



SPECTRALOCK®

HIGH PERFORMANCE THREAD LOCKING WITH ANTI VIBRATION LOOSENING SOLUTIONS

Spectralock®

HIGH PERFORMANCE THREAD LOCKING WITH ANTI-VIBRATION LOOSENING SOLUTIONS

Loosening is one of the significant failure in fasteners. Vibration, Preload, Material strength are the significant contributions factors that causes the loosening. Also, loosening occurred most often on moving parts. This invention is to introduce a new patented design with better features to prevent loosening of the fastener during application with superior anti-vibration performances.



Key Competitive / Value Add Features of Spectralock®	Current Approach / Customer Problem &/or Needs
<ul style="list-style-type: none">• High vibration loosening performances• High Seating Torque• High Off-torque• Better pull out strength• Critical Stress Intensity is now shifted to the minor diameter (shank). <p>Unique Features</p> <ul style="list-style-type: none">✓ Resists vibration loosening✓ High pre-load torque and High off-load torque✓ Easy run-in✓ Distribute tightened load evenly at root diameter✓ Minimized fatigue failure	<ul style="list-style-type: none">• LOCTITE, PATCHING or WASHERS and Other locking devices including Spiralock.• WARRANTY ISSUES WITH CUSTOMER'S CURRENT PRODUCTS• LOOSENING ISSUES ON TESTING OF NEW PRODUCTS• SIMPLE FIX

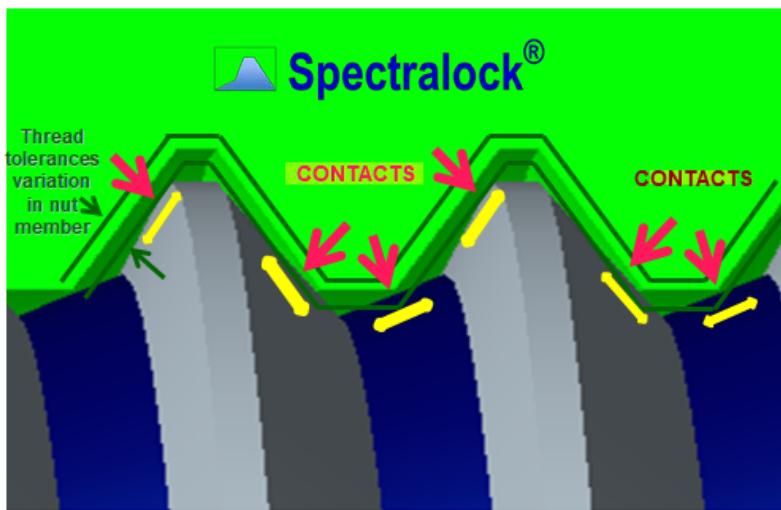


Unique Feature:

1. Poly-directional thread tolerances compensation for locking performances

Thread Tolerances Restraining Design:

→ To create the anchoring points for eliminating the degree of movements (x, y & z directions) during vibration movements.



DESIGN FEATURES:

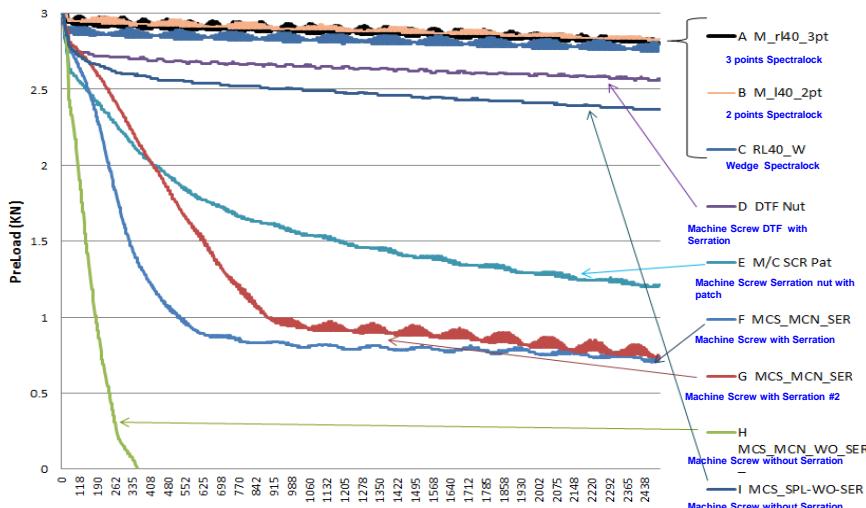
- ✓ Asymmetric thread:
 - ✓ 22°,
 - ✓ 35°, and
 - ✓ 27°.
- ✓ Major thread crest locked with female thread.
- ✓ Minor thread root locked with female thread.
- ✓ Compatible for both metric and inches internal threads tolerances
- ✓ Prevents vibration-induced movements through the 3 critical contacts points
- ✓ Unique features from this new designs:
 - Higher vibration loosening performances
 - Better pull out strength
 - Critical Stress Intensity factor is now at the minor diameter (shank)

2. Vibration loosening performances

SAMPLE TYPE / NO		PRELOAD KN	# CYCLES @ 10Hz	REMAINING PRELOAD KN	REMAINING PRELOAD %
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A	8M_tp5_rI40_25_15_s5	3.0	2500	2.8	93.33
D	11 DTF Nut_S3	3.0	2500	2.57	85.67
E	12 M/C SCR Pat_S3	3.0	2500	1.21	40.33
F	4 MCS_MCN_SER_TOP_S10	3.0	2500	0.74	24.67
G	6 MCS_MCN_SER_COP_S8	3.0	2500	0.73	24.33
H	5 MCS_MCN_WO_SER_MIS_S7	3.0	2500	0.01	0.33

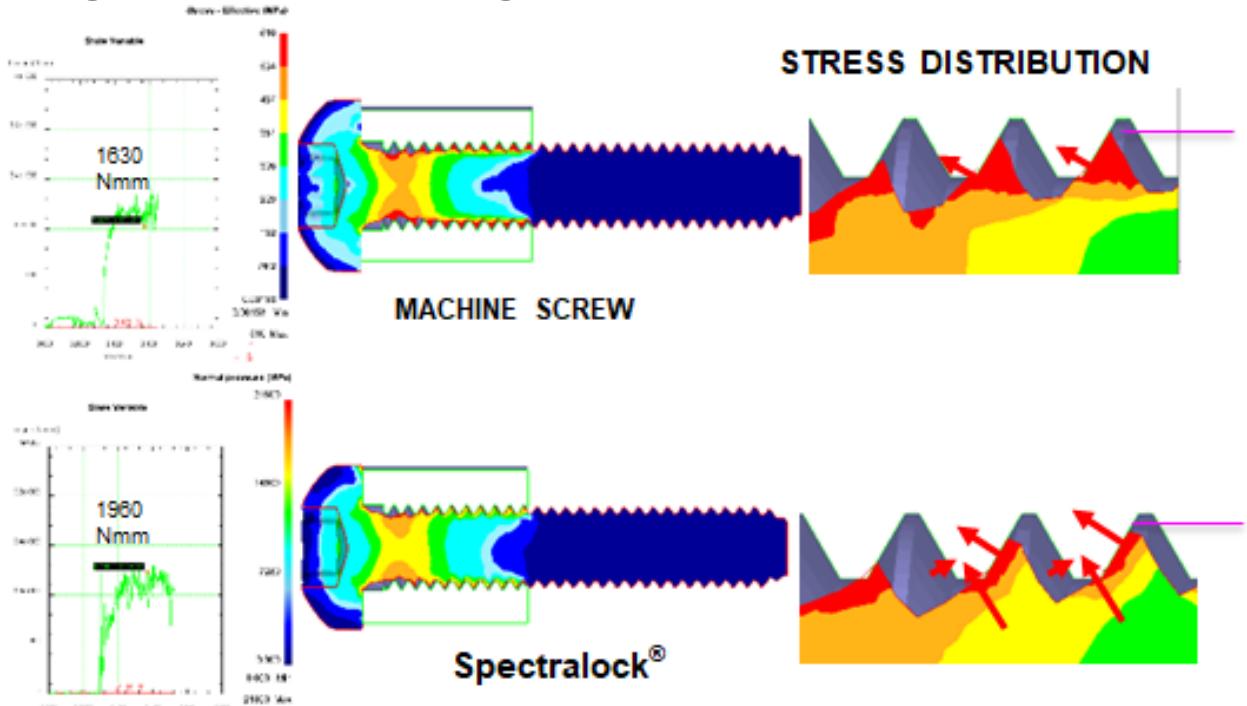
Junker Vibration Test Results

A = 3 points Spectralock
B = 2 points Spectralock
C = Wedge Spectralock



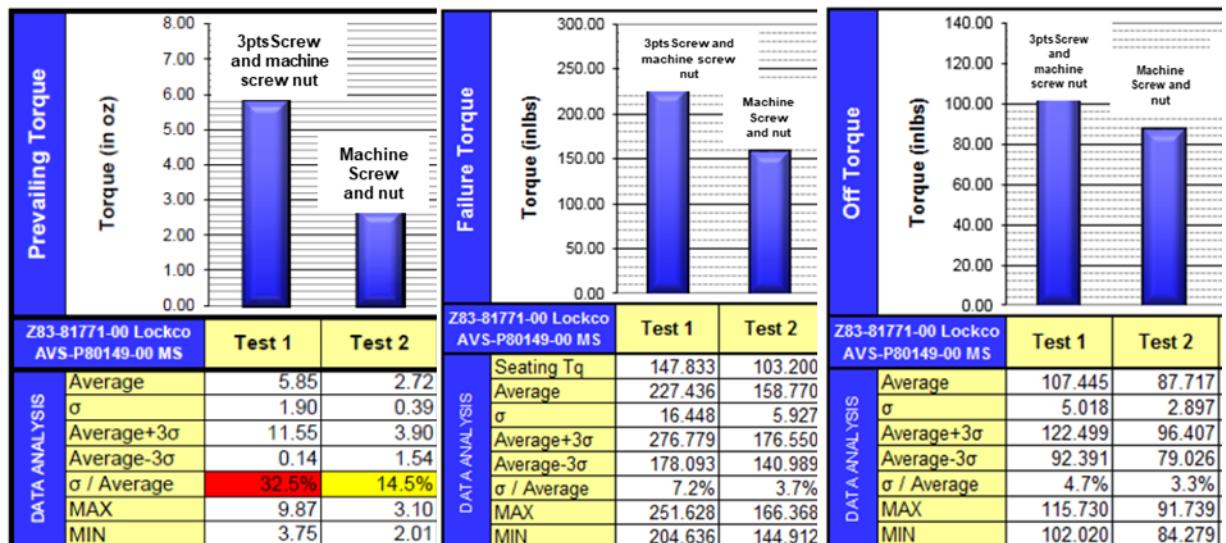
Spectralock® design was proven to have superior vibration loosening functions and performances.

3. Higher Thread Strength



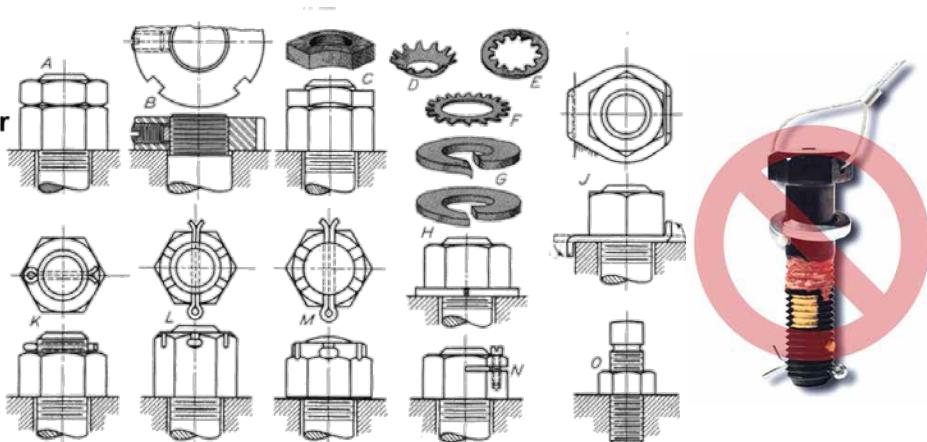
- ✓ Stress intensity is located at the root thread profile, higher surface contact area hence improved in fastener strength
- ✓ At same loading condition in this simulation.
 - ✓ The machined screw has failed (all red color, thread will stripped out)
 - ✓ Spectralock® sample shown stress at root thread and tip of thread yet to reach breaking load.

4. Higher Prevailing, Failure and Off Torque



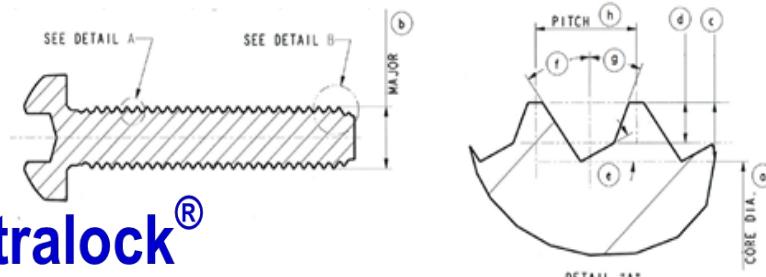
5. Spectralock® eliminates the Common Threaded Joint “Band-Aids”

- Adhesive
- Patch bolt
- Split washer, star washer
- Disk lock - wedge type
- Serrations
- Jam nuts
- Lockwire
- Castle nut w/cotter pin
- Tab lock (keyway)
- Prevailing torque
 - All metal
 - Nylon ring
 - Interference fit



Spectralock® modifies basic joint behavior instead of relying on thread friction

6. Spectralock Fasteners: Technical data



	LC 0.8 X 0.20	LC 1.0 X 0.25	LC 1.2 X 0.25	LC 1.4 X 0.30	LC 1.6 X 0.35	LC 2.0 X 0.40
a	0.600	0.720	0.940	1.088	1.244	1.581
	0.560	0.680	0.900	1.032	1.159	1.486
b	0.800	1.000	1.200	1.400	1.581	1.981
	0.770	0.933	1.170	1.360	1.486	1.886
c	0.11 REF	0.13 REF	0.13 REF	0.15 REF	0.17 REF	0.20 REF

	LC 4.0 X 0.70	LC 6.0 X 1.00	LC 8.0 X 1.25	LC 10.0 X 1.50	LC 12.0 X 1.75	LC 14.0 X 2.00
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	3.150	4.657	6.390	8.0005	9.790	11.350
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	3.860	5.814	7.772	9.732	11.701	13.580
c	0.38 REF	0.56 REF	0.66 REF	0.83 REF	0.96 REF	1.12 REF

	LC 16.0 X 2.00	LC 20.0 X 2.50	LC 22.0 X 2.50	LC 24.0 X 3.00	LC 27.0 X 3.00	LC 30.0 X 3.50
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	15.580	19.490	21.490	23.577	26.400	29.30
c	1.12 REF	1.39 REF	1.39 REF	1.70 REF	1.70 REF	1.96 REF

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Detail Description of Spectralock®

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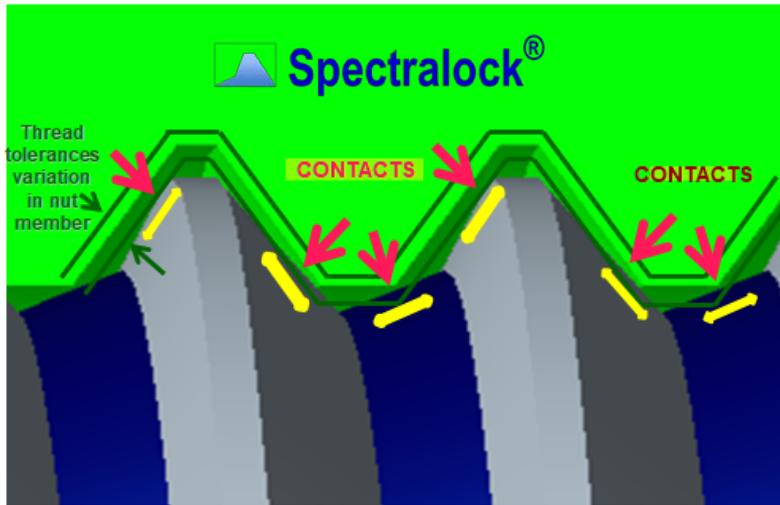
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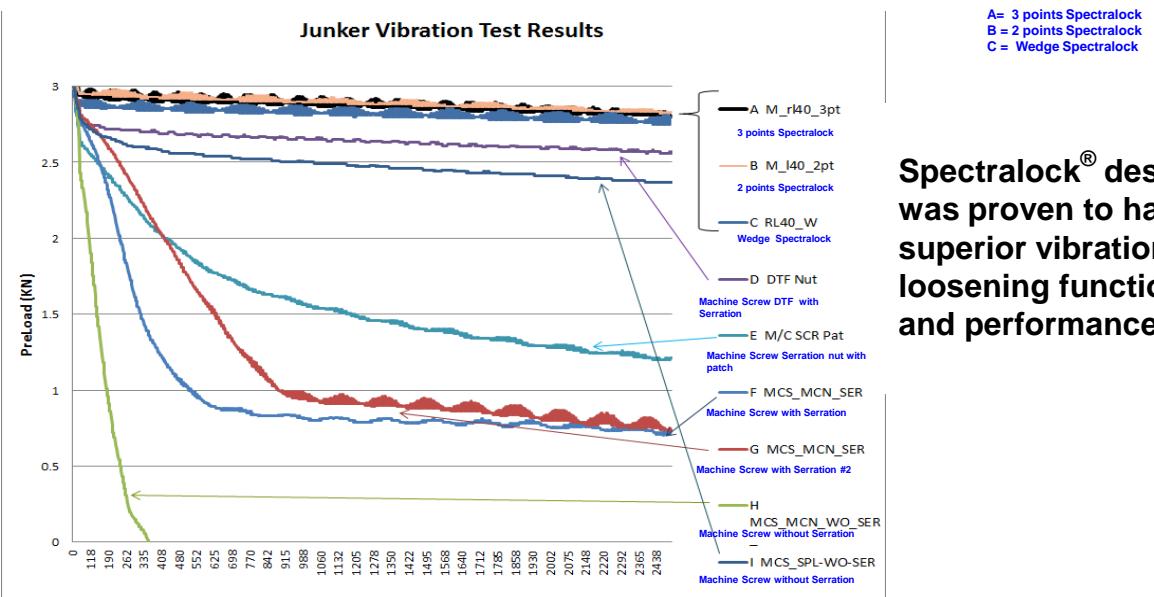
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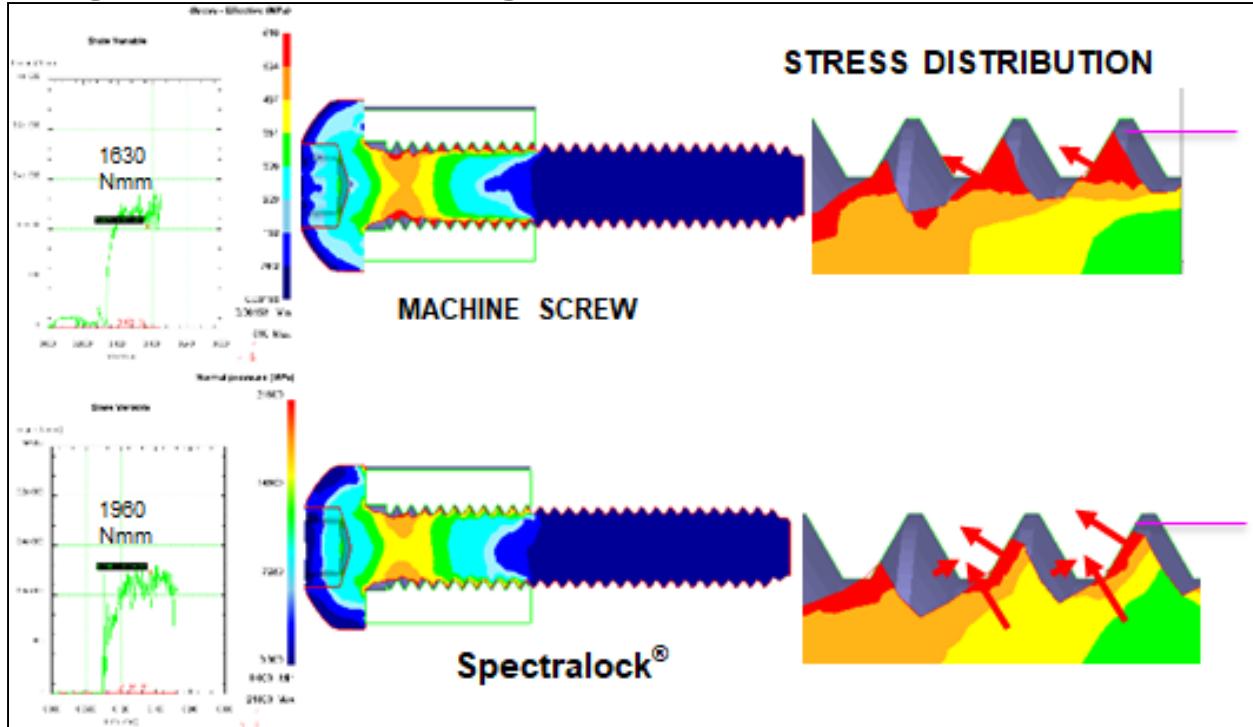
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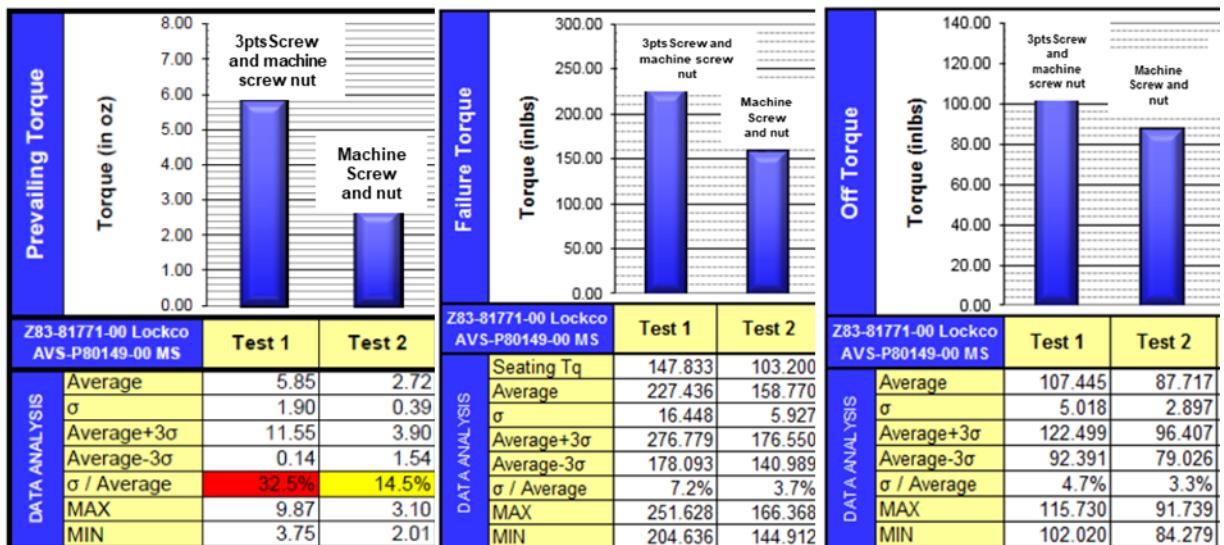
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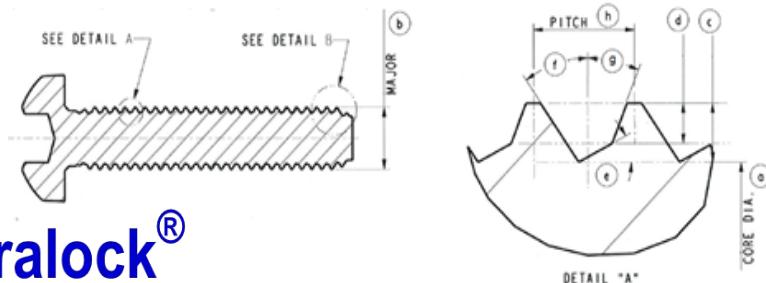


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Spectralock Fasteners: Technical data



Spectralock®

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Thread-Locking with Anti-Vibration Engineered Fastening Solutions



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- High vibration loosening performances
- High Seating Torque
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- Better pull out strength
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- LOC-TITE, Patching or WASHERS and Other locking devices including Spiralock.
- **WARRANTY ISSUES WITH CUSTOMER'S CURRENT PRODUCTS**
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- **SIMPLE FIX**



Unique Selling Features

- ✓ Resists vibration loosening
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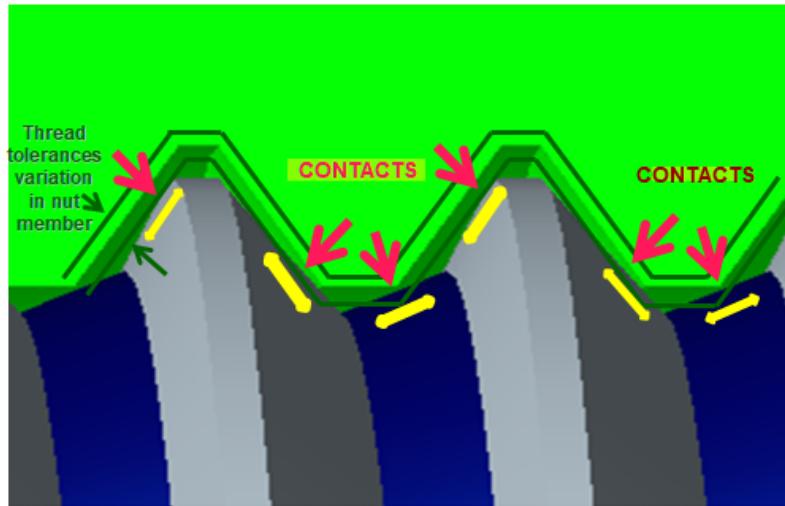


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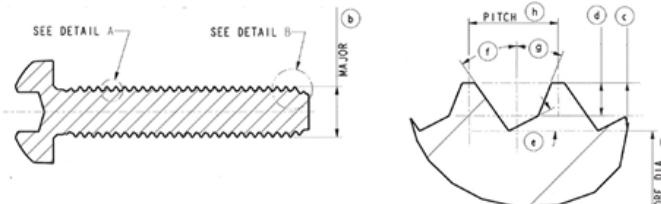
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