Flush Mount Stud (SEB)

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1. Introduction

RIFAST Bolts and Nuts are dimensioned so that the requirements of dimensional standards (for example DIN ISO 898, DIN 267 T25 and DIN 267 T11) are filled.

That is, the fastener head and shaft, as well as the nut height, are designed to be able to achieve the appropriate minimum performance values, including breakloose torque and push-out force, without joint failure. They are designed also, through relatively large head and nut diameters, to create an operationally secure joint in thin sheet metal.

Because there is only a minor reduction in cross-sectional area of the material that flows under the head, the long term durability of the joint is high.

Thereby the joint has a higher operational safety even under vibration. Besides the performance under stress during operation, the staked fasteners must also hold the observed forces and torques during assembly, during storage, and during transport. Moreover, the studs and nuts through further handling should not be unintentionally pushed out or torqued out of the application piece.

What the requirements are, especially in regards to push-out force, depends on each individual case.

With these requirements in mind, the weight and handling conditions, (staple or bulk) with regards to the storage and transport should be decided.

The installation torque as well as the loosening torque are extreme if jammed or damaged fasteners, those under DIN 267, part 15, 26, or 28, are installed into the application, or if the thread is severely corroded.

The force and torque performance of the staked joint can be significantly influenced (softness of designed material).

Under pre-load, the staked ***RIFAST*** fastening elements can achieve the highest torque values. The effective axial pre-load force pulls the staked fasteners to the plate and causes the ribs, which are the significant element in maintaining torque in the bearing surface, to keep the bolt or nut engaged in the plate surface.

Under this pre-load in normal practical conditions, in Aluminum, the staked ***RIFAST*** bolts and ***RIFAST*** nuts of the highest property class 12.9 can be assembled with the recommended tightening torque without stripping the pressed joint. Overloading the joint will result in a fracture of the fastener threads.

2. Test Procedures

In order to evaluate the load bearing performance of the ***RIFAST*** joints, the following examinations are required:

- Push-out Test
- Torque-out Test

These tests take into consideration the different forms of stress on the joint and the ultimate goal of a strong joint.

2.1 Push-out Test

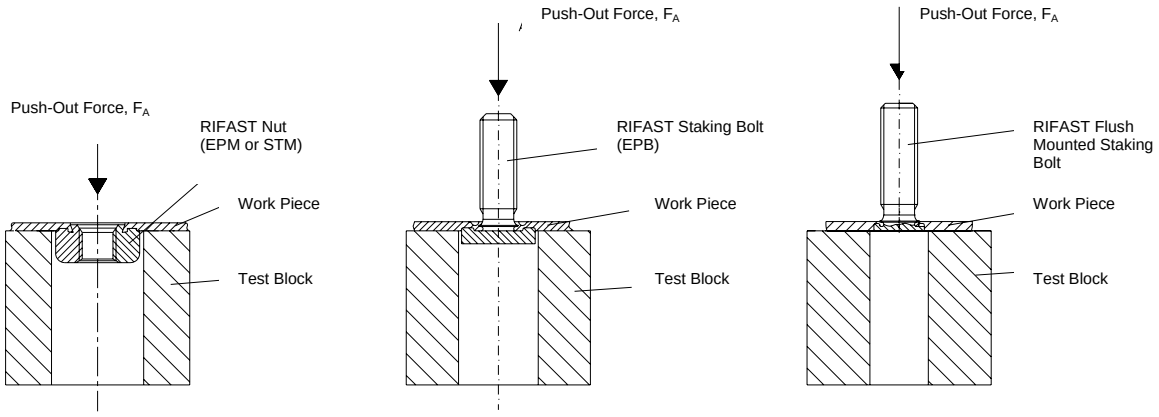
The resistance to axial stress in the push-out direction in the ***RIFAST*** joints should be determined in the push-out test.

In the spirit of Quality Assurance according to DIN ISO 9000, the minimum performance values are listed in this section. These values must be achieved after joint fabrication.

In order to test the joint, a regular sample of the production product should be set aside; for example, for every 1000 pieces produced, 3 parts should be tested.

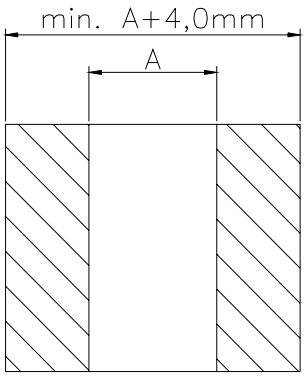
If the minimum performance values are not achieved, the corresponding measurements must be modified. The measurements can be modified, for example, by shimming underneath the base block in the press, thereby pressing the fastener “harder” in the part.

The conditions and procedures used to test push-out strength are specified in the following page.



Push-Out Test

The test pieces in the pictures depict the proper push-out procedure.
For minimum push-out performance, see later tables.



Test Block for Staking Bolts EPB

Nominal Diameter	Diameter A
M6 / M5 Head Diameter 10 mm	Ø11.00 mm
M6 / M5 Head Diameter 12 mm	Ø13.00 mm
M8 Head Diameter 16 mm	Ø17.00 mm
M10 Head Diameter 20 mm	Ø21.00 mm
M12 Head Diameter 22 mm	Ø23.00 mm

Test Block for Flush Mounted Staking Bolts SEB

Nominal Diameter	Diameter A
M4 Head Diameter 6 mm	Ø7.00 mm
M5 Head Diameter 7.2 mm	Ø8.20 mm
M6 Head Diameter 8.2 mm	Ø9.20 mm
M8 Head Diameter 11 mm	Ø12.00 mm

Test Block for Staking Nut EPM

Nominal Diameter	Diameter A
M5 / M6 Outer Diameter 14 mm	Ø15.00 mm
M8 Outer Diameter 16.5 mm	Ø17.50 mm
M10 Outer Diameter 18.5 mm	Ø19.50 mm
M12 Outer Diameter 22.5 mm	Ø23.50 mm

Test Block for Self-Piercing Nut STM

Nominal Diameter	Diameter A
M5 / M6 Outer Diameter 14 mm	Ø15.00 mm
M8 Outer Diameter 16.5 mm	Ø17.50 mm
M10 Outer Diameter 18.5 mm	Ø19.50 mm
M12 Outer Diameter 22.5 mm	Ø23.50 mm

3. Performance of *RIFAST* Flush Mounted Staking Bolts SEB M6 in Steel

Flush Mounted Staking Bolt SEB M6

Plate Thickness (mm)	Push-Out Force (N)	Breakloose Torque (Nm)
1.0	1200	13[1]
1.25	1800	13[1]
1.5	2000	13[1]
1.75	2000	14[1]
2.0	2100	14[1]
2.25	2100	14[1]
2.5	2200	14[1]
3.0	2300	16[1]
3.5	2300	16[1]
4.0	2300	16[1]
5.0	2300	16[1]
6.0	2300	16[1]

(1) Failure through broken bolt or stripped threads in test fastener.
(2) Failure through stripped fastener-test plate joint

All of the above values are minimum values achieved during RIFAST testing!

Under special material and surface conditions, as well as conditions due to tooling, the above performance values may be unattainable. Minimum Breakloose Torque values for Flush Mounted Staking Bolts SEB of property class 8.8 can be found by standard EN ISO 898 part 1 at 12.8 Nm.

The above test data is based on the use of an EN 10130 – Fe P01 test plate.

RIFAST Flush Mounted Staking Bolts can be delivered as follows:

Dimensions:	see Table 4.1
Property Class:	10.9
Thread Point:	according to EN ISO 4753
Coating:	Lite oil or zinc coatings

RIFAST Flush Mounted Staking Bolts can be delivered with non-standard dimensions with sufficient piece count. This includes the following:

Non-standard Threads
Non-standard Lengths
Non-standard Thread-points (Please call)
Non-standard Property Classes
Non-standard Coating Types

It must be observed, however, the construction of standard ***RIFAST*** automation equipment allows a maximum bolt length of L_{max} = 25 mm. Special equipment for longer fasteners can be ordered also.

In order to avoid troubles with the punching head the Flush Mounted Staking Bolt must adhere to the minimum lengths laid out in Table 3.1.

Table 3.1: Minimum lengths of *RIFAST* Flush Mounted Staking Bolts SEB

Thread	M4	M5	M6	M8	M10	M12
Minimum length	8		10	14		

RIFAST Flush Mounted Staking Bolts are quoted in accordance with a standard. This standard is comprised of dimensional layout of the part and further technical information. Thereby the national and international dimensioning standards are taken into consideration.

A layout example will be presented in this standard.

4. Dimensions and Technical Information

Table 4.1 Dimensions of *RIFAST* Flush Mounted Staking Bolts SEB

d	M4	M5	M6	M8	M10	M12
d_h -0.2	4.35	5.35	6.35	8.50		
d_K ± 0.4	6	7.2	8.2	11		
h + 0.2	0.4	0.8	0.9	0.9		
k + 0.1	0.4	0.6	0.7	0.9		
m max.	2.5	3.1	3.6	4.5		
Plate Thickness s	0.6	0.8	1.0	1.0		
l_{min}	8	9	10	12		
l_{max}	25 mm					

8 ribs equally spaced
around the circumference

View A - B

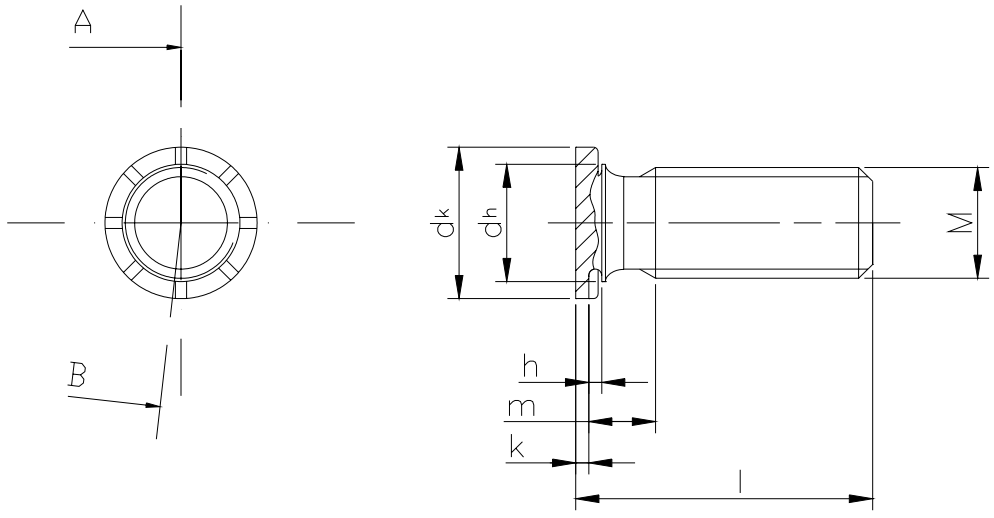


Table 4.2 Standard lengths and weights of *RIFAST* Flush Mounted Staking Bolts SEB

Length, l			**Weight** 7.85 kg/dm^3 in kg per 1,000 pieces				
Nominal	**min.**	**max.**	**M5**	**M6**	**M8**	**M10**	**M12**
10	9.65	10.35					
12	11.65	12.35					
16	15.65	16.35					
20	19.58	20.42					
25	24.58	25.42					

Table 4.3 Technical Information for *RIFAST* Flush Mounted Staking Bolts SEB

Material		**Steel**
General Requirements		DIN ISO 8992
Thread	Tolerance Standard	For fasteners without surface coating 6g DIN 13/12 and DIN 3/15
Mechanical Characteristics	Property class	10.9 12.9
	Standard	DIN ISO 898/1
	Break-Loose Torque of the ***RIFAST*** joint	The minimum achievable breakloose torques and push-out forces
	Push-Out Force of the ***RIFAST*** joint	
Deviation Limits, Form and Position Tolerances	Standard	DIN ISO 4759/1
Surface		Heat treated Black
		DIN 267/2 applies to surface roughness DIN EN 6157 applies to surface defects DIN ISO 4042 applies to galvanized surface protections
Inspection		DIN EN ISO 3269 applies to acceptance inspection

5. Program Summary and Order Layout

RIFAST Flush Mounted Staking Bolts are quoted, as stated before, as different models. Table 2.12 shows a summary of what can be manufactured standard and assembled with standard ***RIFAST*** equipment. Special models are possible.

In order to assure proper delivery, it is important to use the proper layout and descriptions.

RIFAST Flush Mounted Staking Bolts are laid out as follows:

Example Characteristics:

- Type SEB
- Thread: M6
- Nominal Length: 16
- Property Class: 10.9
- Thread Point: LD according to EN ISO 4753
- Coating: Zn yellow

RIFAST Flush Mounted Staking Bolt SEB M6 x 16 mm LD according to EN ISO 4753 - 8.8 Zn yellow

Table 5.1 Standard Models of *RIFAST* Flush Mounted Staking Bolts SEB

Thread	M4 M5 M6 M8 M10 M12
Nominal Length	Tables 2.3 and 2.4, as well as intermediate lengths
Property class/ Material	10.9 12.9 Available upon Request
Thread Point	SD, LD, PC according to EN ISO 4753 or similar, see Table 2.6
Coating	All of the practical standard protective coatings