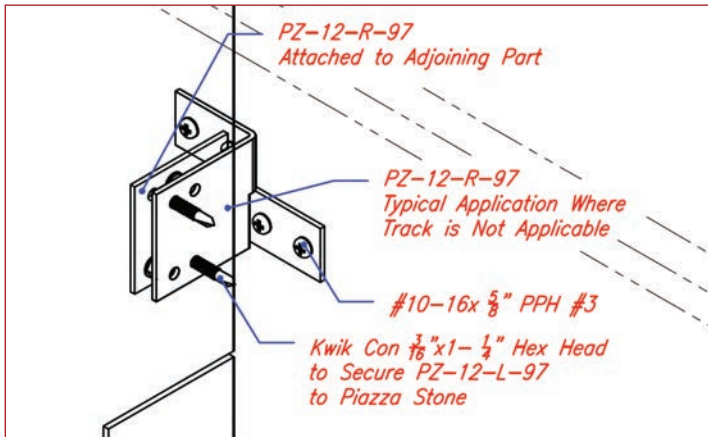
Example Details



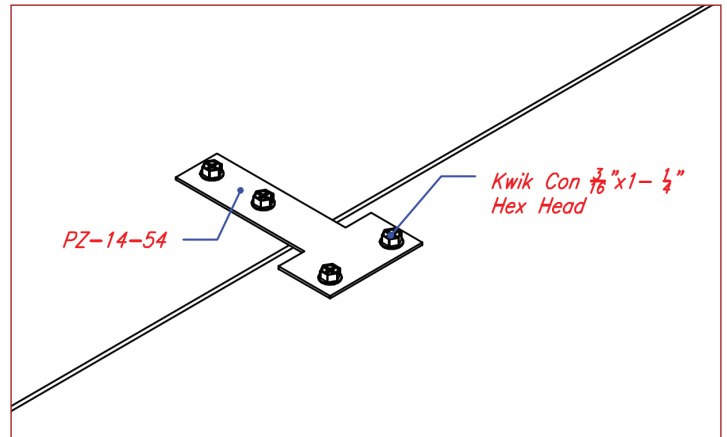
PR-5.75-68 used with PT-5.5-97 or PR-2.0-68 with PT-1.875-68



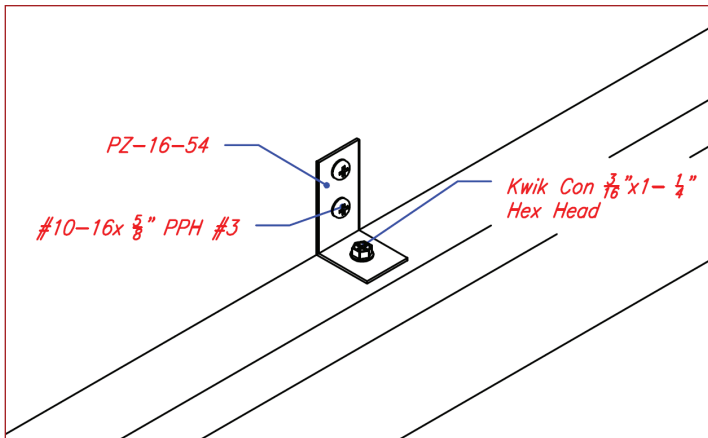
PZ-10-54



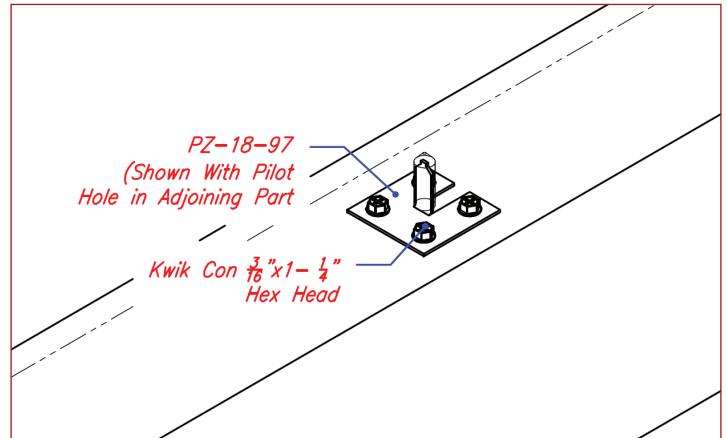
PZ-12-R-97 or PZ-12-L-97



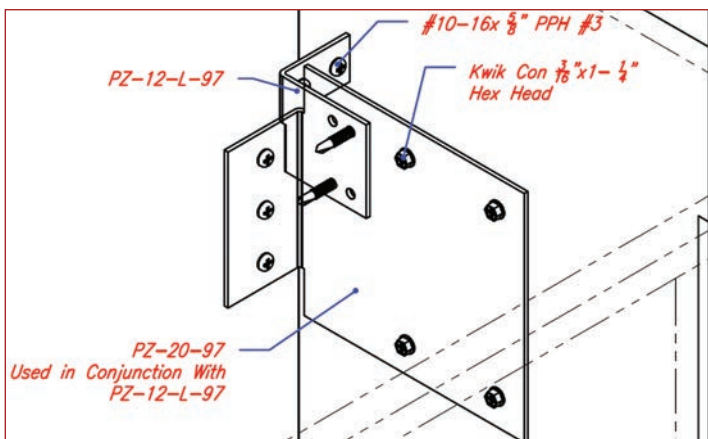
PZ-14-54



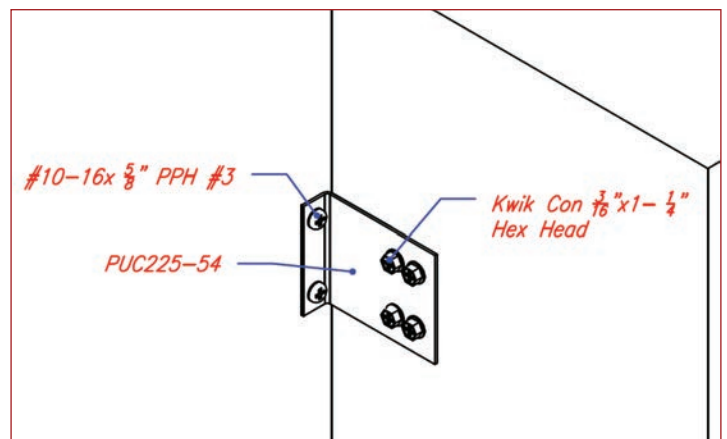
PZ-16-54



PZ-18-97



PZ-12-L-97 with PZ-20-97



PUC225-54 or PUC450-54