



## "Tech Tips"

To Murray Customers Only:

### Magnetism:

Most worm drive hose clamps use some grade or grades of stainless steel in their construction. Historically buyers and users of clamps alike... would pull out a magnet and check the clamps for magnetic attraction. This "test" is intended to separate good clamps from lesser clamps. And while there is some truth to be found in the practice... it can be misleading... and here is why.

There are many classes of stainless steels... and many grades within these classes. Overall... the topic of stainless steel is far too complicated to address in a short bulletin.

However... most worm drive clamps are usually made from Austenitic stainless steel. These are typically grades 201, 301, 304 (W4 in Europe), and 316 (W5 in Europe). As these materials are produced at the mill... they are in the full annealed condition... and only in the full annealed condition will they have zero magnetic attraction. The problem is that being fully annealed these materials are far too soft and weak for use in a worm drive clamp... and they must be strengthened.

Austenitic stainless cannot be strengthened by heat treatment... and can only be strengthened by cold working. This involves rolling the soft material down to thinner gages. When these materials are rolled down... they do become stronger and harder... but they also pick up some degree of magnetic attraction.

One argument that can now be made is that magnetic attraction is really a good thing because it is an indicator of a stronger part... and this is true!

Also to be considered is that as we go from grade 201 up to grade 316 stainless... there are increasing percentages of Chromium and Nickel. These are the two primary alloys which make steel "stainless". With the increasing alloy percentages there is a shift in how much magnetism will be induced... so we really should not be comparing clamps made from different grades because they work harden at different rates.

The magnet test is however... very useful for detecting plated carbon steel screws... and bright hardened 410 stainless screws. Both of which are highly magnetic... have much lower corrosion resistance than the Austenitic grades mentioned above... and almost the same luster.

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