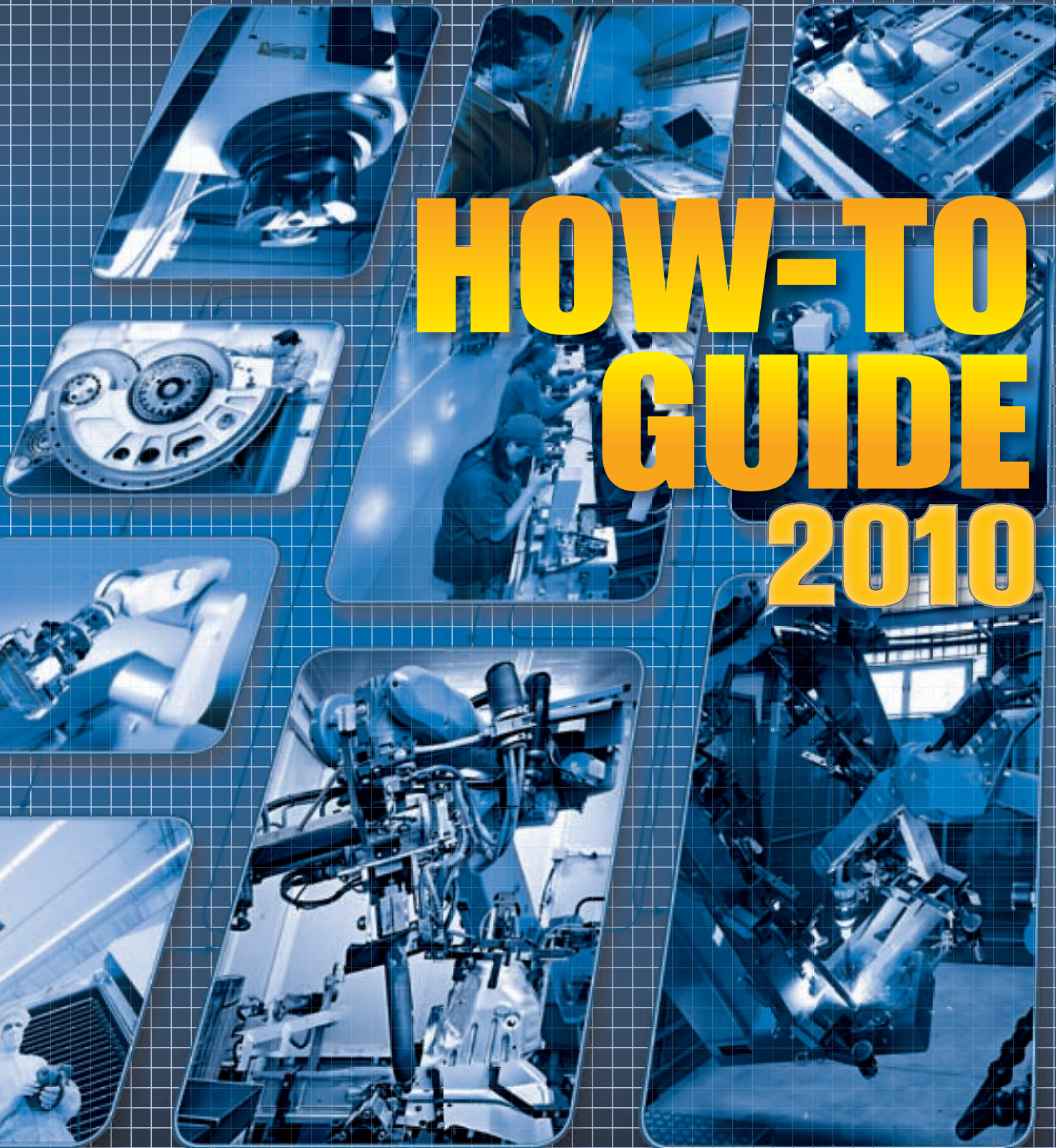


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HOW-TO GUIDE 2010



How To

Prevent Threaded Assembly Failure

Threaded fasteners are the most common detachable hardware, used on thousands of products including automobiles, aircraft, household appliances, and industrial machinery. With more than 300 billion fasteners used annually in the U.S., it is crucial that these fasteners predictably and reliably maintain clamp force on the parts they join.

Why Threaded Assemblies Fail

Threaded fastener loosening due to vibration is the number one cause for catastrophic machinery failure. Such failure occurs when clamp load is not maintained. Gaps that naturally exist between the mating surfaces of threads directly impact the fastener's ability to stay tightly fixed. These tiny gaps allow side-to-side movement on exposure to vibration and thermal expansion or contraction. Side-to-side movement loosens the mated parts, reducing clamp load and ultimately causing the fastener to fail.

Mechanical locking devices were invented to solve the problem of loosening, but all designs have inherent flaws:

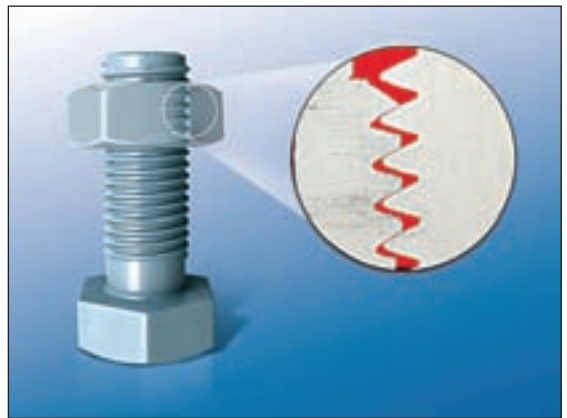
- Split ring or spring washers are designed for increased friction, which reduces clamp loads. These mechanical locking devices are not reliable when exposed to dynamic loads.
- Tooth or ribbed flange bolts are expensive and require large flange-bearing surfaces. They also can damage the surfaces of the mating parts.
- Tab washers, split pins, and castle nuts are costly and time-consuming to lock as they require that components be lined up appropriately before being set.
- Nylon nuts increase friction, which results in inaccurate torque during assembly.

Many of these locking devices loosen over time when exposed to vibration, thermal expansion or improper torque. Mechanical locking devices require that the user keep an extensive and costly parts inventory to fit all fastener shapes and sizes. They do not seal the threads, leaving assemblies susceptible to rust and corrosion.

Preventing Threaded Assembly Failures

Invented more than 50 years ago by Henkel Corporation (then Loctite), anaerobic threadlockers are single-component adhesives that cure into tough thermoset plastics when exposed

to active metals and deprived of air. Threadlockers completely fill the voids between interfacing threads, which prevents side-to-side movement and ultimately prevents loosening.



Loctite® threadlocker between the interfacing threads.

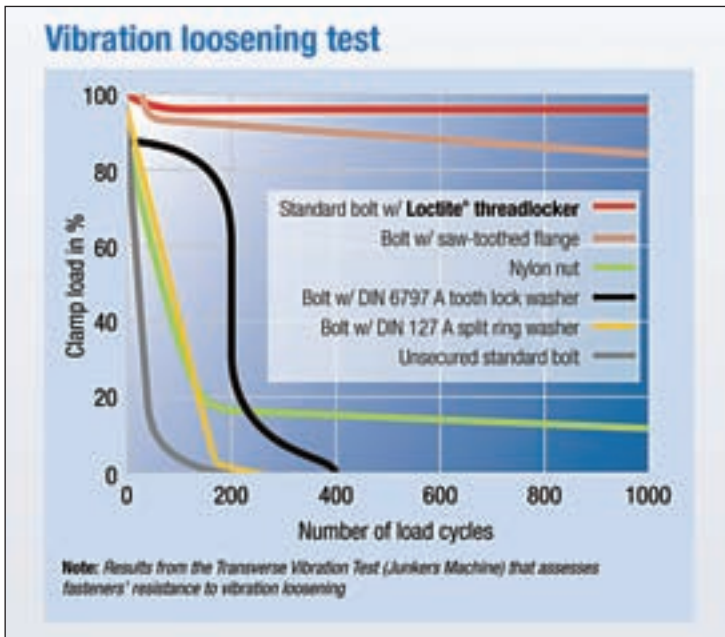
Threadlocking adhesives are the most reliable and cost-effective method to ensure that a threaded assembly will remain locked and sealed for its entire service life. Available in a variety of strengths, they offer excellent temperature resistance, rapid fixture/cure speeds, and easy dispensing. For ease of use, they are available in liquid, gel, stick, and tape forms, and can be used on any shape or size fastener. The newest threadlocking adhesives chemistries provide higher temperature resistance, improved oil tolerance, and primerless performance.

Cost per locking application

Fastener Size	Split Ring Washer	Loctite® Threadlocker
3/8"	2¢	2¢
5/8"	9¢	5¢
7/8"	25¢	7¢

Note: Washer pricing based on 100 units purchased at an industrial distributor. Loctite® pricing based on 50-ml bottle price and number of drops required per application.

Loctite® Threadlockers offer lower cost per unit compared to most locking devices.



Loctite® Threadlockers provide better clamp load retention compared to all mechanical locking devices.

Anaerobic threadlockers act as lubricants during fastener tightening, which allows applied torque to be converted into high clamp load instead of dissipating as friction or heat. Once cured, threadlockers provide a reliable seal, preventing leaks, galling, and corrosion that can seize threads and prevent disassembly.



How to Apply Liquid Threadlockers
 For through-hole assemblies, threadlockers are applied where the nut and bolt will meet when fully tightened. For blind hole assemblies, threadlockers are applied to both the bolt and the mating threads. Low viscosity, water-thin liquid threadlockers can be applied post-assembly.

Spec in Reliability with Anaerobic Threadlockers

Anaerobic threadlockers have dramatically increased the reliability of threaded assemblies.

To spec in reliability, specify Loctite® anaerobic threadlockers. When it comes to resisting vibration, preventing corrosion/leakage, improving quality, and reducing weight, size and overall cost of an assembly, mechanical fasteners just don't hold up.

For more information on the Loctite® Threadlocking User's Guide, go to www.useloctite.com/AA22 or for technical assistance, call 1-800-LOCTITE (562-8483).

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SPEC IN RELIABILITY

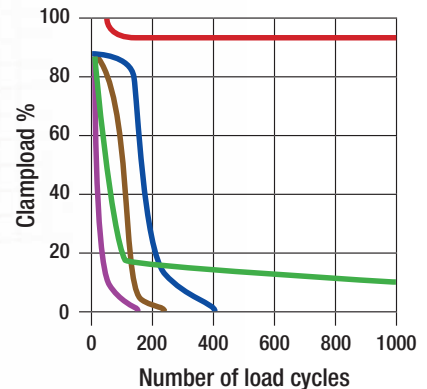
Specify Loctite® Anaerobic Threadlockers

When it comes to:

- resisting vibration
- preventing corrosion and leakage
- improving quality
- reducing weight, size and cost,

mechanical locking devices just don't hold up.

CLAMPLOAD RETENTION COMPARISON



- Bolt with Loctite® liquid threadlocker and nut
- Bolt with tooth lock washer and nut
- Bolt with split ring lock washer and nut
- Bolt with elastic stop nut
- Unsecured bolt and nut

By filling the thread roots and preventing side-to-side movement, Loctite® threadlockers have dramatically increased the reliability of threaded assemblies for over 50 years. New advancements provide higher temperature resistance, improved oil tolerance and primerless performance. Don't let your designs fall apart. Specify Loctite®.

TO REQUEST A SAMPLE and learn more about our newest threadlockers – Loctite® 243™ and Loctite® 263™ – go to www.useloctite.com/AA23. For technical assistance, call 1.800.LOCTITE (562-8483).



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