Vortex Antenna Systems
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How to reduce the possibility of 'Galling' (Cold-Welding)

What is Thread Galling?
Thread galling occurs during installation when pressure and friction cause bolt threads to seize to the threads of a nut or tapped hole. It is also known as "Cold welding".

Once a fastener has seized up from galling it is typically impossible to remove without cutting the bolt or splitting the nut.

What Bolts Are Susceptible To Galling?
Galling is most often seen in stainless steel especially when using nyloc nuts.

What Can I Do to Prevent Galling?

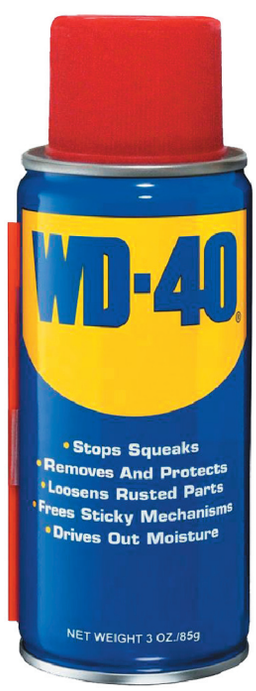
Slow Down Installation Speed
Because heat generated by friction is a contributing factor in galling, slowing down the installation speed can prevent galling. It is recommended that power tools not be used for the installation of stainless steel or other fasteners prone to galling. This is especially important when using nylon insert lock nuts as these nuts significantly increase the chance of galling.

Use a Lubricant - Most Important!
Special anti-seizing or anti-galling lubricants can be used to dramatically reduce the chance of galling. Even a standard lubricant, such as **WD-40®**, can help reduce friction and prevent galling.

Use Extra Care With Lock Nuts
Nylon insert lock nuts and, especially, prevailing torque nuts generate a large amount of friction and heat during installation. If you are experiencing galling problems, slow down the installation speed.

If a Fastener Begins to Bind: STOP
If a fastener begins to bind before you are actually tightening it down, stop immediately. Wait a minute or two to allow any heat to dissipate and then back the fastener off. Inspect the threads for damage loosen and try again with a new nut.

Why Are Stainless Bolts Prone to Galling?
Stainless, aluminum, and titanium fasteners form thin protective oxide films on their exposed surfaces that prevent corrosion. In addition, this coating reduces friction and prevents direct metal to metal contact during fastening.



The protective oxide film can be rubbed or scraped off under the pressure and movement of the fastener being tightened. When this happens these relatively soft metals come into direct contact. Friction increases and the chance of galling increases significantly.

What Is Actually Happening?
Thread surfaces have microscopic high points that can rub together during fastening. In most cases this does not present a problem as the points slide over each other without damage.

Under certain conditions however, the surfaces will not slide past each other. The high points will then shear and lock together, greatly increasing friction and heat.

As tightening continues the increased pressure results in more material being sheared off the threads. This cycle continues with even more shearing and locking until the threads are destroyed and the fastener will no longer turn in either direction.