EPW SCREW

Self extruding high strength screw for thin sheet metal

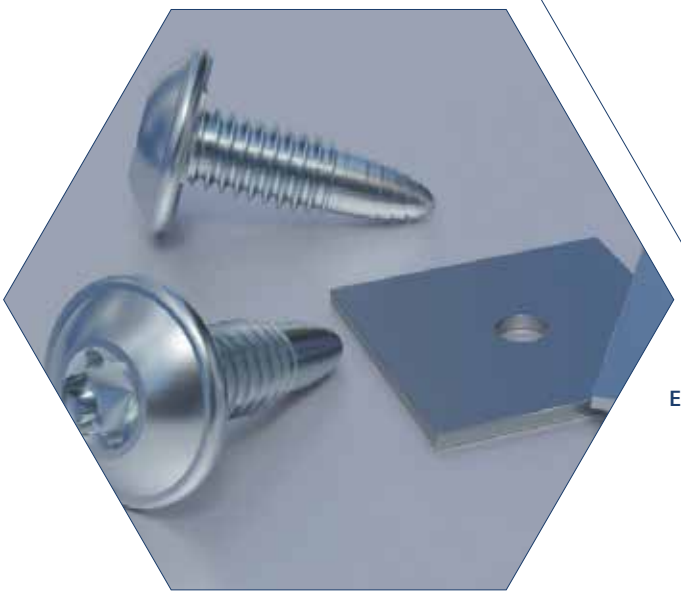
A TR patented fastening solution

Patent number: 2188538

EPW

Self Extruding Screw

TR Fastenings



www.trfastenings.com
sales@trfastenings.com

Edition 2

THE PRODUCT

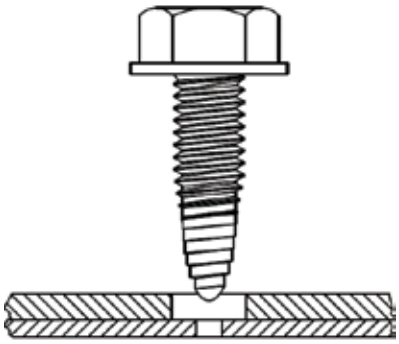
TR has developed and patented a brand new self-extruding thread-form called EPW.

EPW screws create their own female threads in punched thin sheet metal thereby dramatically reducing the cost and time of assembly.

Features and benefits:

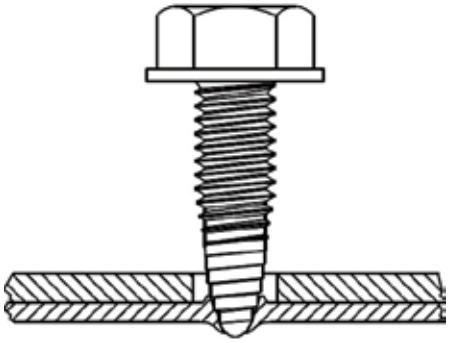
- Removable, strong screw joint
- High stripping torque
- High break loose and prevailing torque
- Excellent vibration resistance
- Combined thread forming and creation of strong extruded profile
- Very high radial compression on screw shank
- Standard machine screws can be used in created thread
- Easy to disassemble and recycle
- Fast, low cost joints
- Can be used for electrical earth connections

1.



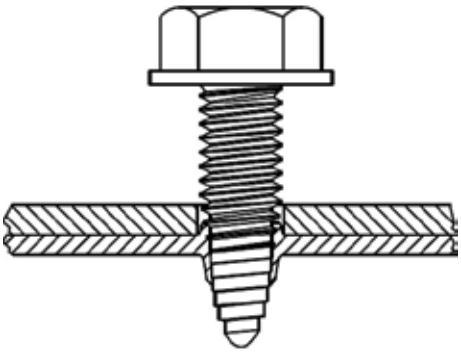
Align the screw to the pilot hole

2.



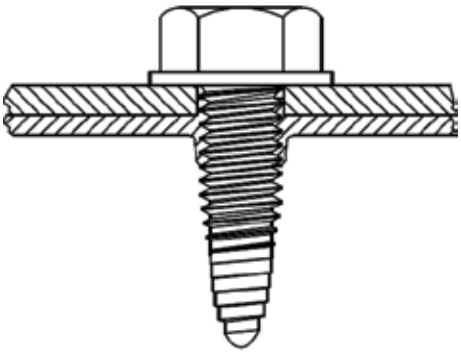
Forming the extruded collar

3.



Combined thread forming and creation of strong extruded profile

4.



Final tightening and clamping

THE DESIGN

Type	EPW	EPW2	EPW3
			
Screw Material	Case hardened mild steel	Case hardened mild steel	Case hardened mild steel
Surfaces	• Chrome VI-free surfaces • White Zinc plated passivated • White Zinc plated passivated+sealant • ZNFe or ZnNi, transparent passivated (with or without black top coats) • Geomet		
Application	Fastening with pre-punched hole	Fastening with pre-punched hole	Fastening with pre-punched hole
Installation material	• Steel 0.4 - 1.0 mm • Aluminium 0.4 - 1.5 mm	• Steel 0.4 - 1.0 mm • Aluminium 0.4 - 1.5 mm	• Steel 0.4 - 1.0 mm • Aluminium 0.4 - 1.5 mm
Characteristics	• Standard forming torque and normal assembly pushing force • Pilot hole diameter about half the nominal screw diameter • Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for • Suited for automated and manual assembly • High joint strength – the extruded profile is about twice the original sheet metal thickness	• Lower forming torque • Pilot hole diameter about half the nominal screw diameter • Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for • Suited for automated and manual assembly • High joint strength – the extruded profile is about twice the original sheet metal thickness	• Lower assembly pushing force • Pilot hole diameter about half the nominal screw diameter • Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for • Suited for automated and manual assembly • High joint strength – the extruded profile is about twice the original sheet metal thickness

DESIGN RECOMMENDATIONS

The usable thread length b of the EPW screw depends on the thickness of S1 and the sheet metal thickness S2.

It is given by: b = S1 + 2 x S2

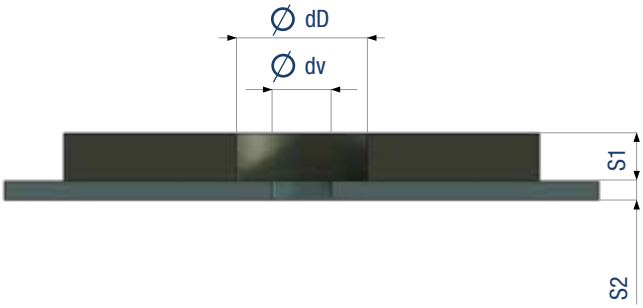
Manufacturing range

EPW screw	M3.5			M4			M5		
	EPW	EPW2	EPW3	EPW	EPW2	EPW3	EPW	EPW2	EPW3
Length: (mm)	USABLE THREAD LENGTH b (mm)								
7	2.7		2.9						
8	3.7		3.9	3.1		3.3			
9	4.7	2.5	4.9	4.1		4.3			
10	5.7	3.5	5.9	5.1	2.5	5.3	2.5		2.7
11	6.7	4.5	6.9	6.1	3.5	6.3	3.5	2.5	3.7
12	7.7	5.5	7.9	7.1	4.5	7.3	4.5	3.5	4.7
13	8.7	6.5	8.9	8.1	5.5	8.3	5.5	4.5	5.7
15	10.7	7.5	10.9	10.1	7.5	10.3	7.5	6.5	7.7

Recommendation hole diameter dv [mm] for EPW

The optimum hole diameter depends on the respective requirement and is stipulated in an application specific way.

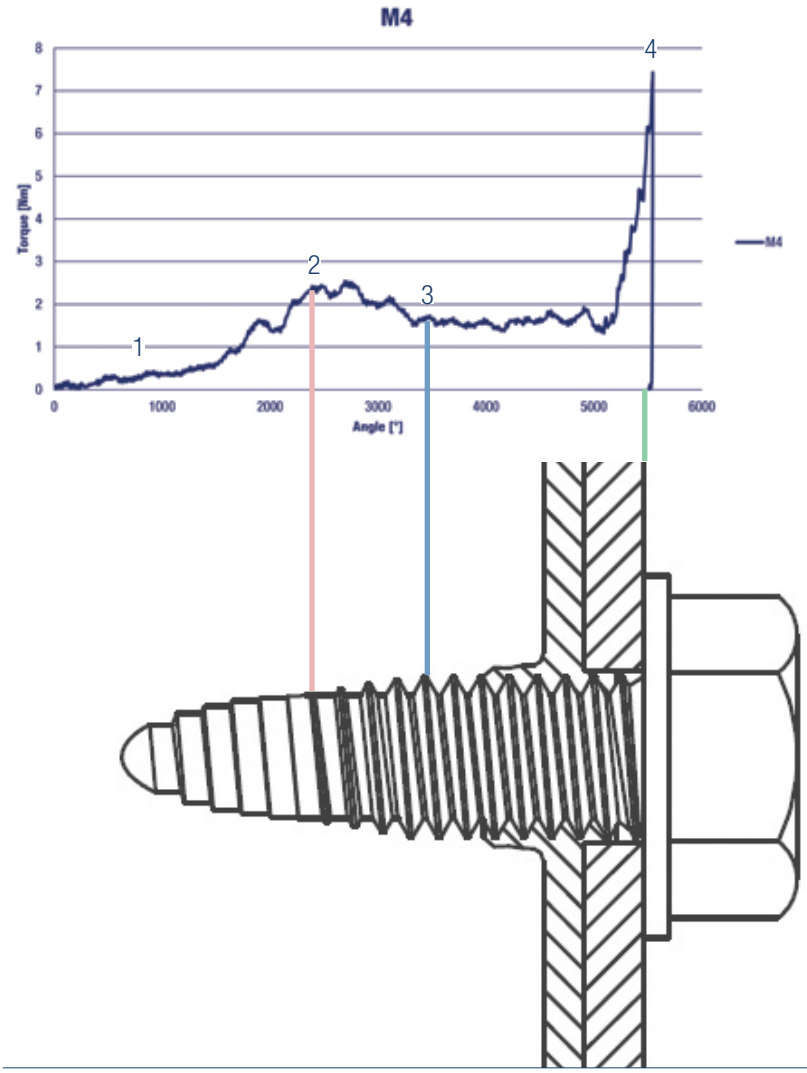
EPW screw / Sheet thickness S2 (mm)	M3.5	M4	M5
0.4	1.2-1.7	1.5-2.0	2.0-2.5
0.5	1.5-1.9	1.6-2.1	2.3-2.9
0.6	1.7-2.1	1.9-2.3	2.6-3.2
0.7	1.9-2.3	2.2-2.6	3.0-3.5
0.8	2.0-2.4	2.5-3.0	3.3-3.8
1	2.3-2.6	2.8-3.3	3.7-4.0



Pilot hole dv for steel
dv: pilot hole diameter
dD: clearance hole

Note: Due to the fact that fastening applications differ greatly, the information provided is for guidance only and is correct to the best of our knowledge. The customer must satisfy themselves with the performance of the fastener and validity of the data. TR Fastenings will not be held responsible for any failure that may occur from the use of this information.

ASSEMBLY RECOMMENDATION



1. Forming the extruded collar
2. Thread forming
3. Engagement of full threads
4. Tightening

The fastening time and flow-drilling process depends on the following parameters:

- Screw diameter
- Type of screw point
- Driver tool speed
- Sheet thickness
- Sheet quality / material specification
- End load
- Part preparation

TR can advise on the correct set up and joint design to deliver the best performance for your application.

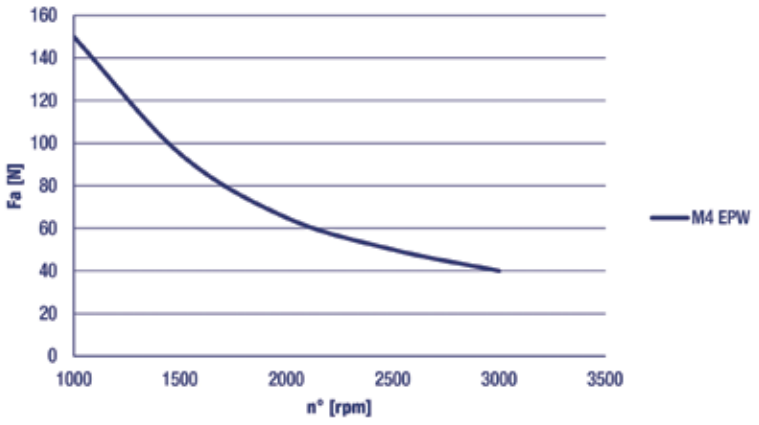
Driver Tool Selection

For the flow-drilling process a certain end load and high driver speed are necessary as well as a certain driver torque for thread forming and tightening.

The necessary assembly data like driver speed and tightening torque are depending on:

- Sheet thickness
- Material strength
- Surface treatment
- Material of the clamped part
- Requirements of the screw joint

End load (pushing force)
- Sheet: C1004 0,80mm
- TR EPW M4 x 9



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UK
t: +44 (0)8454 811 800 f: +44 (0)870 458 7851
e-mail: uk@trfastenings.com

Ireland
t: +353 (0)22 22301 f: +353 (0)22 22056
e-mail: ireland@trfastenings.com

Netherlands
t: +31 (0)541 511515 f: +31 (0)541 517134
e-mail: netherlands@trfastenings.com

Norway
t: +47 67 06 70 00 f: +47 67 06 70 10
e-mail: norway@trfastenings.com

Sweden
t: +46 (0)8 578 44 900 f: +46 (0)8 578 44 950
e-mail: sweden@trfastenings.com

Spain
t: +34 93 647 22 45
e-mail: spain@trfastenings.com

Hungary
t: +36 (06)24 516970 f: +36 (06)24 516961
e-mail: hungary@trfastenings.com

Poland - Representative
t: +48 (22)402 36 14 f: +48 (22)402 36 24
e-mail: poland@trfastenings.com

Italy
t: +39 (0)75 9149015 f: +39 (0)75 9190165
e-mail: info@trvic.it

Germany
t: +49 (0) 5246 . 50320 - 0 f: +49 (0) 5246 . 50320 - 70
e-mail: info@trkuhlmann.com

Slovakia - Representative
m: +421(0)911 012 016
e-mail: slovakia@trfastenings.com

USA
t: +1 800-280-2181 f: +1 281-807-0620
e-mail: usa@trfastenings.com

Singapore
t: +65 6759 6033 f: +65 6759 6022
e-mail: singapore@trfastenings.com

Malaysia
t: +6 (03) 5519 1444 f: +6 (03) 5510 8505
e-mail: psep@psep.com.my

China
t: +86 21 5032 5696 f: +86 21 5032 5775
e-mail: china@trfastenings.com

Taiwan
t: +886 7 557 6366 f: +886 7 557 1977
e-mail: taiwan@trfastenings.com

Philippines - Representative Office
t: +63-25768476
e-mail: philippines@trfastenings.com

India
t: +91 (0)44 4280 3932
e-mail: india@trfastenings.com

Thailand
t: +66(0)20413 340 f: +66(0)20413 340
e-mail: thailand@trfastenings.com

Japan - Representative
t: +81(0)70 4467 1118
e-mail: japan@trfastenings.com

Technical and Innovation Centres

Birmingham - UK
t: +44 (0)121 521 0100 f: +44 (0)121 521 0101
e-mail: wednesbury@trfastenings.com

Gothenburg - Sweden
t: +46 (0)31 31 760 776 f: +46 (0)8 578 44 950
e-mail: sweden@trfastenings.com

CUICAR - South Carolina USA
t: +1 800 280 2181 f: +1 281 807 0620
e-mail: usa@trfastenings.com

sales@trfastenings.com | **www.trfastenings.com** | **info@trfastenings.com**

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