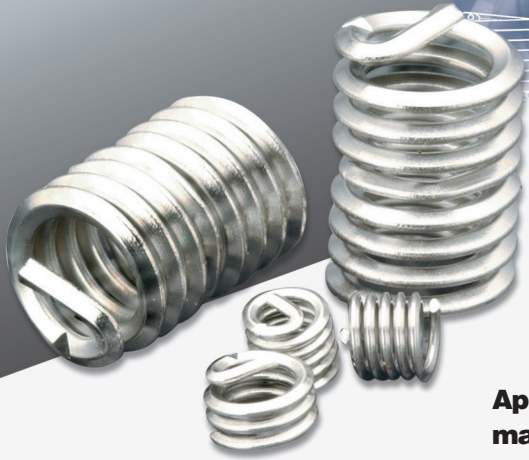




HeliCoil®

Gall Resistant Inserts

Help Semiconductor Manufacturer Clean Up



Application: Nano-manufacturing machinery components for semi-conductor fabrication

Challenge

A global semi-conductor machinery manufacturing company had been utilizing electro-polished screws as well as lubricated thread-enhancing devices to maintain the structural integrity of the framework of a variety of systems used to process silicon wafers.

Electro-polished fasteners are costly and most, if not all, lubricating agents generate residue unacceptable in clean room and vacuum environments. This combination of factors led the company to seek alternatives that would reduce cost while meeting stringent clean room requirements.

Customer Requirements

- Provide a strength-enhancing fastening device
- Debris-free assembly
- Simplified assembly

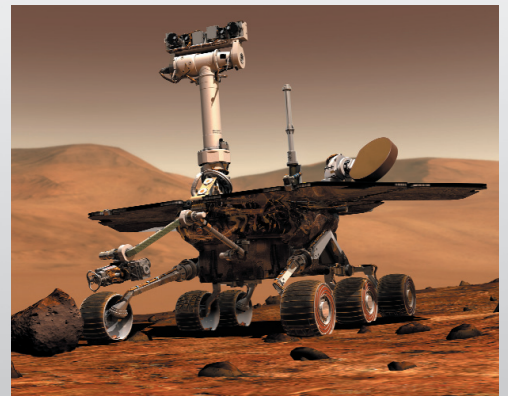
Solutions

Emhart engineers developed a traditional style Heli-Coil® wire insert utilizing a new material: Nitronic 60™. Nitronic 60 is an inherently gall resistant material with strength characteristics similar to 304 Stainless Steel. The great benefit of this material is that it provides

lubricity without the need for external lubricants. The resulting insert provides strong reusable threaded joints, free of foreign particles and residues. The new inserts are marketed as Gall Resistant inserts and are available exclusively from Emhart Teknologies.

Features & Benefits

- Manufactured from corrosion resistant Nitronic 60 Stainless Steel
- Reduces friction during installation
- Increases joint strength through uniform load distribution
- Particle and gall free
- Requires no potentially contaminating lubricants
- 100% non-magnetic
- Ideal for use in vacuum environments
- Requires no additional coating or plating



Gall Resistant inserts are ideal where there is no margin for error.

HeliCoil® Gall Resistant Inserts

Testing was performed using #10-32 standard tapped hole blocks prepared in 316 grade stainless steel material. #10-32 STI holes were prepared to Heli-Coil® specifications in aluminum material. Gall Resistant inserts were installed and tangs removed. Tests were performed using both plain and chemically polished 316 stainless steel screws. Torque tests were conducted with the test blocks correctly aligned as well as mis-aligned by 2.2 and 4.4 degrees from perpendicular. The torque was recorded for the 20 screws in each combination, during the 10 insertions for each screw. (Figure 1.)

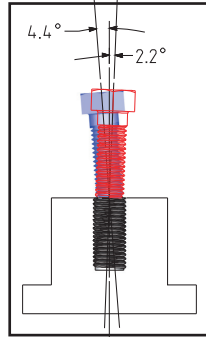
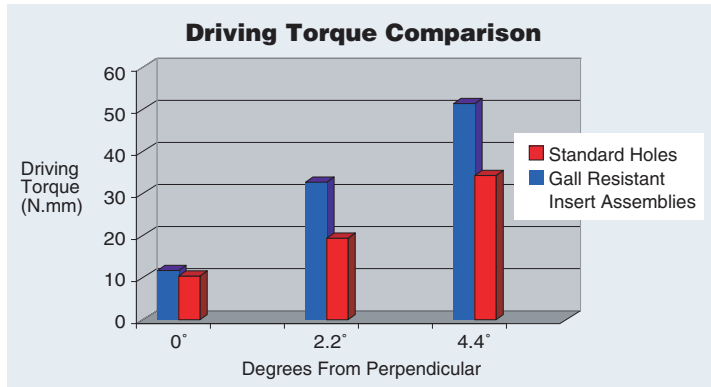
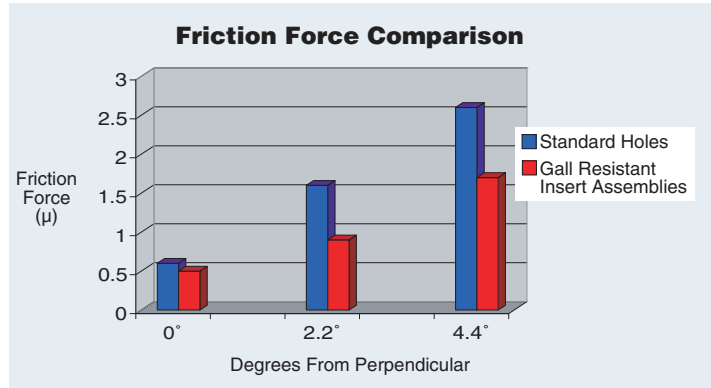


Figure 1

Based on the testing completed, Heli-Coil® Gall Resistant inserts provide superior gall resisting characteristics compared to standard tapped holes fitted with inserts made of 300 series stainless steel. Gall Resistant inserts also provide increased compensation for mis-alignment of both assemblies and fasteners. Because of the reduction in friction, Gall Resistant inserts provide a more consistent, true clamping torque in the fastener assembly.



Nitronic 60 Material Specifications (UNS S21800)

Temperature range: up to 500°F
 Tensile: 200,000 PSI
 Hardness: RHc 43-50
 Corrosion resistance: Moderate
 Magnetic Permeability: <1 G/o

Americas

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