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Initial Approval
September, 2006

Re-Approved
June, 2020

See all **Pei ES** Listings at: www.p-e-i.com

Report Owner

Aerosmith Fastening Systems

5621 Dividend Road
Indianapolis, IN 46241

Product

VersaPin Gripshank® & Helical® Pneumatic Fasteners

Approved Manufacturing Locations

Pei ES has on file a list of each approved manufacturing location and which product is approved to be manufactured at each location.

For Evaluation Report Questions

www.aerosmithfastening.com
Aerosmith Contact: Spencer Jessee
Phone: (800) 528-8183

General Details

The **VersaPin Gripshank** and **Helical** Fasteners are manufactured by approved independent companies. Any company manufacturing product for **Aerosmith**, that is intended to be listed by this **Product Evaluation Report**, has an agreement in place with **Progressive Engineering Inc.** to monitor their Quality Control Program and finished product on a scheduled time frame.

Listing Details

VersaPin Gripshank and Helical Fasteners are pneumatically driven steel pins used to attach siding, wall sheathing and floor decking materials to steel framing. The pins pierce the steel framing while the specially designed shank grips the steel framing. The threaded portion of the shank must penetrate completely through the steel thickness.

Product Description

The **VersaPin Gripshank Fasteners** are manufactured from AISI C 1060 steel, heat treated to a Rockwell C hardness between 52 and 55, have a minimum tensile strength of 240 ksi and a bending yield strength of 250 ksi. The pins are electro-zinc plated with a chromate rinse, mechanically zinc plated ASTM B633 Type 1 SC, ASTM B695 Type 1 Class 5 or a nickel metal alloy. The plating is a minimum thickness of .0002" thick.

The **VersaPin Helical Fasteners** are manufactured from AISI C 1060 steel, heat treated to a Rockwell C hardness between 52 and 55, have a minimum tensile strength of 240 ksi and a bending yield strength of 250 ksi. The pins are electro-zinc plated with a chromate rinse, mechanically zinc plated per ASTM B633 Type 1 SC, ASTM B695 Type 1 Class 5 or a nickel metal alloy. The plating is a minimum thickness of .0002" thick.

The pins are manufactured with a nominal finished shank dia. of .100" and a nominal head dia. of .250" or .312". The shank has a proprietary thread and the point is ballistic shaped. The approved pins are identified by an **Aerosmith** logo head stamp as shown on pages 2 and 3 of this **Product Evaluation Report**. The pins are collated for powered installation tools.

Code Compliance

1997 Uniform Building Code	2009, 2012, 2015 & 2018 International Residential Code
2015 National Building Code of Canada	2009, 2012, 2015 & 2018 International Building Code
2014 Florida Building Code	

2012, 2015 & 2018 IRC

Section R104.11 - VersaPin fasteners meet the intent of the IRC when installed in accordance with the manufacturer's installation instructions and this **PER**.

Section R301.1.3 - The fasteners may be used in Structures regulated under the IRC when an engineered design is submitted in accordance with Section R301.1.3

Section R603.5 - Method of attachment for exterior wall covering materials to cold-formed steel stud wall framing shall conform to manufacturers installation instructions.

2012, 2015 & 2018 IBC

Section 104.11 - VersaPin fasteners meet the intent of the IBC when installed in accordance with the manufacturer's installation instructions and this **PER**.

Section 1405.16 Fiber Cement Siding - Unless otherwise specified in manufacturers installation instructions fasteners used to fasten the siding to wood stud should be corrosion resistant round head smooth shank and long enough to penetrate the metal framing.

The VersaPin **Gripshank** Fasteners are limited to use in resisting wind and seismic forces in this **PER**. Fire Rated assemblies are outside of the scope of this evaluation report.

2015 NBC

Section 9.24.1.4 Screws - Screws for the application of cladding, sheathing or interior finish materials to steel studs, runners and furring channels shall conform to a) ASTM C 954, "Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness. Note: Please reference Opinion Letter dated April 10, 2008 for conformance with this standard. Copies can be made available to parties upon request.

Section 9.241.5 Cladding, Sheathing and Interior Finish Required - Cladding or sheathing and interior finish shall be installed on steel stud framing and shall be fastened with screws spaced at appropriate spacing described in Section 9.29 and penetrating not less than 10mm through the metal.

Section 9.27.5.4 Size and Spacing of Fasteners - Note Table 9.27.5.4 Attachment of Cladding - Panel or sheet type cladding up to 7mm thick.

Section 9.27.5.5 For Corrosion Resistance - Nails or staples for the attachment of cladding and wood trim shall be corrosion-resistant and shall be compatible with the cladding material.

Section 9.27.5.7 Penetration of Fasteners - 1.) Fasteners for shakes and shingles shall penetrate through the nail-holding base or not less than 19mm into the framing 2.) Fasteners for cladding other than that described in sentence 1) shall penetrate through the nail-holding base or not less than 25mm into the framing.

Note:

These standards are developed using processes that may differ from those used by Canadian standards development organizations; nevertheless; these standards have been reviewed by the relevant standing committees and found to be acceptable. The ASTM standards referenced herein are referenced in the NBC.

Pei as an IAS (ILAC MRA Signatory Accreditation Body) accredited Testing Laboratory, is a recognized testing laboratory by the Standard Council of Canada.

Tested to

ASTM B 117 - 192 Hour Salt Spray Test (2325A) (*Reference 2011-1679 Test Report for 2635G & 5573G*)

ASTM C 1513 - Specification for Steel Tapping Screws for Cold Formed Steel Framing Applications (*Provisions Apply**)

ASTM D 1037 - Fastener Withdrawal Test

ASTM E 72 - Wall Racking Test

ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences

ASTM E 564 - Static Load Test for Shear Resistance of Framed Walls for Buildings

ASTM E 2126-07A - Cyclic Load Test for Shear Resistance of Vertical Elements

AISI TS-5-052 - Test Methods for Mechanically Fastened Cold-Formed Steel Connections

Approved Helical Pins

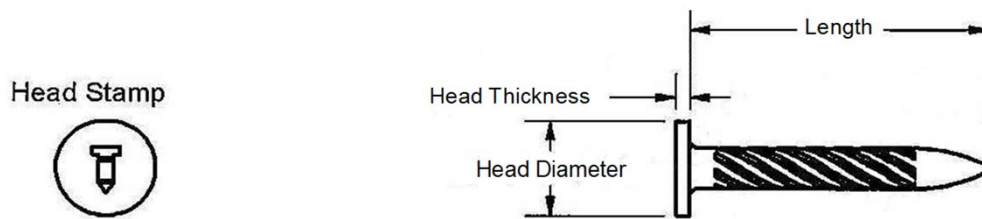


Figure 1 - Profile of Approved Helical Pins per Table 1

Table 1 - Aerosmith Helical Pins Nominal Dimensions^{1,2}

Approved Pin	Head Diameter	Head Thickness	Length
2191 Z or AG ²	0.250	0.035	0.750
2351 Z or AG/SG ²	0.250	0.035	1.375
2501 Z or SG ²	0.250	0.035	2.000
2631 Z or SG ²	0.250	0.035	2.500

Notes:

1. Z - Zinc coated pin

2. AG - SG - Aerosmith alloy plating PT2000™ coated pin

Approved Gripshank Pins

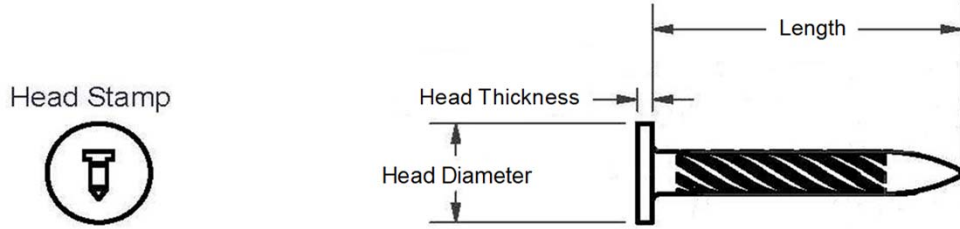


Figure 2 - Profile of Approved Gripshank Knurled Pins per Table 2

Table 2 - Aerosmith Gripshank Knurled Pins Nominal Dimensions^{1,2}

Approved Pin	Head Diameter	Head Thickness	Length
2192 Z or AG/SG ²	0.250	0.035	0.750
2352 Z or AG/SG ²	0.250	0.035	1.375
2502 Z or SG ²	0.250	0.035	2.000

Notes:

- 1. Z - Zinc coated pin
- 2. AG - SG - Aerosmith alloy plating PT2000™ coated pin

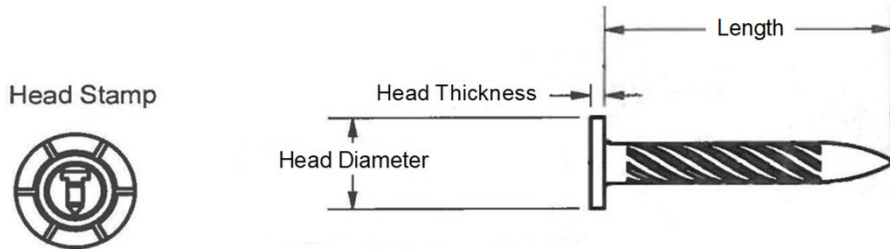


Figure 3 - Profile of Approved Gripshank Knurled Pins per Table 3

Table 3 - Aerosmith Gripshank Knurled Pins Nominal Dimensions^{1,2}

Approved Pin	Head Diameter	Head Thickness	Length
2255 AG ²	0.312	0.035	1.000
2325 Z or AG ²	0.312	0.035	1.250
2385 Z or AG ²	0.312	0.035	1.500
2505 Z or SBG ²	0.312	0.035	2.000
2635 Z or or SBG ²	0.312	0.035	2.500

Notes:

- 1. Z - Zinc coated pin
- 2. AG or SBG - Aerosmith alloy plating PT2000™ coated pin

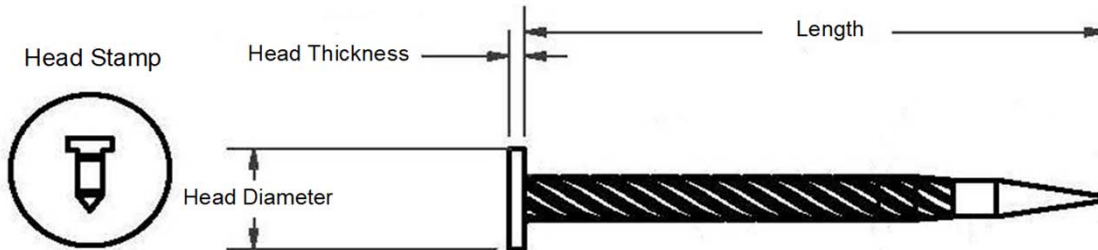


Figure 4 - Profile of Approved Gripshank Knurled Pins with Super Sharp Point per Table 4

Table 4 - Aerosmith Gripshank Knurled Pins with Super Sharp Point Nominal Dimensions¹

Approved Pin	Head Diameter	Head Thickness	Length
2229 G	0.250	0.035	0.875
2359 G	0.250	0.035	1.375
2389 G	0.250	0.035	1.500
2509 G	0.250	0.035	2.000
2639 G	0.250	0.035	2.500

Notes:

- 1. AG or SBG - Aerosmith alloy plating PT2000™ coated pin

Steel Framing

The steel framing shall comply with ASTM A 653 SS (33 ksi) with the following minimum steel thickness for each nominal gauge size.

Table 5 - Ultimate Withdrawal Values for Gauge Steel Framing

Steel Gauge	Minimum Thickness	Gripshank Ultimate Withdrawal Values	Helical Ultimate Withdrawal Values
14	.071"	596 lbs.	351 lbs.
16	.055"	449 lbs.	330 lbs.
18	.045"	337 lbs.	235 lbs.
20	.037"	284 lbs.	--

Approved Siding Material

James Hardie Building Products 5/16" Hardipanel® Vertical Siding & 5/16" Hardiplank® Lap Siding or equivalent. The siding is to be installed using the siding manufacturer's installation instructions and Gripshank Fasteners. The minimum steel thickness to be used is 20 gauge.

Approved Exterior Sheathing

DensGlass Gold Exterior Sheathing 1/2" and 5/8" Fireguard Type X. The sheathing is to be installed using the sheathing manufacturers Installation Instructions and **Gripshank** Fasteners. The cold-formed steel studs shall have a minimum 20 gauge thickness.

The Sure-Board Series 200W Structural Panel 5/8" or 1/2" thick Type X gypsum board adhered to 22 ga. Steel. Aerosmith pins shall be installed in compliance with manufacturers Installation Instructions. The minimum steel thickness to be used is 20 gauge.

Approved Plywood Sheathing

Plywood sheathing complying with USDC Product Standard PS-1 or PS2-92 (UBC Standards 23-2 or 23-3). **Aerosmith** pins shall be installed in compliance with manufacturers Installation Instructions. The cold-formed steel studs shall have a minimum 20 gauge thickness.

Approved Structural Cement Panel

USG Structural Panel Concrete Subfloor and Concrete Roof Deck 3/4" Structural Cement Panel reinforced with fiberglass strands. See **Pei ES** PER-13067 and PER-14076. The sheathing is to be installed using the sheathing manufacturers Installation Instructions and **Gripshank** Fastener 2385A (0.100" x 1-1/2") only. Applies to installation on 16 gauge, 50 ksi cold-formed steel only.

Table 6a - James Hardie Siding Fastened with Gripshank Fasteners

Maximum Allowable Wind Speed (mph-3 second gust) Based on 2018 IBC section 1609.1.1 (ASCE 7 - 16)									
Siding Type & Dimensions	Nominal Head Diameter	Nailing Method	Stud Spacing	Zone	Exposure				
					B	C		D	
					<30'	15'	30'	15'	30'
48" x 96" Hardipanel Vertical Siding	.250"	Face	16"	4	120	110	100	100	100
				5	110	100	90	90	90
48" x 96" Hardipanel Vertical Siding	.250"	Face	24"	4	110	100	90	90	90
				5	100	90	85	85	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	170	150	150	140	130
				5	150	140	130	130	120
5/16" tk. x 7-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	150	140	130	120	120
				5	130	120	110	110	100
5/16" tk. x 8-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	130	120	110	110	100
				5	120	110	100	100	90
5/16" tk. x 5-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	140	-	-	-	-
				5	125	-	-	-	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	120	110	100	100	90
				5	110	100	90	90	85
5/16" tk. x 7-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	90	85	-	-	-
				5	85	-	-	-	-
5/16" tk. x 8-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	85	-	-	-	-
				5	-	-	-	-	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding with 15/32" Plywood Underlayment	.312"	Blind	24"	4	120	110	100	100	100
				5	110	100	90	90	90

Table 6b - James Hardie Siding Fastened with Gripshank Fasteners

Maximum Allowable Wind Speed (mph-fastest mile) Based on 1997 UBC									
Siding Type & Dimensions	Nominal Head Diameter	Nailing Method	Stud Spacing	Zone	Exposure				
					B	C		D	
					<30'	15'	30'	15'	30'
48" x 96" Hardipanel Vertical Siding	.250"	Face	16"	4	110	100	90	80	80
				5	100	80	80	70	70
48" x 96" Hardipanel Vertical Siding	.250"	Face	24"	4	100	90	80	70	70
				5	90	80	70	70	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	130	130	120	120	110
				5	130	120	110	100	100
5/16" tk. x 7-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	130	110	110	100	90
				5	120	100	90	90	80
5/16" tk. x 8-1/4" wide Hardiplank Lap Siding	.250"	Face	24"	4	120	100	90	90	80
				5	110	90	80	80	70
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	110	90	90	80	80
				5	100	80	80	70	70
5/16" tk. x 7-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	80	70	-	-	-
				5	70	-	-	-	-
5/16" tk. x 8-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	70	-	-	-	-
				5	-	-	-	-	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding with 15/32" Plywood Underlayment	.312"	Blind	24"	4	110	100	90	80	80
				5	100	80	80	70	70
5/16" tk. x 8-1/4" wide Hardiplank Lap Siding	.312"	Blind	24"	4	70	-	-	-	-
				5	-	-	-	-	-
5/16" tk. x 6-1/4" wide Hardiplank Lap Siding with 15/32" Plywood Underlayment	.312"	Blind	24"	4	110	100	90	80	80
				5	100	80	80	70	70

Notes:

1. For Vertical Siding, pins were set 8" o.c. in the field, 4" o.c. around the perimeter, 3/8" from panel edge & 2" from corners.
2. For Lap siding, butt joints were placed at 1/3 and 2/3 of wall height, siding was overlapped 1-1/4", and pins were set at 3/8" from siding end and 3/4" up from bottom edge.
3. All siding used Gripshank fasteners, 20ga x 33ksi CWN C-studs (depth = 1-3/8", flange = 3-5/8", and a return = 3/8"), wall heights for the above values = 30ft or less.
4. Zone 4 is the interior section of the wall between Zone 5s & Zone 5 is the section within a minimum of 3 ft. of all corners, refer to ASCE 7 for actual width.

Table 6c - Glass-mat Sheathing & James Hardie Siding Fastened with Gripshank Fasteners

Maximum Allowable Wind Speed (mph-3 second gust) Based on the 2018 IBC section 1609.1.1(ASCE 7 - 16) & 2017 FBC									
Siding Type & Dimensions	Nominal Head	Nailing Method	Stud Spacing	Zone	Exposure				
					B	C		D	
					<30'	15'	30'	15'	30'
5/8" Densglass Fireguard Gold Type X	.312"	Face	16"	4	140	128	118	115	109
				5	126	115	106	104	98
5/8" Densglass Fireguard Gold Type X	.312"	Face	24"	4	144	131	121	118	112
				5	129	118	109	107	100
5/8" USG Securock Firecode Glass-mat Type X	.312"	Face	24"	4	130	118	109	107	101
				5	117	106	99	96	91
5/8" USG Securock Firecode Glass-mat Type X	.312"	Face	24"	4	135	123	114	111	104
				5	121	111	102	100	94
4'x4'x5/16" Hardipanel	.244"	Face	16"	4	130	118	110	107	101
				5	117	107	99	96	91
4'x4'x5/16" Hardipanel	.244"	Face	24"	4	106	96	89	87	82
				5	95	87	80	78	74
6-1/4" Wide Plank Hardiplank	.244"	Face	24"	4	179	164	151	148	139
				5	161	147	136	133	125
7-1/4" Wide Plank Hardiplank	.244"	Face	24"	4	155	142	131	128	120
				5	140	127	118	115	108
8-1/4" Wide Plank Hardiplank	.244"	Face	24"	4	135	124	114	112	105
				5	122	111	103	100	95
6-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	128	116	108	105	99
				5	115	105	97	95	89
7-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	97	89	82	80	75
				5	87	80	74	72	68
8-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	86	78	72	71	67
				5	77	70	65	64	60
6-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	130	118	110	107	101
				5	117	107	99	96	91
6-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	129	118	109	106	100
				5	116	106	98	96	90
7-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	86	78	72	71	66
				5	77	70	65	64	60
8-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	111	101	94	91	86
				5	100	91	84	82	78
6-1/4" Wide Plank Hardiplank	.285"	Face	24"	4	112	102	94	92	87
				5	100	92	85	83	78

Table 7 - Allowable Design Pressure Based on ASTM E330 Tests

Siding Type & Dimensions	Nominal Head Diameter	Fastener Spacing	Frame Gage - Tensile Strength	Stud Size	Stud Spacing	Design Load
5/8" Densglass Fireguard Gold Type X	.312"	8" o.c. Perimeter 8" o.c. Field	16 ga. - 50 KSI	1-3/8" x 3-5/8"	16"	38.1 psf
5/8" Densglass Fireguard Gold Type X	.312"	8" o.c. Perimeter 8" o.c. Field	16 ga. - 33 KSI	1-3/8" x 3-5/8"	24"	40.3 psf
5/8" Densglass Fireguard Gold Type X	.312"	8" o.c. Perimeter 8" o.c. Field	18 ga. - 33 KSI	1-3/8" x 3-5/8"	24"	25.5 psf
5/8" Densglass Fireguard Gold Type X	.312"	8" o.c. Perimeter 8" o.c. Field	22 ga. - 33 KSI	1-3/8" x 3-5/8"	24"	24.7 psf
1/2" Densglass Gold	.312"	8" o.c. Perimeter 8" o.c. Field	22 ga. - 33 KSI	1-3/8" x 3-5/8"	16"	23.3 psf
1/2" GlasRoc Sheathing Panels	.312"	8" o.c. Perimeter 8" o.c. Field	22 ga. - 33 KSI	--	16"	21.7 psf
5/8" GlasRoc Sheathing Panels	.312"	8" o.c. Perimeter 8" o.c. Field	22 ga. - 33 KSI	--	24"	21.6 psf
5/8" GlasRoc Sheathing Panels	.312"	8" o.c. Perimeter 8" o.c. Field	18 ga. - 33 KSI	--	24"	21.8 psf
5/8" GlasRoc Sheathing Panels	.312"	8" o.c. Perimeter 8" o.c. Field	16 ga. - 33 KSI	--	24"	21.5 psf
5/8" GlasRoc Sheathing Panels	.312"	8" o.c. Perimeter 8" o.c. Field	16 ga. - 33 KSI	--	16"	34.2 psf
5/8" GlasRoc Sheathing Panels	.312"	6" o.c. Perimeter 6" o.c. Field	16 ga. - 33 KSI	--	24"	25.6 psf
5/8" USG Sheetrock Type X Gypsum	.312"	8" o.c. Perimeter 8" o.c. Field	22 ga. - 33 KSI	1-3/8" x 3-5/8"	24"	22.9 psf
5/8" USG Securock Firecode X Glass-Mat Sheathing	.312"	6" o.c. Perimeter 4" o.c. Center of Field Stud	18 ga. - 33 KSI	1-5/8" legs	24"	32.7 psf
5/8" USG Securock Firecode X Glass-Mat Sheathing	.312"	6" o.c. Perimeter 4" o.c. Center of Field Stud	16 ga. - 33 KSI	1-5/8" legs	24"	35.3 psf
5/8" National Gypsum eXP Sheathing	.312"	8" o.c. Perimeter 8" o.c. Center of Field Stud	18 ga. - 33 KSI	1-1/4" legs	16"	34.8 psf

Notes:

1. Pins were installed 3/8" from panel edge & 2" from corners.
2. The values in this table are based on testing per ASTM E330, and represent the capacity of the sheathing to resist flexural failure or fastener pull-through using a 2.5 Safety Factor. Framing design is the responsibility of the Designer of record.
3. Table 2 shows Seismic and Wind Shear Wall values using Aerosmith Brand Pin Fasteners in Cold Formed Steel Framing. The maximum aspect ratio considered is 2:1. A Simpson Strong-Tie model HTT4 Tension Tie (or equivalent) is required at both ends of the wall and must be installed per manufacturer's installation instructions. All steel must be a minimum of 50 ksi.

Table 8 - Plywood/OSB Shear Wall Wind & Seismic Design Capacity (Based on Cyclic Testing)

Sheathing	Minimum Sheathing Thickness	Framing Spacing	Minimum Steel Thickness	Minimum Head Diameter	Pin Spacing	Occupancy Category	Unit Shear			
							V _{ASD} Seismic	V _{ASD} Wind	V _{LRFD} Seismic	V _{LRFD} Wind
(4 ply) Plywood "Rated Sheathing"	15/32"	24"	16 ga., 54 mils	.305"	2" around Perimeter 12" in Field	I or II	602.0 plf	819.0 plf	903.0 plf	1065.0 plf
						III	655.0 plf		982.0 plf	
						IV	661.0 plf		991.0 plf	
(4 ply) Plywood "Rated Sheathing"	15/32"	24"	16 ga., 54 mils	.305"	4" around Perimeter 12" in Field	I or II	462.0 plf	623.0 plf	693.0 plf	809.5 plf
						III	498.0 plf		747.0 plf	
						IV	501.0 plf		751.5 plf	
(4 ply) Plywood "Rated Sheathing"	15/32"	24"	16 ga., 54 mils	.305"	6" around Perimeter 12" in Field	I or II	322.0 plf	427.0 plf	483.0 plf	554.0 plf
						III	341.0 plf		512.0 plf	
						IV	341.0 plf		512.0 plf	
APA Rated OSB "Structural 1"	15/32"	24"	16 ga., 54 mils	.305"	2" around Perimeter 12" in Field	I or II	611.0 plf	804.0 plf	916.0 plf	1045.0 plf
						III	643.0 plf		964.0 plf	
						IV	643.0 plf		964.0 plf	
APA Rated OSB "Structural 1"	7/16"	24"	16 ga., 54 mils	.305"	4" around Perimeter 12" in Field	I or II	464.0 plf	604.5 plf	696.0 plf	786.0 plf
						III	483.5 plf		725.0 plf	
						IV	483.5 plf		725.0 plf	
APA Rated OSB "Structural 1"	7/16"	24"	16 ga., 54 mils	.305"	6" around Perimeter 12" in Field	I or II	317.0 plf	405.0 plf	476.0 plf	527.0 plf
						III	324.0 plf		486.0 plf	
						IV	324.0 plf		486.0 plf	
APA Rated OSB "Structural 1"	7/16"	24"	18 ga., 43 mils	.305"	4" around Perimeter 12" in Field	I or II	405.0 plf	506.0 plf	607.0 plf	657.0 plf
						III	405.0 plf		607.0 plf	
						III or IV	405.0 plf		607.0 plf	
APA Rated OSB "Structural 1"	7/16"	24"	14 ga., 68 mils	.305"	2" around Perimeter 12" in Field	I or II	765.0 plf	956.0 plf	1147.0 plf	1243.0 plf
						III	765.0 plf		1147.0 plf	
						III or IV	765.0 plf		1147.0 plf	

Notes:

1. The .100" dia. pins were installed 3/8" from panel edge & 2" from corners.
2. Values based on wall testing per ASTM E 2126-07a, Method C and ASTM E 564-06.
3. ASD and LRFD calculations based on AISI S213-07-S1-09, Section C.
4. CFSF shall comply with ICC AC 230, Nov. 1, 2010; Section 3.3 for grades, dim, yield & tensile strength.
5. The 4"/12" spacing values are interpolated from the actual tested values for 2"/12" and 6"/12" results.
6. The sheathing is to be installed vertically with a double stud at each sheathing seam. (48"o.c.)

Table 9 - Unadjusted Shearwall Static Test Results using Gripshank® Pins

Maximum Allowable Shear for Plywood Shear Walls using .100" Pins (lbs. per foot)								
Plywood Grade	Framing Spacing	Minimum Steel Gauge	Minimum Panel Thickness	Pin Spacing				
				6" on Edge	4" on Edge	3" on Edge	2" on Edge	4" on Edge
				6" in Field	6" in Field	6" in Field	6" in Field	8" in Field
Structural I	24"	20 ga., 33 mils	3/8"	155	235	310	395	---
	24"	20 ga., 33 mils	7/16"	170	255	340	435	---
	24"	20 ga., 33 mils	15/32"	205	305	410	520	---
Grades other than Structural I	24"	20 ga., 33 mils	3/8"	140	210	280	360	---
	24"	20 ga., 33 mils	7/16"	155	230	310	390	---
	24"	20 ga., 33 mils	15/32"	185	275	370	470	---
APA Rated Sheathing	16"	16 ga., 54 mils	19/32"	---	---	---	---	551.9 using 3x safety factor

Notes:

1. Values listed are test values and have not been changed by wind or seismic adjustment factors.
2. The minimum panel edge distance for pin placement is 3/8 inch
3. The track-to-stud connection is permitted to be any means of one .100" diameter by 3/4" long Aerosmith pin at each track-to-stud connection, for a total of two at each end to each stud.
4. Nominal head diameter is .250".

Table 10 - Aerosmith .100" Dia. VersaPins Ultimate Shear Values (Steel to Steel)³

Layers	(Gauge) Inches/ksi	(Gauge) Inches/ksi	# of Tests ¹	Coupon Size ²	Average Load (lbs.)	Knurled Pin	Fastener Point
	Top Layer	Bott. Layer					
2	(16).060/50	(15).068/50			1,129.7	Helical	Balistic
2	(15).068/50	(15).068/50			1,345.1	Helical	Balistic
2	(18).046/33	(16).057/50			920.5	Helical	Balistic
2	(18).045/33	(18).046/33			571.5	Helical	Balistic
2	(19).041/50	(19).041/50			202.7	Helical	Balistic
2	(19).041/50	(16).060/50			508.7	Helical	Balistic
2	(18).047/33	(18).046/33			331.8	Helical	Balistic
2	(14).073/50	(16).058/50			778.0	Helical	Balistic
2	(14).071/50	(16).058/50			777.9	Helical	Balistic
2	(16).058/50	(16).058/50			828.3	Helical	Balistic
2	(16).059/50	(16).057/50			828.3	Helical	Balistic
2	(15).071/50	(16).057/50		Steel Stud	1,088.5	Helical	Balistic
2	(15).072/50	(16).057/50		Steel Stud	1,097.1	Helical	Balistic
2	(15).072/50	(16).057/50		Steel Stud	1,079.3	Helical	Balistic
1	(20).036/50		20	Hat-Section	331.0	Gripshank	Super Sharp
1	(20).036/50		10	Hat-Section	329.6	Gripshank	Super Sharp
1	(18).0428/43		10	Steel Channel	512.0	Gripshank	Super Sharp

Notes:

1. Three (3) tests were recorded for each coupon combination unless otherwise noted.
2. Coupon Sizes are 4" x 8" unless otherwise noted.
3. Applications include (but are not limited to) stud-to-track, pack studs, built-up headers, and walls with strapping.

Table 11 - Sure-Board Series 200 Structural Panel Racking Resistance (Gripshank Pins)

Fasteners ¹	Studs	Sheathing	Hold Downs	Peak Force	Mean Drift (In.)
Screw = No. 8 x 1-3/4" / Aerosmith 1-3/8" x 1/4-in. diameter head.	16 ga., 54 mils / 16" o.c.	4ft. X 9ft. Sure-Board Series 200 - 1/4" Magnesium Board	SHD15	9981 lbs.	1.238"
Screw = No. 8 x 1-3/4" / Aerosmith 1-3/8" x 1/4-in. diameter head.	18 ga., 43 mils / 16" o.c.	4ft. X 9ft. Sure-Board Series 200 - 1/4" Magnesium Board	SHD15	8803 lbs.	1.196"
Screw = No. 8 x 1-3/4" / Aerosmith 1-1/4" x 5/16-in. diameter head.	16 ga., 54 mils / 16" o.c.	4ft. X 9ft. Sure-Board Series 200 - 5/8" Densglass Gold	(2)SHD10 (1) SHD15	11301 lbs.	1.606"
Screw = No. 8 x 1-3/4" / Aerosmith 1-1/4" x 5/16-in. diameter head.	18 ga., 43 mils / 16" o.c.	4ft. X 9ft. Sure-Board Series 200 - 5/8" Densglass Gold	(2)SHD10 (1) SHD15	9797 lbs.	1.505"

Notes:

1. The spacing for the Grabber Screws and Aerosmith pins are as follows: Vertical Perimeter Fasteners Screws are 12" on-center (o.c.); five(5) Aerosmith pins installed between screws at approximately 2" o.c. Vertical Field Fasteners Screws were 12" o.c.; Aerosmith Pins 12" o.c. (installed between self drilling screws) Horizontal Perimeter Fasteners Screws 2" o.c. in top and bottom plate members; no pins.

Table 12 - Ultimate Test Values from ASTM E 2126-07A Testing using Aerosmith Brand Pin Fasteners in Cold Formed Steel Framing

Sheathing	Framing Spacing	Minimum Steel Thickness	Nominal Pin Diameter & Minimum Head Diameter	Pin Spacing	Ultimate Load
15/32" (4 ply) Plywood "Rated Sheathing"	24" o.c.	16 ga. [54 mils]	.100" dia. x .305" dia. head	2" around Perimeter 12" in Field	1721.0 plf
				4" around Perimeter 12" in Field	1304.9 plf ³
				6" around Perimeter 12" in Field	888.9 plf
7/16" APA Rated OSB "Structural 1"	24" o.c.	14 ga. [68 mils]	.144" dia. x .295" dia. head	2" around Perimeter 12" in Field	1911.5 plf
		16 ga. [54 mils]	.100" dia. x .305" dia. head	2" around Perimeter 12" in Field	1674.9 plf
		16 ga. [54 mils]	.100" dia. x .305" dia. head	4" around Perimeter 12" in Field	1259.9 plf ³
		16 ga. [54 mils]	.100" dia. x .305" dia. head	6" around Perimeter 12" in Field	844.9 plf
		18 ga. [43 mils]	.100" dia. x .305" dia. head	4" around Perimeter 12" in Field	1011.4 plf

Notes:

1. A Simpson Strong-Tie model HTT4 Tension Tie (or equivalent) is required at both ends of the wall and must be installed per manufacturer's installation instructions
2. CFSF shall comply with ICC AC 230, Nov. 1, 2010; Section 3.3 for grades, dim, yield & tensile strength. 50 ksi minimum steel
3. The 4"/12" spacing value using Plywood or OSB was interpolated from the actual tested values for 2"/12" and 6"/12" results
4. The maximum aspect ratio is 2:1
5. The sheathing is to be installed vertically with a double stud at each sheathing seam. (48"o.c.)
6. ASTM E2126 under ICC-ES AC230 standard deviation +/- 10% before additional testing

Table 13 - Ultimate Test Values from ASTM E 564-06 Testing using Aerosmith Brand pin Fasteners in Cold Formed Steel Framing

Sheathing	Framing Spacing	Minimum Steel Thickness	Nominal Pin Diameter & Minimum Head Diameter	Pin Spacing	Ultimate Load
15/32" (4 ply) Plywood "Rated Sheathing"	24" o.c.	16 ga. [54 mils]	.100" dia. x .305" dia. head	2" around Perimeter 12" in Field	2193 plf
				4" around Perimeter 12" in Field	1597 plf ³
				6" around Perimeter 12" in Field	1002 plf
7/16" APA Rated OSB "Structural 1"	24" o.c.	14 ga. [68 mils]	.144" dia. x .295" dia. head	6" around Perimeter 12" in Field	1007 plf
		16 ga. [54 mils]	.100" dia. x .305" dia. head	6" around Perimeter 12" in Field	997 plf
		18 ga. [43 mils]	.100" dia. x .305" dia. head	4" around Perimeter 12" in Field	1327 plf

Notes:

1. A Simpson Strong-Tie model HTT4 Tension Tie (or equivalent) is required at both ends of the wall and must be installed per manufacturer's installation instructions.
2. CFSF shall comply with ICC AC 230, Nov. 1, 2010; Section 3.3 for grades, dim, yield & tensile strength. 50 ksi minimum steel.
3. The 4"/12" spacing value using 15/32" Plywood was interpolated from the actual tested values for 2"/12" and 6"/12" results
4. The maximum aspect ratio is 2:1.
5. The sheathing is to be installed vertically with a double stud at each sheathing seam. (48"o.c.)
6. ASTM E564 standard deviation +/- 15% before additional testing.

Table 14 - Design Wind Pressure Calculations

Exposure: B		Basic Wind Speed							
Structure Class: II		85	90	100	110	120	130	140	150
Basic Pressure (P_{net30})		16.2	18.2	22.5	27.2	32.4	38.0	44.0	50.5
Building Ht. (ft.)	Ht & Exp. Factor	Design Wind Pressure (PSF)							
0-15	1.00	16.2	18.2	22.5	27.2	32.4	38.0	44.0	50.5
20	1.00	16.2	18.2	22.5	27.2	32.4	38.0	44.0	50.5
25	1.00	16.2	18.2	22.5	27.2	32.4	38.0	44.0	50.5
30	1.00	16.2	18.2	22.5	27.2	32.4	38.0	44.0	50.5
35	1.05	17.0	19.1	23.6	28.6	34.0	39.0	46.2	53.0
40	1.09	17.7	19.8	24.5	29.6	35.3	41.4	48.0	55.0
45	1.12	18.1	20.4	25.2	30.5	36.3	42.6	49.3	56.6
50	1.16	18.8	21.1	26.1	31.6	37.6	44.1	51.0	58.6

Note: $K_{zt} = 1.0$, $K_d = 1.0$, $GC_p = 1.8$, $GC_{pi} = 0.18$ (Per ASCE 7-10, Method 1)

Design Wind Pressure = Net Pressure

K_z									
Building Ht. (ft.)	Exp B	Exp C	Exp D	K_{zt}	K_d	I	Zone 4 GC_p	Zone 5 GC_p	GC_{pi}
0-15	0.70	0.84	1.03	1	0.85	1	1.1	1.4	0.18
20	0.70	0.90	1.08	1	0.85	1	1.1	1.4	0.18
25	0.70	0.94	1.12	1	0.85	1	1.1	1.4	0.18
30	0.70	0.98	1.16	1	0.85	1	1.1	1.4	0.18
35	0.73	1.01	1.19	1	0.85	1	1.1	1.4	0.18
40	0.76	1.04	1.22	1	0.85	1	1.1	1.4	0.18
45	0.78	1.06	1.24	1	0.85	1	1.1	1.4	0.18
50	0.81	1.09	1.27	1	0.85	1	1.1	1.4	0.18

q (Zone 4)				q (Zone 5)		
Building Ht. (ft.)	Exp B	Exp C	Exp D	Exp B	Exp C	Exp D
0-15	0.001950	0.002340	0.002869	0.002407	0.002888	0.003541
20	0.001950	0.002507	0.003008	0.002407	0.003094	0.003713
25	0.001950	0.002618	0.003120	0.002407	0.003232	0.003851
30	0.001950	0.002730	0.003231	0.002407	0.003369	0.003988
35	0.002033	0.002813	0.003314	0.002510	0.003472	0.004091
40	0.002117	0.002897	0.003398	0.002613	0.003576	0.004194
45	0.002173	0.002952	0.003454	0.002682	0.003644	0.004263
50	0.002256	0.003036	0.003537	0.002785	0.003748	0.004366

Product Labeling

Each Box of fasteners shipped, that are covered by this **Product Evaluation Report**, must have a label attached with at least the following information:

1. **Aerosmith Fastening Systems** Name, Address or Website.
2. Fastener designation
3. This **Product Evaluation Report** number & **Pei ES** logo
4. The Catalog Number
5. A Lot Number & Mfg. Plant Identification/Traceability
6. A Trademark head stamp by **Aerosmith** as shown
7. Florida Building Code (FBC) - FL#14885-R2
8. ICC-ES Report ESR-1641 (as applicable)
9. ICC-ES Report ESR-3145 (as applicable)
10. ICC-ES Report ESR-3453F (as applicable)
11. ICC-ES Report ESR-3833F (as applicable)

Acceptable Evaluation Marks



Table 15: Cantilever Horizontal Diaphragm Testing

Aerosmith Fastener	Fastener Spacing		Minimum Edge Distance	Joist gauge	Joist Steel	Joist Spacing	Decking	S _u - Ultimate Shear
	Perimeter	Field						
2385AG	6"	6"	3/8"	16	50 ksi	24"	15/32" Plywood	626 plf
2359NG	6"	6"	3/8"	20	65 ksi	24"	7/16" OSB	468 plf
5454HPG	6"	6"	3/8"	14	50 ksi	48"	1-1/8" Plywood	893 plf
5454HPG	6"	12"	3/8"	14	50 ksi	24"	19/32" Struct 1 OSB	550 plf

Notes:

1. Refer to **Table 16** of this PER for applicable diaphragm safety (Ω) and load resistance (ϕ) factors corresponding to ASD, LRFD, and/or LSD design methods.
2. **1 to 1** maximum Aspect Ratio for Cantilever Diaphragms.
3. Diaphragm stiffness to be determined by rational engineering analysis. Conservatively can use worst-case scenario between rigid or flexible assumptions. The deflection of diaphragm shall be determined by principle of mechanics considering the deformation of the sheathing, attachment of sheathing, chords and collectors.
4. Steel joists shall conform to AISI
5. Values are "Unblocked Diaphragms" decking attached with long panel direction perpendicular to joists.

Table 16: Safety Factors and Resistance Factors for Diaphragms

Framing Type	Fastener	Decking	Earthquake			Wind		
			Ω (ASD)	ϕ (LRFD)	ϕ (LSD) ⁴	Ω (ASD)	ϕ (LRFD)	ϕ (LSD) ⁴
Steel Joist	.100" dia.x 1-1/2"lg. Gripshank	15/32" Plywood	3.12	0.59	0.48	2.49	0.64	0.52
Steel Truss	.100" dia.x 1-1/2"lg. Gripshank	7/16" OSB	3.28	0.56	0.45	2.63	0.61	0.49
Steel Joist	.145" dia.x 1-3/4" lg. Helical Pin	1-1/8" Plywood	3.01	0.61	0.50	2.41	0.67	0.54
Steel Joist	.145" dia.x 1-3/4" lg. Helical Pin	19/32" Struct 1 OSB	3.18	0.58	0.47	2.54	0.63	0.51

Notes:

1. **Tabulated values have been evaluated for horizontal diaphragm use only.**
2. Safety factors and resistance factors for wood Subfloor diaphragms installed over cold-formed steel framing are based upon AISI S100-2016, Section B5.4.3, S400-15/s1-16, Section F2.4.2, Section K2.1.1, K2.12
3. Safety factors and resistance factors for diaphragms installed over steel joists are based on the worst case of the standard factors from the American Wood Council Special Design Provisions for Wind and Seismic (AWC SDPWS-2008) and those tabulated for steel framing.
4. Limit States Design (LSD) shall be used in combination with the load combinations found in the National Building Code of Canada (NBCC).

Product Documentation

- A Product Evaluation Service Agreement between **Pei Evaluation Service®** and **Aerosmith Fastening Systems**.
- A Follow-up Inspection Service Agreement between **Progressive Engineering Inc.** and **Aerosmith Fastening Systems**.
- An Agreement between **Product Evaluation Report** owner (**Aerosmith**) & each Approved Manufacturer.
- A Quality Control Manual for **Aerosmith Fastening Systems** - Dated: 4/1/2020
- A Quality Control Manual from each Approved Manufacturer.
- VersaPin Gripshank** Fastening Guidelines for Cement Fiber Board
- Test Reports for ASTM B117, E72, E330, E564 & E2126 Testing
- Test Reports for AISI S907 Testing
- Numerous Opinion Letters
- Numerous calculations by a Professional Engineer