

## Metal Building Systems Information



## 410 Stainless Steel Sheeting Screws

Over the years, there have been questions regarding stainless steel materials. We would like to clarify a couple of points regarding 410 and 18-8 stainless steel.

Stainless steels are alloys of iron which contain a minimum of 10.5% chromium. Generally, the more chromium the more corrosion resistance. 410 stainless steel contains 11.5% to 13.5% chromium along with a carbon content of 15%. These elements along with others, allows the material to be heat treated. This produces a higher strength than 18-8 stainless steel so that self-drilling fasteners can be produced.

410 stainless steel is also magnetic, which allows the use of magnetic sockets during installation.

### Tapping Screws

410 steel tapping screws were first used for sheeting metal buildings in the early 1950's. Since then their use has increased steadily, and now these screws are used in many applications in the metal sheeting industry.

With a few exceptions, the performance of these screws has been outstanding in every respect.

The exceptions can be traced directly to improper manufacturing techniques which resulted in either rusted or broken screws.

410 screws must be bright hardened in the proper atmosphere and never should be carburized or carbonitrided in the manner carbon steel screws are treated. Improper hardening of this kind will result in premature discoloration which can be quite extensive.

When properly heat treated, 410 screws reach extreme high-strength levels-much higher than carbon steel screws. While this is both necessary and desirable, it increases the danger of hydrogen embrittlement resulting from improper processing.

The hydrogen danger usually results from electroplating without the required post-plating treatment.

This problem is completely eliminated with mechanical plating, and that is why Atlas uses the mechanical process for all 410 screws.

Correct hardening will provide a very bright screw with no case or extra surface hardness. Even though the screw may have a core hardness of Rockwell C40 or higher, this is not sufficient for thread forming in structural steel without a

surface lubricant. Therefore, we zinc plate all these screws for lubricity.

### Self-Drilling Screws

Users of 410 tapping screws who have changed or are contemplating a change to 410 self-drilling screws should be armed with some very important information.

Both screws are made from the same steel, but there the similarity ends.

To be self-drilling, a high surface hardness or case is required.

The surface hardness can be developed by carburizing or carbonitriding in the same manner that carbon steel drill screws are heat treated. In fact, some manufacturers are heat treating in that manner.

This, however, is a mistake because it results in a heavy carbon deposit on the screw surface which is extremely vulnerable to oxidation and early development of extensive red rust.

We must point out that this is a cosmetic problem only because the deterioration will not continue after the very thin case has been dissipated by oxidation.

410 drill screws should be bright hardened in a furnace specifically designed for this type of heat treatment. Such furnaces utilize an atmosphere of hydrogen, nitrogen and ammonia and operate at much higher temperatures than ordinary carbonitriding furnaces.

Atlas is operating such a furnace in the Ashland plant and, as far as we know, it is the only furnace of this type in our industry. This explains why Atlas is supplying most of the 410 drill screws going into the metal building market.

## Specify Atlas 410 Screws



**Atlas Bolt & Screw Company**  
1628 Troy Road, Ashland, Ohio 44805