



# GALLING: ITS CAUSES AND PREVENTION

Factors	Consequences	Prevention
Lack of Awareness	Cold Welding	Knowledge
Stainless Steel Hardware	Broken & Damaged Parts	Educate
High Speed Drivers	Delays	Anti-Seize
Impact Drivers	Increased Costs	Reduce Driver Speed
Friction & Heat	Decreased Profits	Store Hardware away from Direct Sunlight
Sun Exposed Hardware (Hot)		

**NOTE:** PLP Solar does not warranty hardware or permit consequential damages where galling has occurred. The party overseeing the assembly and installation of the PLP Solar product is responsible for taking proper preventative measures to prevent galling. Some preventative measures are identified within this document.

Galling is a misunderstood phenomena that can negatively affect hardware but few take the time to learn about. As a result, when galling occurs, many mistakenly assume that faulty hardware or a poorly designed system must be the cause. If you're working with stainless steel hardware or have employees doing so, it is in your best interest to understand galling and to teach your workers not only how and why it occurs, but more importantly, how to prevent it. These simple actions could save you time, money, and aggravation.

## Causes of Galling

Galling is a form of wear caused by friction, and can result in metal surfaces being friction-welded together. Under the right set of circumstances, galling can easily develop between the threads of stainless steel nuts and bolts, in particular those with coarse threads. As fasteners are tightened, the pressure that builds up between the contacting thread surfaces breaks down the protective oxide coating into small shavings. These shavings interlock and eventually generate enough heat to fuse (cold weld) the nut and bolt together. All this can happen in an instant, especially when using a high speed driver and/or impact driver. But it can also happen with a simple hand held wrench, particularly if the stainless steel hardware is thermally heated from sun exposure and/or from sitting on a hot rooftop surface.

Galled hardware usually cannot be taken apart but must be cut or broken for removal and replacement. Unfortunately, this type of action may also damage the very parts secured by the hardware. Fortunately, galling can be avoided by implementing certain preventative measures and educating everyone at the job site about galling.

## Prevention

- (1) Always apply an anti-seize lubricant to the threads. A molybdenum disulfide or silver grade variety is preferred and is available in tubes, cans or aerosol dispensers. Apply in small amounts directly to the threads before assembly.
- (2) NEVER use an impact driver and if using a high speed driver, set it to a slow speed. Remember, high speeds generate more heat and friction leading to galling. High driver speeds do not equate to faster job completion or higher profits if galling occurs.
- (3) Before installing, keep stainless steel fasteners out of direct sunlight and away from heat sources like hot rooftops. Remember, thermally heated fasteners contribute to galling.