

TECHNICAL BULLETIN 1



“Binding” or “galling” of stainless steel threads on Polyfab Pro Shade Sail Hardware. Note that it is stated on the Polyfab parts list—“It is recommended that an anti-seize product be used on turnbuckle threads to minimize binding.”:

“Thread galling is a common, yet seldom understood problem with threaded fasteners. Galling, often referred to as a cold-welding process, can occur when the surfaces of male and female threads are placed under heavy pressure.

Stainless steel fasteners are particularly susceptible to thread galling, although it also occurs in other alloys that self-generate an oxide surface film, such as aluminum and titanium. During the tightening of the fastener, pressure builds between the contacting thread surfaces and breaks down the protective oxide coatings. With the absence of the oxide coating, the metal high points of the threads are exposed to one another, which increases friction. The combination of these two events can generate enough heat to fuse and seize the nut and bolt together.”¹

We see this when a customer attempts to install a shade sail and uses the turnbuckles alone to rapidly tension the shade, or uses a power driver to tighten stainless hex nuts. The combination of heat and pressure causes the galling effect. Then we get a call from the customer or the distributor, claiming that the fittings are defective. This is not a product defect, but the nature of the stainless fitting that can be mitigated by proper installation techniques and lubrication.

“Galling can be minimized with the following measures:

Thread lubrication is one of the most effective measures to decrease the potential for galling. The lubricant reduces friction, which is a key element in thread galling. There are some outstanding PTFE based coatings that can be applied to stainless steel fasteners. They are able to drastically reduce the frictional coefficient.”¹

There are a number of anti-seize products on the market. One of these is called Tef-Gel, available in a syringe for easy disbursement:



The other way to minimize galling is by using proper installation techniques. When attaching a cable-edged shade sail, install the hardware loosely (the turnbuckles should start between half-open to full-open), then hand-tighten the cable and clamp it together.



So now that the shade sail is moderately taut and all the corners are attached. The turnbuckles have threads available, so all the installer has to do is go around to all the corners and slowly tighten each a few turns at a time (like installing lug nuts on a car wheel) until the shade sail is “just tight”.

For a webbing-edged shade sail, or if the installer can’t pull the corner close enough to the attachment point at first, he can use a piece of rope or a ratcheting “come along” device, available from any hardware store, to gently pull the corner close enough to the attachment point to loosely attach the turnbuckle:



Then go around to all the corners and slowly tighten each turnbuckle a few turns at a time until the shade sail is “just tight”.

¹ Fastenal Engineering & Design Support (<http://www.fastenal.com/content/feds/pdf/Article%20-%20Galling.pdf>)