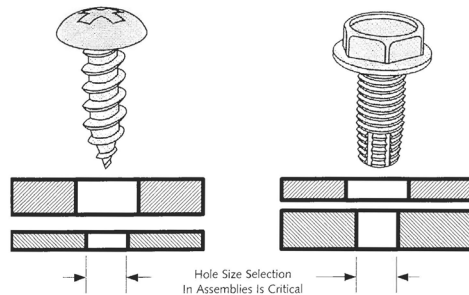


Hole Size Is Critical To Tapping Screws Performance



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 screw break during installation.
4. The screw 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 what the root cause of the problem is.

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:

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 |

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| 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.

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