



**STANLEY®**  
Engineered Fastening

**Spectralock®**  
Self-Locking Bolt

**OPTIA®**

# Spectralock<sup>®</sup>

Self-locking bolt for use with a standard 60-degree threaded hole



Loosening is one of the most critical failures in fastened joints. Vibration, preload and material strength are the most significant factors contributing to fastener loosening, especially in moving parts.

Common ancillary devices to address fastener loosening include:

- Adhesives
- Patch bolts
- Split washers, star washers
- Serrations
- Jam nuts
- Lockwire
- Castle nuts with cotter pins
- Tab locks
- Prevailing torque
  - » All metal
  - » Nylon ring
  - » Interference fit

## Introducing Spectralock<sup>®</sup>

Spectralock modifies basic joint behavior instead of relying on thread friction. Its asymmetric thread design limits the clearance between threads to create three specific contact points engaging with the female thread form. The Spectralock patented design is an advantageous fastening solution which allows for a standard female threaded hole to utilize this self-locking bolt for consistent locking and reusability in situations where cyclic or high temperatures are present and severe vibration occurs.

## Key Competitive/ Value Added Features:

- High vibration loosening performance
- High seating torque
- High off-torque
  - » Multiple contact points
- Better pull-out strength
- Critical stress intensity is shifted

## Unique Selling Features:

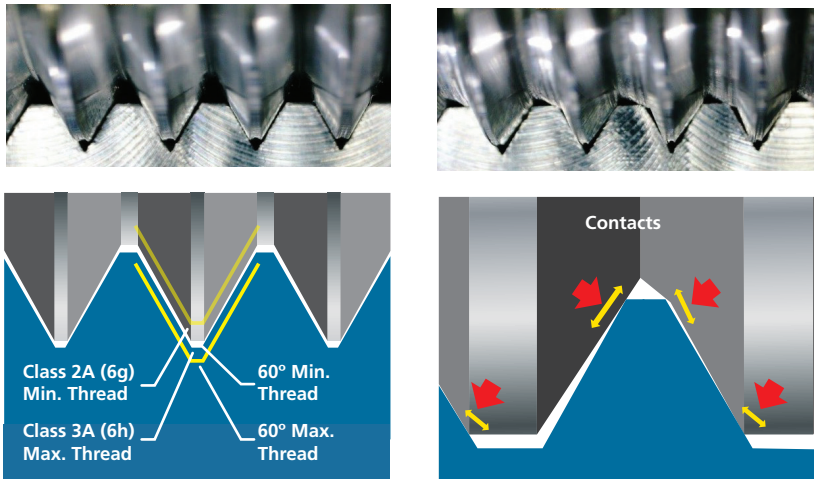
- Vibration loosening resistance
- High pre-load torque and high off-load torque
- Easy run-in
- Distribute tightened load evenly at root diameter
- Minimized fatigue failure
- Elimination of the use of patching

## Thread Tolerances Restraining Design

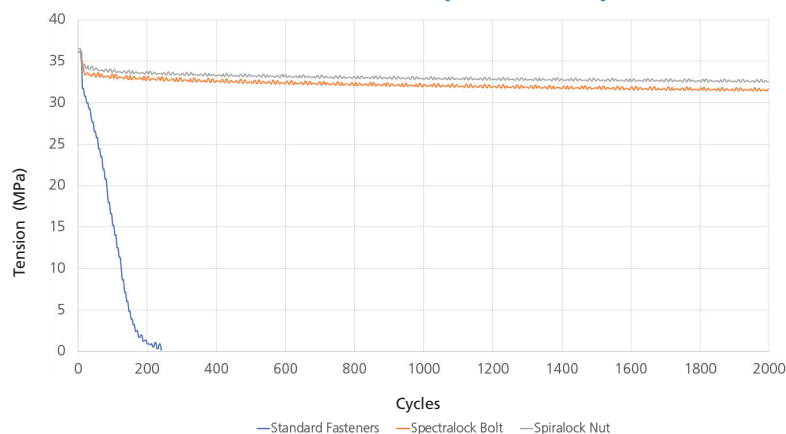
To create the anchoring points for eliminating the degree of movement under extreme vibration.

- Major thread crest locked with female thread
- Minor thread root locked with female thread
- Compatible with both metric and inch external thread tolerances
- Prevents vibration-induced movement from the 3 critical contacts points
- Unique features of the design:
  - » Higher vibration loosening performance
  - » Better pull out strength
  - » Critical stress intensity is now shifted to the minor diameter (shank)

Poly-directional thread tolerances enable multiple contact points on the female thread against the Spectralock bolt geometry to ensure a self-locking threaded assembly.



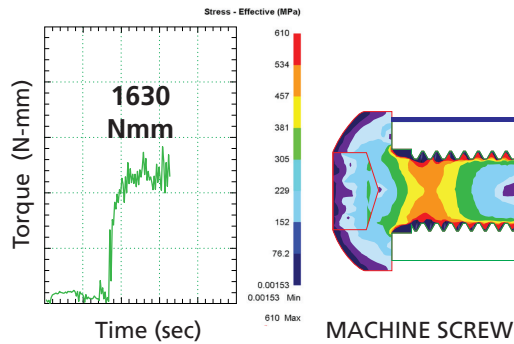
## Junker Vibration Test for M10 Spiralock®, Spectralock® and Standard Fasteners



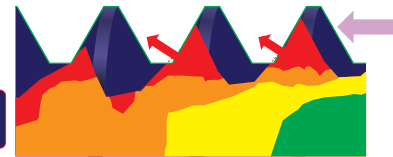
Spectralock design was proven to have superior vibration loosening resistance and performance.

## Higher Thread Strength

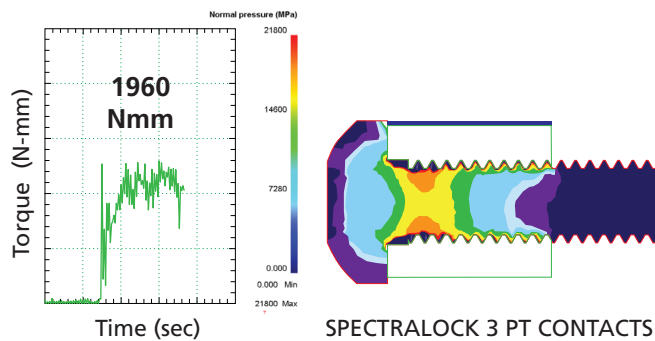
- Stress intensity is located at the root of the thread profile, creating higher surface contact area resulting in improved fastener strength
- At the same loading condition in this simulation:



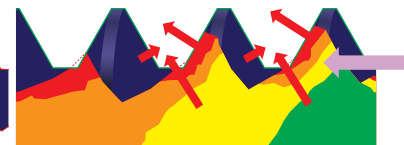
### Stress Distribution



The machined screw has failed (thread will strip out).



### Stress Distribution



Spectralock sample showed stress at the root of the thread and tip of the thread has yet to reach breaking load.

**STANLEY**  
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