



EVALUATION SUBJECT: EJOT EJOFAST® bi-metal SELF-DRILLING SCREWS JF3

REPORT HOLDER:
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CSI Division: 05 – METALS
CSI Section: 050523 – Metal Fastenings

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2012 International Building Code® (2012 IBC)
- 2009 International Building Code® (2009 IBC)

1.2 Evaluated in accordance with:

- ICC-ES Acceptance Criteria for Tapping Screw Fasteners (AC118), approved February 2016

1.3 Properties assessed:

- Structural

2.0 PRODUCT USE

The EJOT EJOFAST® bi-metal self-drilling screws are used to resist shear and tension loads in engineered connections for cold-formed steel to cold formed-steel construction complying with IBC Sections 2210 and 2211 in thicknesses ranging from No. 20 gage to No. 26 gage.

3.0 PRODUCT DESCRIPTION

3.1 Product information: The EJOT EJOFAST® bi-metal self-drilling screws, illustrated in Figure 1 of this report are No. 12 self-drilling screws. The screws have a nominal major shank diameter of 0.217 inch (5.5 mm) and nominal minor shank diameter of 0.161 inch (4.1 mm) with 17 threads per inch. The screws include a hex washer head with a 0.413 inch (10.5 mm) nominal diameter, and a custom drill point. Screws are 1 inch (25 mm) in length. Table 1 of this report provides a description of the screws recognized in this report.

3.2 Material information

3.2.1 Screws: The screws described in this report are

manufactured from stainless steel conforming to ASTM 304 and in the area of the drill point from carbon steel conforming to ASTM A 510, Grade 1022, and hardened through induction, and coated with zinc coating. The screws comply with Corrosion Protection Performance Classification Code Fe/Zn 3A in accordance with ASTM F1941-10.

3.2.2 Cold-Formed Steel Members: Connected members (sheet metal) shall be manufactured from materials in compliance with the American Iron and Steel Institute *North American Specification for the Design of Cold-Formed Steel Structural Members* (AISI S100). Loads provided in this report are based on the following material properties:

MEMBER THICKNESS DESIGNATION NO.	MINIMUM NOMINAL THICKNESS (mils)	DESIGN THICKNESS (in.)	MINIMUM YIELD STRESS (psi)	MINIMUM TENSILE STRESS (psi)
26 gage	16	0.017	33,000	45,000
24 gage	22	0.023	33,000	45,000
22 gage	27	0.028	33,000	45,000
20 gage	32	0.034	33,000	45,000

For SI 1 mil = 0.0254 mm, 1 inch = 25.4 mm, 1 psi = 0.006895 MPa

4.0 DESIGN AND INSTALLATION

4.1 Design: The nominal, design, and allowable shear and tensile strengths of the screws are provided in Table 2 of this report. The nominal shear strength, P_{ss} , and nominal tensile strength, P_{ts} , of the screws are the average ultimate values from testing. The tabulated LRFD design strength and ASD allowable strength values are based on a resistance factor, Φ , and a safety factor, Ω , as defined in AISI S100.

The nominal density, and allowable strengths for shear, pull-over, and pull-out of steel-to-steel connections are provided in Tables 3, 4, and 5 of this report, respectively. The resistance factors and safety factors used to determine the LRFD and ASD strengths are determined in accordance with AISI S100.

For connections subject to shear, the lesser of the fastener shear strength (Table 2 of this report) and the connection shear strength (Table 3 of this report) shall be used for design. For connections subject to tension, the least of the tension strength of screws (Table 2 of this report of this report), connection pull-over strength (Table 4 of this report) and connection pull-out strength (Table 5 of this report) shall be used for design. Connections subject to combined tension and shear loading shall be designed in accordance with Section E4.5 of AISI S100, using strength values found in this report.

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.





4.2 Installation: Installation of the EJOT EJOFAST® bi-metal self-drilling screws shall be in accordance with AISI S100, the manufacturer’s published installation instructions and this report. The manufacturer’s published installation instructions shall be available at the jobsite at all times during the installation. The minimum spacing between the centers of fasteners shall be three times the diameter of the screw in accordance with Section E4.1 of AISI S100, and the minimum distance shall be 1.5 times the diameter of the screw from the center of a fastener to the edge of any connected part in accordance with Section E4.2 of AISI S100.

The screws shall be installed perpendicular to the work surface using a tool with maximum recommended speed of 2,500 rpm. The screw shall penetrate through the supporting steel with a minimum of three threads protruding past the back side of the steel not in contact with the screw head.

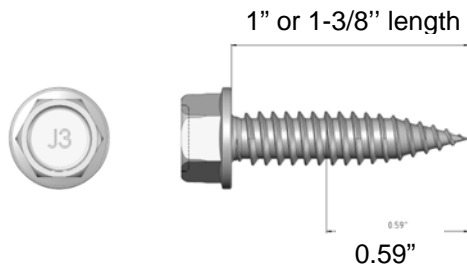


Figure 1 - EJOT EJOFAST® bi-metal SELF-DRILLING SCREW JF3

5.0 LIMITATIONS

The EJOT EJOFAST® bi-metal self-drilling screws described in this report are in compliance with, or are acceptable alternatives to what is specified in, those codes listed in Section 1.0 of this report subject to the following conditions:

5.1 Screws shall be installed in accordance with AISI S100, the manufacturer’s published installation instructions and this report. Where conflict exists between these three documents, the more restrictive shall govern.

5.2 The allowable strengths (ASD) specified in Section 4.1 of this report shall not be increased when the screws are used to resist wind or seismic force.

5.3 The bi-metal screws shall be suitable for the intended use, as determined by a registered design professional.

5.4 Calculations to verify conformance with this report

shall be submitted to the code official for review and approval. The calculations and applicable drawings are to be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is proposed.

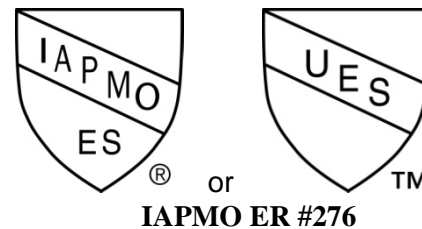
5.5 The connected members shall be checked for rupture in accordance with Section E5 of AISI S100.

6.0 SUBSTANTIATING DATA

Data in accordance with ICC-ES *Acceptance Criteria for Tapping Screw Fasteners* (AC118), approved June 2012, including test results from laboratories in compliance with ISO/IEC 17025.

7.0 IDENTIFICATION

The EJOT EJOFAST® bi-metal self-drilling screws described in this report are identified with “J3” on the top surface of the screw head, as shown in Figure 1. Packages of screws are labeled with the report holder’s name (EJOT), the brand name (EJOFAST®), the model number (JF3-2-5.5X25 or JF3-2-5.5X35), the screw quantity in the package, and the number of the evaluation report (ER-276).



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For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org



Table 1 - Self-Drilling Screw Specifications

Model No.	Designation	Size	Nominal Diameter (mm)	Nominal Screw Length (mm)	Head Style	Nominal Point Length (mm)
EJOT EJOFAST® JF3	5.5 (#12 X 17)	5.5 x 25 (#12 x 1")	5.5 (0.217")	25 (1")	Hex Washer	15 (0.591")
EJOT EJOFAST® JF3	5.5 (#12 X 17)	5.5 x 35 (#12 x 1 3/8")	5.5 (0.217")	35 (1 3/8")	Hex Washer	15 (0.591")

Table 2 - Self-Drilling Screw Strengths (lbs)

Model No.	Nominal Strength		Design Strength (LRFD)		Allowable Strength (ASD)	
	Shear (P_{ss})	Tension (P_{ts})	Shear (P_{ss})	Tension (P_{ts})	Shear (P_{ss})	Tension (P_{ts})
EJOT EJOFAST® JF3	1912	2732	956	1366	637	911

Note - For LRFD, $\Phi = 0.5$. For ASD, $\Omega = 3.0$.

**Table 3 - Self-Drilling Screw Lap-Joint Connection
Shear Strength limited by Tilting and Bearing (lbs)**

Model No.	Strength	Minimum base steel thickness			
		26 gage	24 gage	22 gage	20 gage
EJOT EJOFAST® JF3	Nominal Strength, P_{ns}	490	745	1018	1056
	Design Strength (LRFD), ΦP_{ns}	190	377	459	442
	Allowable Strength (ASD), P_{ns}/Ω	119	236	287	282

Notes: For 26 gage, $\Phi = 0.6$ and $\Omega = 2.7$. For 24 gage, $\Phi = 0.6$ and $\Omega = 2.5$.
For 22 gage, $\Phi = 0.6$ and $\Omega = 2.5$. For 20 gage, $\Phi = 0.5$ and $\Omega = 3.0$.

**Table 4 - Self-Drilling Screw Lap-Joint Connection
Tensile Strength limited by Pull-Over (lbs)**

Model No.	Strength	Minimum base steel thickness of member not in Contact with screw head			
		26 gage	24 gage	22 gage	20 gage
EJOT EJOFAST® JF3	Nominal Strength, P_{ns}	473	775	888	1188
	Design Strength (LRFD), ΦP_{ns}	169	366	373	496
	Allowable Strength (ASD), P_{ns}/Ω	106	229	233	317

Notes: For 26 gage, $\Phi = 0.5$ and $\Omega = 3.0$. For 24 gage, $\Phi = 0.6$ and $\Omega = 2.7$.
For 22 gage, $\Phi = 0.6$ and $\Omega = 2.7$. For 20 gage, $\Phi = 0.5$ and $\Omega = 3.0$.

**Table 5 - Self-Drilling Screw Lap-Joint Connection
Tensile Strength limited by Pull-Out (lbs)**

Model No.	Strength	Minimum base steel thickness of member not in Contact with screw head			
		26 gage	24 gage	22 gage	20 gage
EJOT EJOFAST® JF3	Nominal Strength, P_{ns}	259	334	464	497
	Design Strength (LRFD), ΦP_{ns}	101	158	196	235
	Allowable Strength (ASD), P_{ns}/Ω	63	99	122	147

Note - For all thicknesses, $\Phi = 0.6$ and $\Omega = 2.7$.