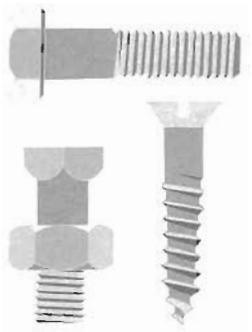

Hole Size Matters

by Joe Greenslade

Below is a list of common tapping screw user's complaints to screw suppliers:

1. The screws strip out.
2. The screws will not seat in the application.
3. The screws break during installation.
4. The screws cause excessive driver bit usage.

Many times a thorough review of the screws reveals that they conform to all of their applicable requirements. The only logical conclusion to reach then is that the user is somehow unintentionally using the tapping screws inappropriately. After the screw supplier determines his screws are not the root cause of the user's assembly problem he must work with the user to help determine the root cause of the problem.

One of the most common assembly mistakes made by tapping screw users is inappropriate hole size selection. Extensive tapping screw hole size guidance is given in Appendix B of the American Society of American Engineers standard for tapping screws, ASME B18.6.4. This document contains recommended hole sizes for the use of all of the standard types of inch tapping screws from #2 through 3/8 inch in a variety of materials having a range of thicknesses from 0.018 through 0.500 inches.

I will not reproduce the entire Appendix B in this article but I will provide excerpts to illustrate what information it does contain.

Hole Size Is Critical To Tapping Screws Performance

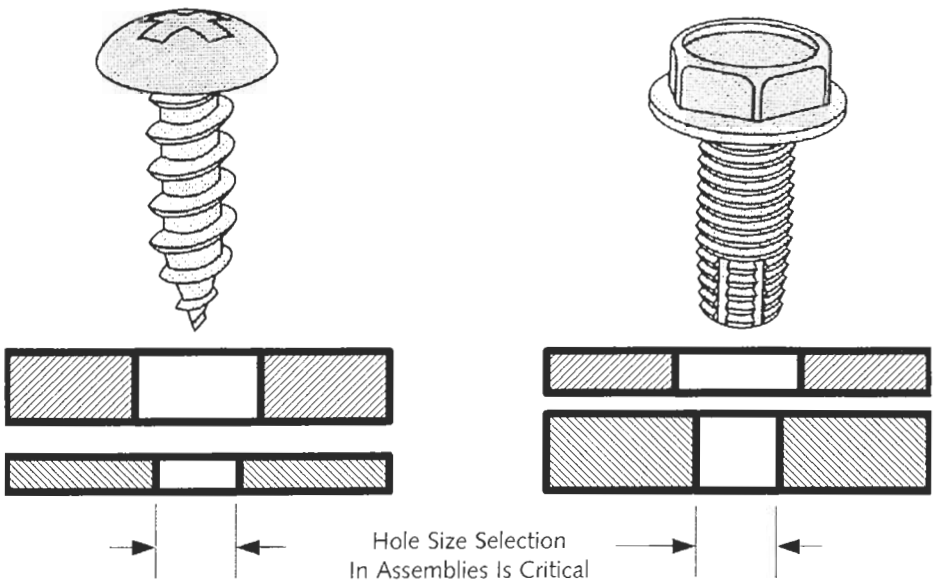

TABLE B1. Approximate Hole Sizes for Steel Type AB Thread Forming Tapping Screws

Metal	Steel, Stainless Steel, Monel, Brass				Aluminum Alloy		
Screw Size	Material Thickness	Pierced or Extruded	Drilled or Clean Punched Hole		Pierced or Extruded	Drilled or Clean Punched Hole	
		Hole Diameter	Hole Diameter	Drill Size No.	Hole Diameter	Hole Diameter	Drill Size No.
#8-18	0.018	0.136					
	0.024	0.136	0.125	1/8	0.136		
	0.030	0.136	0.125	1/8	0.136	0.116	32
	0.036	0.136	0.125	1/8	0.136	0.120	31
	0.048	0.136	0.128	30	0.136	0.128	30
	0.060		0.136	29		0.136	29
	0.075		0.140	28		0.140	28

Joe Greenslade has been active in the fastener industry since 1970. He has held positions with major fastener producers in sales engineering, marketing, product design, manufacturing management, and research and development management.

Mr. Greenslade holds twelve U.S. patents on various fastener related products. He has authored over 136 trade journal articles on fastener applications, manufacturing and quality issues. He is one of the fastener industry's most frequent speakers at trade association meetings and conferences. He is the youngest person ever inducted to the Fastener Industry Hall of Fame.

Mr. Greenslade is active in numerous fastener industry associations and societies holding office in several of them.

In addition to guiding the activities of Greenslade & Company, Mr. Greenslade works as a consultant with fastener suppliers and end users on product design, applications engineering, and quality issues. In this capacity he works to resolve fastener applications problems, to help select the best fastening approaches in new product designs, to assist in the standardization of fasteners used within an organization, and to provide training on various aspects of fastening technology and fastener quality assurance. He also serves as Expert Witness in litigation involving fastener related issues. He can be reached at: phone 817-870-8888, fax 817-870-9199 or email: greensladeandcompany@sbcglobal.net.

TABLE B4. Approximate Hole Sizes for Steel Types D, F, G, and T Thread Cutting Tapping Screws

Metal		Steel		Aluminum Alloy		Cast Iron		Die Cast Zinc and Aluminum	
Screw Size	Material Thickness	Drilled or Clean Punched Hole		Drilled or Clean Punched Hole		Drilled or Clean Punched Hole		Drilled or Clean Punched Hole	
		Hole Diameter	Drill Size No.	Hole Diameter	Drill Size No.	Hole Diameter	Drill Size No.	Hole Diameter	Drill Size No.
#8-32	0.050	0.136	29	0.136	29	0.147	26	0.144	27
	0.060	0.140	28	0.136	29	0.150	25	0.144	27
	0.083	0.140	28	0.136	29	0.150	25	0.144	27
	0.109	0.144	27	0.140	28	0.150	25	0.144	27
	0.125	0.144	27	0.140	28	0.150	25	0.147	26
	0.140	0.147	26	0.144	27	0.150	25	0.147	26
	0.187	0.150	25	0.147	26	0.154	23	0.147	26
	0.250	0.150	25	0.150	25	0.154	23	0.150	25
	0.312	0.150	25	0.150	25	0.154	23	0.150	25

The Appendix B of ASME B18.6.4 is the only location I know of where this information is available. This information is not reproduced in the Industrial Fastener Institute (IFI) Standards Book. All suppliers of tapping screws should obtain a copy of ASME B18.6.4 from the American Society of Mechanical Engineers. ASME can be contacted on the Internet at www.asme.org or by calling 800-843-2763.

Not all screw installation problems are caused by non-conforming screws. Screw suppliers need to have the knowledge and the resource materials to help screw users find the root cause of assembly problems when the screws are not at fault. ■