

# Galling

Why stainless fasteners seize during tightening — and how to stop it.

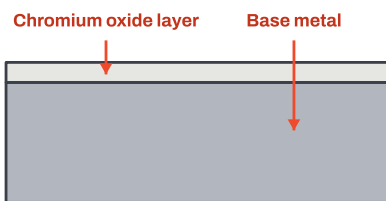
Galling — also called seizing, cold welding or pick-up — happens when two metal surfaces are pressed together hard enough that they bond rather than slide. Stainless steel accounts for the majority of cases.

Stainless owes its corrosion resistance to a self-generating passive layer of chromium oxide, which shields the metal beneath from oxygen and moisture. As a stainless nut runs down a stainless bolt, friction scrapes that layer away. The exposed base metals make direct contact and weld together, and continued tightening strips the thread or twists the fastener off.

## HOW THE PASSIVE LAYER BEHAVES

### STEP 1

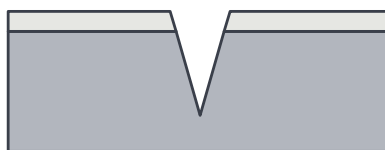
#### Chromium oxide layer



Intact surface — a thin chromium oxide layer sits over the base metal.

### STEP 2

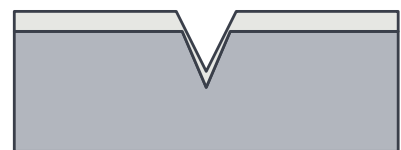
#### Scratched through



A scratch cuts through the oxide layer, exposing bare base metal.

### STEP 3

#### Passive layer reforms



Chromium in the base metal re-oxidises, forming a new passive layer.

## Reducing the risk

Three things make galling far less likely:

- **Slow the installation speed**

Run the driver at low RPM. The faster the thread turns, the more heat builds at the flanks — and heat is what drives the two surfaces to weld.

- **Lubricate the threads**

An anti-seize compound keeps the mating surfaces apart and carries heat away.

- **Mix the grades**

Where the application allows, pair a grade 304 nut with a grade 316 bolt, or vice versa. Dissimilar grades resist bonding far better than identical ones.

You may need one or all three to eliminate galling. It does not happen often — but when it does, a seized fastener is expensive to remove.