

ICC-ES Evaluation Report

ESR-4481

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DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings

DIVISION: 09 00 00—FINISHES
Section: 09 22 16.23—Fasteners

REPORT HOLDER:

AEROSMITH FASTENING SYSTEMS

EVALUATION SUBJECT:

AEROSMITH TRAXPIN® GT SERIES FASTENERS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012 and 2009 *International Building Code®* (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see [ESR-4481 LABC and LARC Supplement](#).

For evaluation for compliance with codes adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architects (DSA), see [ESR-4481 CBC and CRC Supplement](#).

Property evaluated:

Structural

2.0 USES

Aerosmith TraxPIN® GT Series power-driven fasteners are power-actuated fasteners used to fasten building components such as light-gage cold-formed steel framing to normalweight concrete, concrete masonry units (CMUs) and structural steel substrate materials. The fasteners are used as alternatives to the cast-in-place concrete anchors described in 2018 and 2015 IBC Section 1901.3 (2012 IBC Section 1908; 2009 IBC Section 1911) for placement in concrete; the embedded anchors described in Section 8.1.3 of TMS 402-13 referenced in Section 2107 of the

2018 and 2015 IBC (Section 2.1.4 of TMS 402-11 and -08, referenced in Section 2107 of the 2012 and 2009 IBC, respectively); and to the welds and bolts used to attach to steel, described in IBC Sections 2204.1 and 2204.2, respectively. For structures regulated under the IRC, the fasteners may also be used where an engineered design is submitted in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 Aerosmith GT Series Power Driven Fasteners:

Aerosmith TraxPIN® GT Series power-driven fasteners are manufactured from carbon steel and austempered (heat treated) to a minimum Rockwell “C” core hardness of 54 in accordance with the manufacturer’s specifications. The fasteners have a zinc coating. See Table 1 for shank descriptions, fastener dimensions, coating type and applicable base materials. See Figure 1 for fastener images.

3.2 Substrate Materials:

3.2.1 Concrete: Normalweight concrete must comply with IBC Chapter 19 or IRC Section R402.2, as applicable. The minimum concrete compressive strength at the time of fastener installation must be as noted in Table 2.

3.2.2 Concrete Masonry Units (CMUs): CMUs must be minimum 8-inch-thick normalweight blocks conforming to ASTM C90.

3.2.3 Structural Steel: Structural steel used in supports must comply with the minimum strength requirements of ASTM A36 and must have the thickness noted in Table 4.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: Selection of fasteners must take into consideration the applicable base material and the length of the fastener. The minimum fastener length must be determined as follows:

- For installation into concrete and concrete masonry base materials, the minimum effective shank length shown in Table 1 must equal or exceed the sum of the thickness of the attached material and the minimum embedment depth shown in Tables 2 and 3, as applicable.
- For installation through steel base materials, the minimum effective shank length shown in Table 1 must equal or exceed the sum of the following: the thickness of the attached material, the thickness of the base material and the required point penetration shown in Table 4.

4.1.2 Allowable Loads: The applicable allowable shear and tension load tables for the fasteners driven into different base materials may be determined by referencing Table 1. The most critical applied loads, excluding seismic load effects, resulting from the load combinations in IBC Section 1605.3.1 or 1605.3.2 must not exceed the allowable loads described in this section. For fasteners which are subjected to seismic loads, see Section 4.1.5 for additional information.

The allowable shear and tension (pullout) values in the tables of this report are for use in allowable stress design (ASD). The allowable loads apply to the interaction between the fasteners and the specified base materials only, and limit states such as pull-over and lateral bearing, which are governed by the properties of attached materials, are outside the scope of this report. Design of the connection to the attached material must comply with the applicable requirements of the IBC. The stress increases and load reductions described in IBC Section 1605.3 are not allowed.

4.1.3 Combined Loading: For fasteners subjected to both shear and tension loads, compliance with the following interaction equation must be verified:

$$(p/P_a) + (v/V_a) \leq 1$$

where:

- p = Actual applied tension load on fastener, lbf(N)
- P_a = Allowable tension load for the fastener, lbf (N)
- v = Actual applied shear load on fastener, lbf (N)
- V_a = Allowable shear load for the fastener, lbf (N)

4.1.4 Steel-to-Steel Connections: When the fasteners listed in Table 4 are used in connections of two steel elements in accordance with Section J5 of AISI S100-16 (Section E5 of AISI S100-12), connection capacity must be determined in accordance with Sections 4.1.4.1 and 4.1.4.2, as applicable.

4.1.4.1 Connection Strength – Tension: To determine tensile connection strength in accordance with Section J5.2 of AISI S100-16 (Section E5.2 of AISI S100-12), the fastener tension strength, pull-out strength and pull-over strength must be known. These characters must be determined as follows:

- **PAF Tensile Strength:** The allowable fastener tension strengths must be calculated in accordance with Section J5.2.1 of AISI S100-16 (Section E5.2.1 of AISI S100-12) using a value of 260,000 psi for F_{uh} .
- **Pull-out Strength:** See Table 4 for available pull-out strength.
- **Pull-over Strength:** The available pull-over strengths must be calculated in accordance with Section J5.2.3 of AISI S100-16 (Section E5.2.3 of AISI S100-12).

4.1.4.2 Connection Strength – Shear: To determine shear connection strength in accordance with Section J5.3 of AISI S100-16 (Section E5.3 of AISI S100-12), the fastener shear strength, bearing and tilting strength, pull-out strength in shear, net section rupture strength and shear strength limited by edge distance must be known. These characteristics must be determined as follows:

- **PAF Shear Strength:** The allowable fastener shear strengths must be calculated in accordance with Section J5.3.1 of AISI S100-16 (Section E5.3.1 of AISI S100-12) using a value of 260,000 psi for F_{uh} .
- **Bearing and Tilting Strength:** The available bearing

and tilting strengths must be calculated in accordance with Section J5.3.2 of AISI S100-16 (Section E5.3.2 of AISI S100-12).

- **Pull-out Strength in Shear:** The available pull-out strength in shear must be the applicable allowable shear strength from Table 4 or must be calculated in accordance with Section J5.3.3 of AISI S100-16 (Section E5.3.3 of AISI S100-12).
- **Net Section Rupture Strength and Shear Strength Limited by Edge Distance:** The net section rupture strength must be determined in accordance with Section J5.3.4 of AISI S100-16 (Section J5.3.4 of AISI S100-12) and the shear strength limited by edge distance must be determined in accordance with Section J5.3.5 of AISI S100-16 (Section E5.3.5 of AISI S100-12).

4.1.5 Seismic Considerations: The fasteners are recognized for use when subjected to seismic loads as follows:

1. The fasteners may be used for attachment of nonstructural components listed in Section 13.1.4 of ASCE 7, which are exempt from the requirements of ASCE 7.
2. Concrete Base Materials: The fasteners installed in concrete base materials may be used to support acoustical tile or lay-in panel suspended ceiling systems, distributed systems and distribution systems where the service load on any individual fastener does not exceed the lesser of 90 lbf (400 N) or the allowable load shown in Table 2.
3. Steel Base Materials: The fasteners installed in steel may be used for attaching nonstructural components where the service load on any individual fastener does not exceed the lesser of 250 lbf (1112 N) or the allowable load shown in Table 4.
4. Interior, Nonstructural Walls: For interior, nonstructural walls that are not subject to sustained tension loads and are not a bracing application, the power-driven fasteners described in Section 3.1 may be used to attach steel track to concrete or steel in all Seismic Design Categories. In Seismic Design Categories D, E and F, the allowable shear load due to transverse pressure must be no more than 90 pounds (400 N) when attaching to concrete; or 250 pounds (1,112 N) when attaching to steel. Substantiating calculations are submitted addressing the fastener-to-base-material capacity and the fastener-to-attached-material capacity. Interior nonstructural walls are limited to locations where bearing walls, shear walls or braced walls are not required by the approved plans. The design load on the fastener must not exceed the allowable load shown in Tables 2 and 4, as applicable.

4.2 Installation:

4.2.1 General: The fasteners must be installed in accordance with this report and the Aerosmith Fastening Systems published installation instructions. A copy of these instructions must be available on the jobsite at all times during installation.

The fasteners are installed with a power fastening tool in accordance with Aerosmith Fastening Systems recommendations. The fastener penetration, spacing and edge distances must be as noted in the tables of this report. For fasteners installed into concrete, the fasteners must not be driven until the concrete has reached the designated compressive strength.

5.0 CONDITIONS OF USE

The Aerosmith TraxPIN® GT Series power driven fasteners described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in section 1.0 of this report, subject to the following conditions:

- 5.1 The fasteners must be manufactured and identified in accordance with this report.
- 5.2 Fastener installation must comply with this report and Aerosmith Fastening Systems' published installation instructions. In the event of a conflict between this report and the Aerosmith Fastening Systems published installation instructions, the more restrictive requirements govern.
- 5.3 Calculations demonstrating that the applied loads are less than the allowable loads described in this report must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.4 For steel-to-steel connections that meet the applicability requirements of Section J5 of AISI S100-16 (Section E5 of AISI S100-12), calculations demonstrating that the available connection strength has been determined in accordance with Section J5 of AISI S100-16 (Section E5 of AISI S100-12) and Section 4.1.4 of this report, and equals or exceeds the applied load, must be submitted to the code official. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.5 Refer to Section 4.1.5 for seismic considerations.
- 5.6 The minimum concrete thickness must be three times the fastener embedment, except where noted otherwise in this report.

5.7 The use of fasteners is limited to uncracked concrete or masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.

5.8 Installation must be limited to dry interior environments, which include exterior walls which are protected by an exterior wall envelope.

5.9 The use of fasteners in contact with preservative-treated or fire-retardant-treated wood is outside the scope of this report.

5.10 The fasteners are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Power-actuated Fasteners Driven into Concrete, Steel, and Masonry Elements (AC70), dated December 2019.

7.0 IDENTIFICATION

7.1 The containers of the fasteners must be labeled with the report holder's name (Aerosmith Fastening Systems); the product name (TraxPIN®), part number, length, the lot number and the evaluation report number (ESR-4481). In addition, the fasteners are identified by the logo symbol stamped into the fastener head as shown in Figure 1.

7.2 The report holder's contact information is the following:

AEROSMITH FASTENING SYSTEMS
5621 DIVIDEND ROAD
INDIANAPOLIS, INDIANA 46241
(800) 528-8183
www.aerosmithfastening.com
info@aerosmithfastening.com

TABLE 1—AEROSMITH TRAXPIN® GT SERIES FASTENERS

FASTENER	SHANK TYPE	SHANK DIAMETER (inch)	HEAD DIAMETER (inch)	MAXIMUM POINT LENGTH (inch)	MINIMUM EFFECTIVE SHANK LENGTH (inch)	FASTENER COATING	APPLICABLE BASE MATERIAL	APPLICABLE LOAD TABLES
GT034FP	Smooth, straight	0.102	0.248	0.216	0.709	Zinc	Concrete	2
GT100FP					0.961	Zinc	Concrete, Masonry	2, 3
GT114FP					1.209			
GT112FP					1.461			
GT012PFP	Smooth, stepped	0.102/0.120	0.248	0.216	0.516	Zinc	Steel	4
GT034PFP					0.642			4

For **SI**: 1 inch = 25.4 mm.

**TABLE 2—ALLOWABLE TENSION AND SHEAR VALUES FOR AEROSMITH TRAXPIN® GT SERIES FASTENERS
INSTALLED IN NORMALWEIGHT CONCRETE (lbf)**

FASTENER	SHANK TYPE	NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inches)	MINIMUM SPACING (inches)	MINIMUM EMBEDMENT DEPTH (inch)	ALLOWABLE LOADS (lbf)			
Concrete Compressive Strength:						4,000 psi		6,000 psi	
Load Direction:						Tension	Shear	Tension	Shear
GT###FP ²	Straight	0.102	3	4.0	¹¹ / ₁₆	52	77	50	89

For **SI**: 1 inch = 25.4 mm, 1 psi = 6.89 kPa, 1 lbf = 4.45 N.

¹The fasteners must not be driven until the concrete has reached the designated minimum compressive strength. Minimum concrete thickness is three times the fastener embedment into the concrete.

²### designates numbers used in product designation to indicate nominal fastener length.

**TABLE 3—ALLOWABLE TENSION AND SHEAR VALUES FOR AEROSMITH TRAXPIN® GT SERIES FASTENERS
INSTALLED IN HOLLOW CONCRETE MASONRY UNITS (CMUs) (lbf)**

FASTENER	NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE ³ (inches)	MINIMUM EMBEDMENT DEPTH (inch)	ALLOWABLE LOADS (lbf)	
Fastener Location:				Face Shell ^{1,2}	
Load Direction:				Tension	Shear
GT###FP ⁴	0.102	3	³ / ₄	107	170

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹Values are applicable to CMU with compressive strength of 4400 psi. For lower strength CMU, values shall be reduced by a factor equal to $\sqrt{\frac{f_{cmu}}{f_{cmu,test}}}$ where f_{cmu} = the specified compressive strength and $f_{cmu,test}$ = 4400 psi.

²Only one fastener may be installed in each cell.

³Distance from edge of individual concrete masonry unit. Fasteners must be spaced a minimum of 4 inches apart.

⁴### designates numbers used in product designation to indicate nominal fastener length.

**TABLE 4—ALLOWABLE TENSION AND SHEAR VALUES FOR AEROSMITH TRAXPIN® GT SERIES FASTENERS
INSTALLED IN ASTM A36 STEEL¹ (lbf)**

FASTENER	NOMINAL SHANK DIAMETER (inch)	MINIMUM EDGE DISTANCE (inch)	MINIMUM SPACING (inch)	ALLOWABLE LOADS (lbf)	
Steel Thickness (inch):				¹ / ₄	
Load Direction:				Tension	Shear
GT012PFP GT034PFP	0.102/0.120	0.5	1.0	133	354

For **SI**: 1 inch = 25.4 mm, 1 lbf = 4.45 N.

¹The allowable tension and shear values are for fastenings that have the point end of the fastener penetrating through the steel base material a minimum of 0.17 inch.

**Head Marking****Part No. GT###FP****Part No. GT###PFP****FIGURE 1—AEROSMITH TRAXPIN® GT SERIES FASTENERS**

DIVISION: 03 00 00—CONCRETE**Section: 03 16 00—Concrete Anchors****DIVISION: 04 00 00—MASONRY****Section: 04 05 19.16—Masonry Anchors****DIVISION: 05 00 00—METALS****Section: 05 05 23—Metal Fastenings****DIVISION: 09 00 00—FINISHES****Section: 09 22 16.23—Fasteners****REPORT HOLDER:****AEROSMITH FASTENING SYSTEMS****EVALUATION SUBJECT:****AEROSMITH TRAXPIN® GT SERIES FASTENERS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Aerosmith TraxPIN® GT Series power-driven fasteners, described in ICC-ES evaluation report [ESR-4481](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The Aerosmith TraxPIN® GT Series power-driven fasteners, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4481](#), comply with LABC Chapters 19, 21 and 22 and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The Aerosmith TraxPIN® GT Series power-driven fasteners described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4481](#).
- The design, installation, conditions of use and identification of the Aerosmith TraxPIN® GT Series power-driven fasteners are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-4481](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- The allowable values listed in the attached evaluation report and tables are for the fasteners only. Connected members shall be checked for their capacity (which may govern).
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, issued February 2021 and revised March 2021.

DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 23—Metal Fastenings

DIVISION: 09 00 00—FINISHES
Section: 09 22 16.23—Fasteners

REPORT HOLDER:**AEROSMITH FASTENING SYSTEMS****EVALUATION SUBJECT:****AEROSMITH TRAXPIN® GT SERIES FASTENERS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Aerosmith TraxPIN® GT Series power-driven fasteners, described in ICC-ES evaluation report ESR-4481, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

2.0 CONCLUSIONS**2.1 CBC:**

The Aerosmith TraxPIN® GT Series power-driven fasteners, described in Sections 2.0 through 7.0 of evaluation report ESR-4481, comply with CBC Chapters 19, 21 and 22, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17, as applicable.

2.1.1 OSHPD:

The Aerosmith TraxPIN® GT Series power-driven fasteners, described in Sections 2.0 through 7.0 of evaluation report ESR-4481, comply with CBC Chapters 19, 21 and 22 as amended, [OSHPD 1R, 2 and 5] or Chapters 19A, 21A and 22A [OSHPD 1 & 4], provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements in Sections 2.1.1.1 and 2.1.1.2 of this supplement:

2.1.1.1 Verification Test Requirements: The installation verification test loads, frequency, and acceptance criteria shall be in accordance with Section 1901.3.4 [OSHPD 1R, 2 and 5] or 1910A.5 [OSHPD 1 & 4] of the CBC, as applicable.

2.1.1.2 Conditions of Use:

1. Power-actuated fastener use in seismic shear applications shall be in accordance with Section 1901.3.1 [OSHDP 1R, 2 & 5] or 1617A.1.20 [OSHDP 1 & 4].
2. For Cold Formed Steel applications, the connection design for steel to steel, shall be in accordance with Section 2210.1 [OSHDP 1R, 2 & 5] or Section 2210A.1 [OSHDP 1 & 4].

2.1.2 DSA:

The Aerosmith TraxPIN® GT Series power-driven fasteners, described in Sections 2.0 through 7.0 of the evaluation report ESR-4481, comply with CBC Chapters 19, 21 and 22 as amended, [DSA-SS/CC] and Chapters 19A, 21A and 22A [DSA-SS], provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements in Sections 2.1.2.1 and 2.1.2.2 of this supplement:

2.1.2.1 Verification Test Requirements: The installation verification test loads, frequency, and acceptance criteria shall be in accordance with Section 1909.2.7 [DSA-SS/CC] and 1910A.5 [DSA-SS] of the CBC, as applicable.

2.1.2.2 Conditions of Use:

1. Power actuated fastener in seismic shear application shall be in accordance with Section 1617A.1.20 [DSA-SS].
2. For Cold Formed Steel applications, the connection design for steel to steel, shall be in accordance with Section 2210.1 [DSA-SS/CC] or Section 2210A.1 [DSA-SS].

2.2 CRC:

The Aerosmith TraxPIN® GT Series power-driven fasteners, described in Sections 2.0 through 7.0 of the evaluation report ESR-4481, comply with CRC Section R301.1.3, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Chapters 16 and 17.

This supplement expires concurrently with the evaluation report, issued February 2021 and revised March 2021.