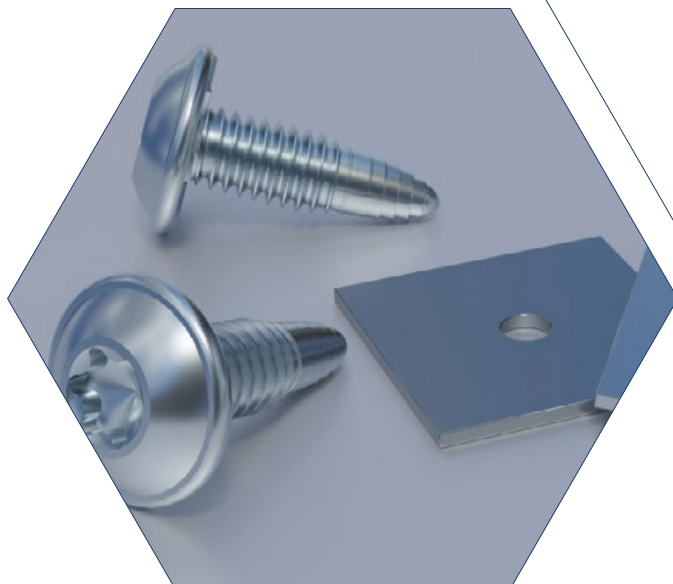
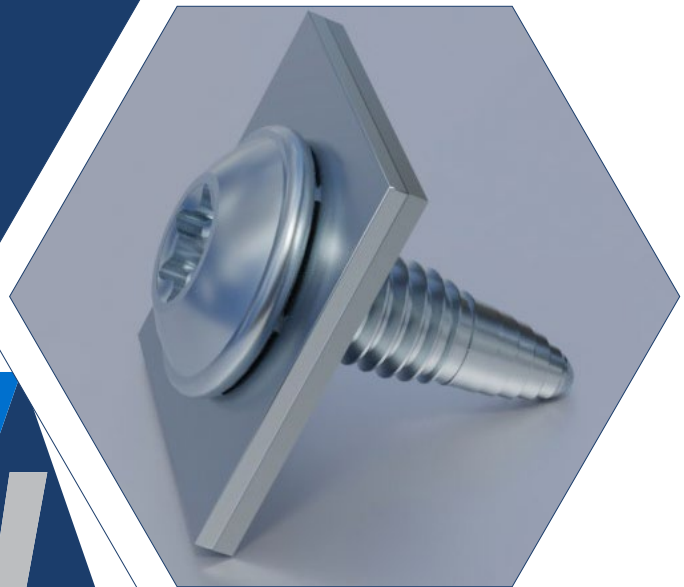


# EPW SCREW

Self extruding high strength  
screw for thin sheet metal

*A TR patented fastening solution*

*Patent number: 2188538*



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Edition 3

# THE PRODUCT

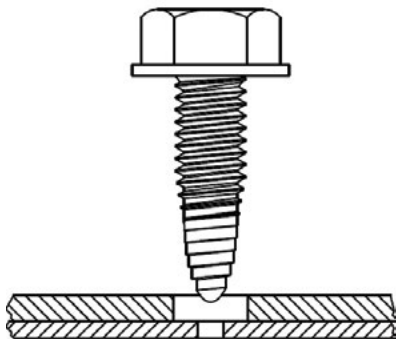
TR has developed and patented a brand new self-extruding thread-form called EPW.

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

## Features and benefits:

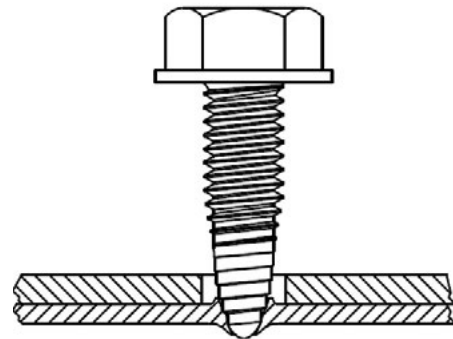
- Removable, strong screw joint
- High stripping torque
- High break loose and prevailing torque
- Excellent vibration resistance
- Combined thread forming and creation of strong extruded profile
- Very high radial compression on screw shank
- Standard machine screws can be used in created thread
- Easy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

1.



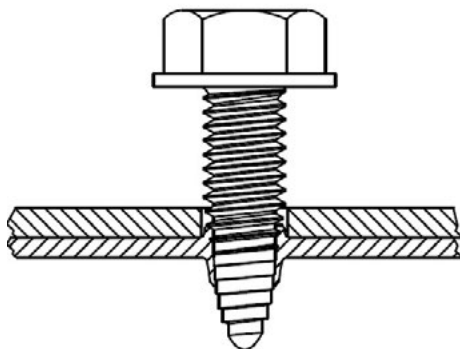
Align the screw to the pilot hole

2.



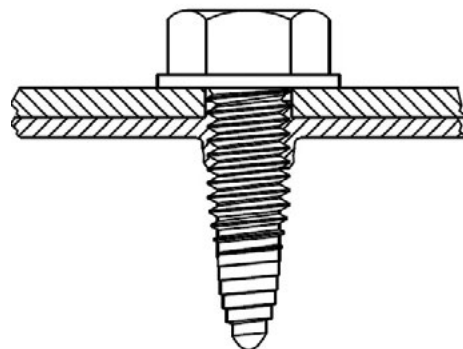
Forming the extruded collar

3.



Combined thread forming and creation of strong extruded profile



4.



Final tightening and clamping

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.

## THE DESIGN

Type	EPW	EPW2	EPW3
			
<b>Screw Material</b>	Case hardened mild steel	Case hardened mild steel	Case hardened mild steel
<b>Surfaces</b>	<ul style="list-style-type: none"> <li>• Chrome VI-free surfaces</li> <li>• White Zinc plated passivated</li> <li>• White Zinc plated passivated+sealant</li> <li>• ZNFe or ZnNi, transparent passivated (with or without black top coats)</li> <li>• Geomet</li> </ul>		
<b>Application</b>	Fastening with pre-punched hole	Fastening with pre-punched hole	Fastening with pre-punched hole
<b>Installation material</b>	<ul style="list-style-type: none"> <li>• Steel 0.4 - 1.0 mm</li> <li>• Aluminium 0.4 - 1.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Steel 0.4 - 1.0 mm</li> <li>• Aluminium 0.4 - 1.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Steel 0.4 - 1.0 mm</li> <li>• Aluminium 0.4 - 1.5 mm</li> </ul>
<b>Characteristics</b>	<ul style="list-style-type: none"> <li>• Standard forming torque and normal assembly pushing force</li> <li>• Pilot hole diameter about half the nominal screw diameter</li> <li>• Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for</li> <li>• Suited for automated and manual assembly</li> <li>• High joint strength – the extruded profile is about twice the original sheet metal thickness</li> </ul>	<ul style="list-style-type: none"> <li>• Lower forming torque</li> <li>• Pilot hole diameter about half the nominal screw diameter</li> <li>• Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for</li> <li>• Suited for automated and manual assembly</li> <li>• High joint strength – the extruded profile is about twice the original sheet metal thickness</li> </ul>	<ul style="list-style-type: none"> <li>• Lower assembly pushing force</li> <li>• Pilot hole diameter about half the nominal screw diameter</li> <li>• Due to the bigger clearance hole compared to the smaller pilot hole, some tolerances can be compensated for</li> <li>• Suited for automated and manual assembly</li> <li>• High joint strength – the extruded profile is about twice the original sheet metal thickness</li> </ul>

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## 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:  $b = S1 + 2 \times S2$

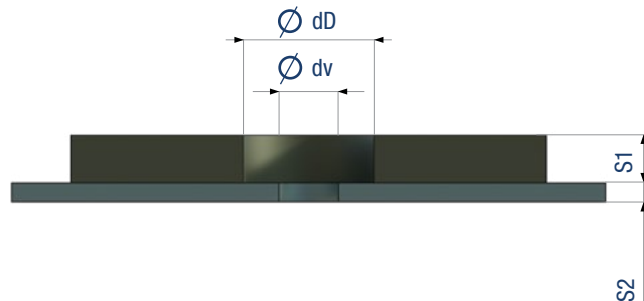
### Manufacturing range

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 $d_v$ [mm] for EPW

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

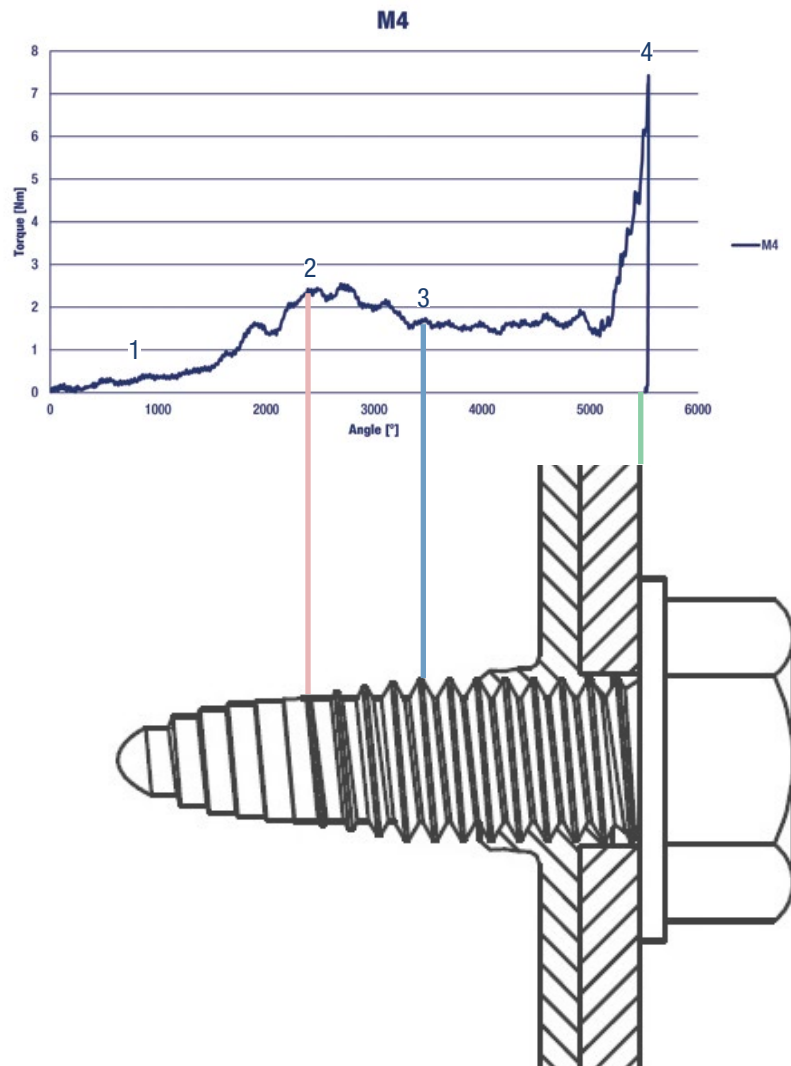
EPW screw	Sheet thickness $S2$ (mm)		
	M3.5	M4	M5
0.4	1.2-1.7	1.5-2.0	2.0-2.5
0.5	1.5-1.9	1.6-2.1	2.3-2.9
0.6	1.7-2.1	1.9-2.3	2.6-3.2
0.7	1.9-2.3	2.2-2.6	3.0-3.5
0.8	2.0-2.4	2.5-3.0	3.3-3.8
1	2.3-2.6	2.8-3.3	3.7-4.0



Pilot hole  $d_v$  for steel  
 $d_v$ : pilot hole diameter  
 $dD$ : clearance hole (=  $\emptyset$  nominal thread +  $0.5 \div 1$ mm)

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## 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.

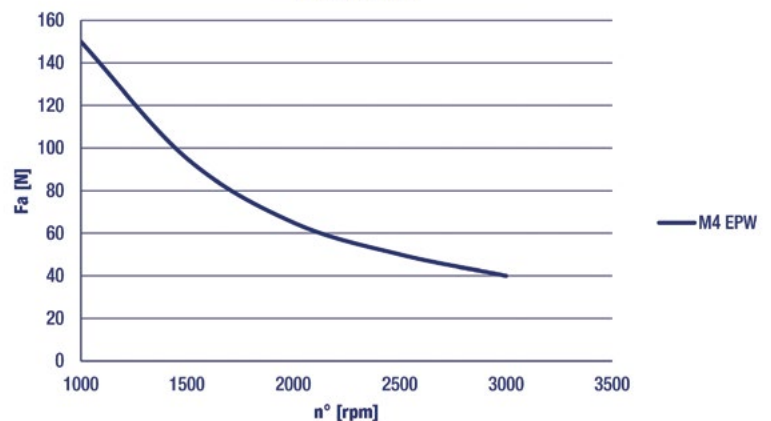
### Driver Tool Selection

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:

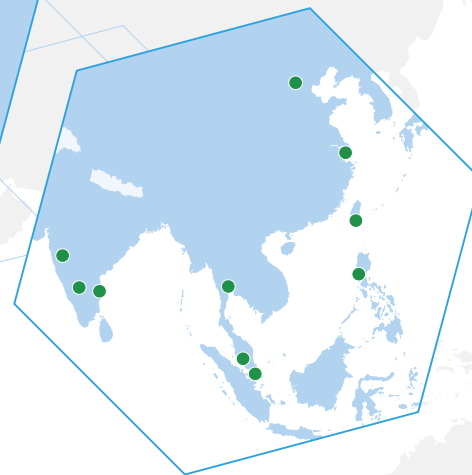
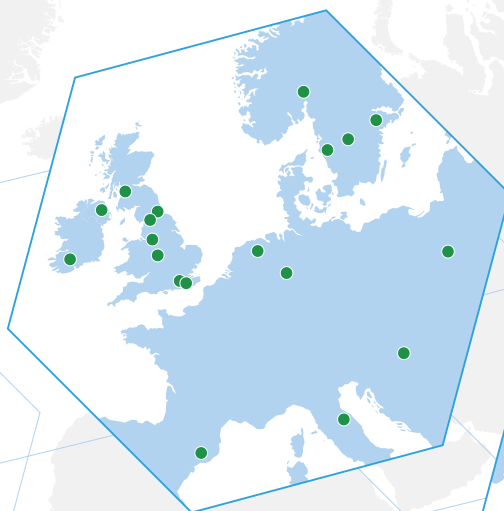
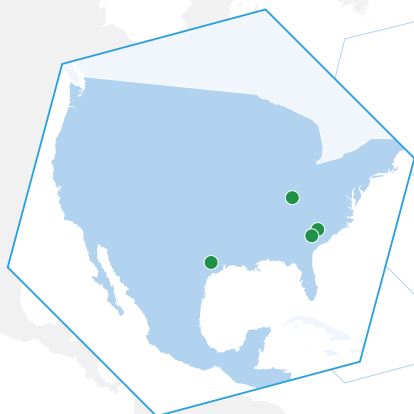
- Sheet thickness
- Material strength
- Surface treatment
- Material of the clamped part
- Requirements of the screw joint

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



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