

300 Series Stainless Steel Thread Rolling Screws Do NOT Work in Stainless Steel Applications

by Joe Greenslade

About twenty-five years ago I learned a hard, expensive lesson about selling 300 series stainless steel (18-8) thread rolling screws. Periodically, after it was too late, I have shared my experience with others who have made the same mistake. I hope this article will help some readers avoid this mistake altogether by knowing the facts before a sizable order of 300 series stainless steel thread rolling screws is already produced and a dispute with a customer has already occurred.

STAINLESS STEEL APPLICATIONS

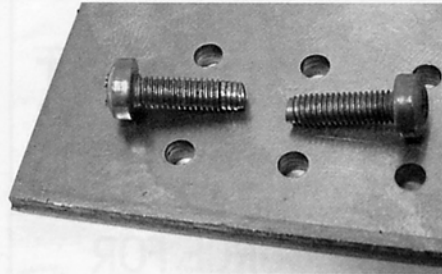
300 series stainless steel is used in applications needing high resistance to corrosion. The applications are frequently related to food processing or the handling of very corrosive chemicals. 300 series stainless steel is difficult to manufacture in all respects including thread tapping.

Occasionally manufacturers of stainless steel products learn about thread rolling screws either on their own, or from information given to them by a screw supplier. The idea that the screw itself will tap the holes in the application instead of the product manufacturer having to pre-tap the holes is very appealing.

Without first trying sample screws, the product manufacturer orders screws and the unaware screw supplier accepts the order. Everything goes well until the screws are shipped and the product manufacturer discovers that the screw threads on all of the screws collapse and deform when driven into the application instead of forming threads as both the user and the supplier anticipated.

INVESTIGATING SCREW FAILURES

At this point the supplier starts looking more closely at the screws and wants to test them. The first thing the supplier does is get a standard drive test plate as specified in SAE J81 or the old IFI-112 and performs the drive



300 (18-8) stainless steel thread rolling screw with collapsed threads after trying to drive into a steel test plate (left) and a screw from the same lot before driving (right)

test. The supplier then discovers that all of the threads on all of the screws also collapse and deform in the test plates. The immediate thought is that there is something wrong with the screws. If the supplier is not the screw manufacturer, the screw manufacturer or importer gets involved to try to solve this mysterious problem.

Eventually, the supplier discovers that SAE J81 and IFI-112 do not apply to any thread rolling screws except those made from low carbon steel. The specifications do not include any grade of stainless steel, 300 (18-8) or 410 stainless steel. The supplier ultimately learns that there is NO specification in existence covering stainless steel thread rolling screws.

The reason there is no standard for stainless steel thread rolling screws is that the standards organizations know that, in general, stainless steel thread rolling screws will NOT form threads in most commonly used materials. Unfortunately, none of the standards actually state this. The standards organizations assume everyone understands this and it does not need to be specifically addressed.

THE REASON 300 STAINLESS STEEL THREAD ROLLING SCREWS FAIL

The reason stainless steel thread rolling screws will not form threads in stainless steel or carbon steel applications is that thread rolling screws will only form threads in mating materials where the screw is substantially harder than the material it is driven into. 300 series stainless steel screws are only slightly harder than the stainless steel or carbon steel into which they are intended to be driven. No matter what hole size they are driven into, or what lubricant is applied to the screws, they are going to fail miserably when driven into stainless or carbon steel applications. 300 series stainless steel screws are generally approximately Rockwell C 25 on their surface where as carbon steel thread rolling screws are Rockwell C 45 minimum on their surface.

WHERE 300 STAINLESS STEEL THREAD ROLLING SCREWS WILL WORK

300 series stainless steel thread rolling screws will perform adequately if driven into aluminum or zinc die cast applications provided they are waxed and the hole size they are driven into is correct. 410 stainless steel thread rolling screws will work marginally in carbon steel applications, but will not work in stainless steel applications.

300 stainless steel thread rolling screw WARNING!

My message to screw users and suppliers is: DO NOT TRY TO USE 300 SERIES STAINLESS STEEL THREAD ROLLING SCREWS IN STAINLESS STEEL OR CARBON STEEL APPLICATIONS!

To do so is to waste time and money, and to jeopardize the supplier-user relationship. I learned this the hard way. I hope others will read this and learn it the easier, much less expensive way. ■

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.

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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.

