



Helical Spring Lock Washers Separating Myth from Truth

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Rev: -





ASME B18.21.1-1999, “Lock Washers”

- The B18.21.1 standard deals with two types of washers:
 - Helical Spring-Lock Washers
 - Tooth-Lock Washers
- ASME Standard review
 - ASME codes and standards are developed, reviewed, and revised by a balanced committee of experts, professionals, and other competent and concerned interests. They are also made available for public review and comment from industry, academia, regulatory agencies, and the public-at-large.
 - The B18.21.1 standard was developed using recommendations from the Helical Washer Institute in 1969, among others
 - The latest B18 committee consists of 40 members

ASME B18.21.1-1999
(Revision of ASME B18.21.1-1994)

LOCK WASHERS
(INCH SERIES)



**The American Society of
Mechanical Engineers**

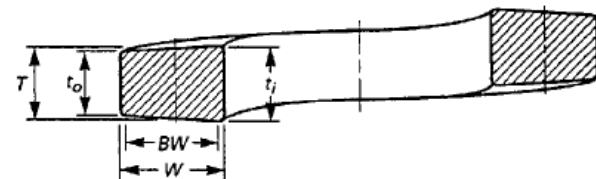
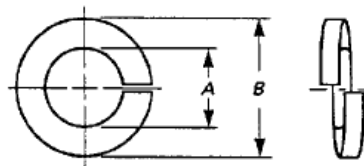


Let's Be Clear About Intended Application

- The ASME B18.21.1-1999 provides a definition of the intended application of the Helical Spring-Lock Washer as follows:

“2.1 The helical spring-lock washers covered in this Standard are intended for general applications. Helical spring-lock washers compensate for developed looseness between component parts of an assembly, distribute the load over a larger area for some head styles, and provide a hardened bearing surface”

- Important Points:
 - The helical spring-lock washers has several simultaneous intended functions (compensate for loosening, distribute load, provide hard bearing surface, etc ...)
 - **Intended application does NOT include to “prevent loosening”.**



Enlarged Section

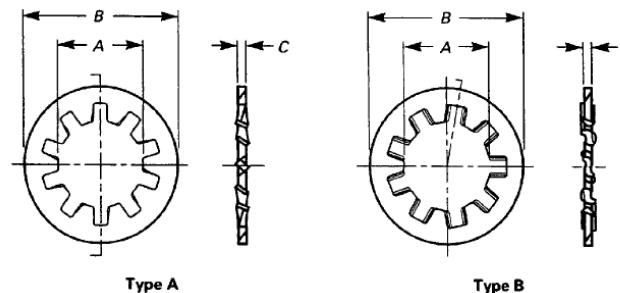


Let's Be Clear About Intended Application

- The ASME B18.21.1-1999 provides a definition of the intended application of the Tooth-Lock Washer as follows:

“3.1 The tooth-lock washers covered in this Standard are intended for general applications. The tooth-lock washers serve to increase the friction between the screw and the assembly. Internal tooth-lock washers are preferred where it is desirable to provide a smooth periphery.”

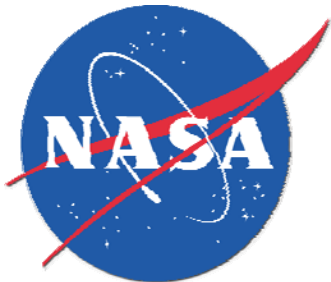
- Important Points:
 - The tooth-lock washer has only one function – to increase friction.
 - Intended application IS to “prevent loosening”.

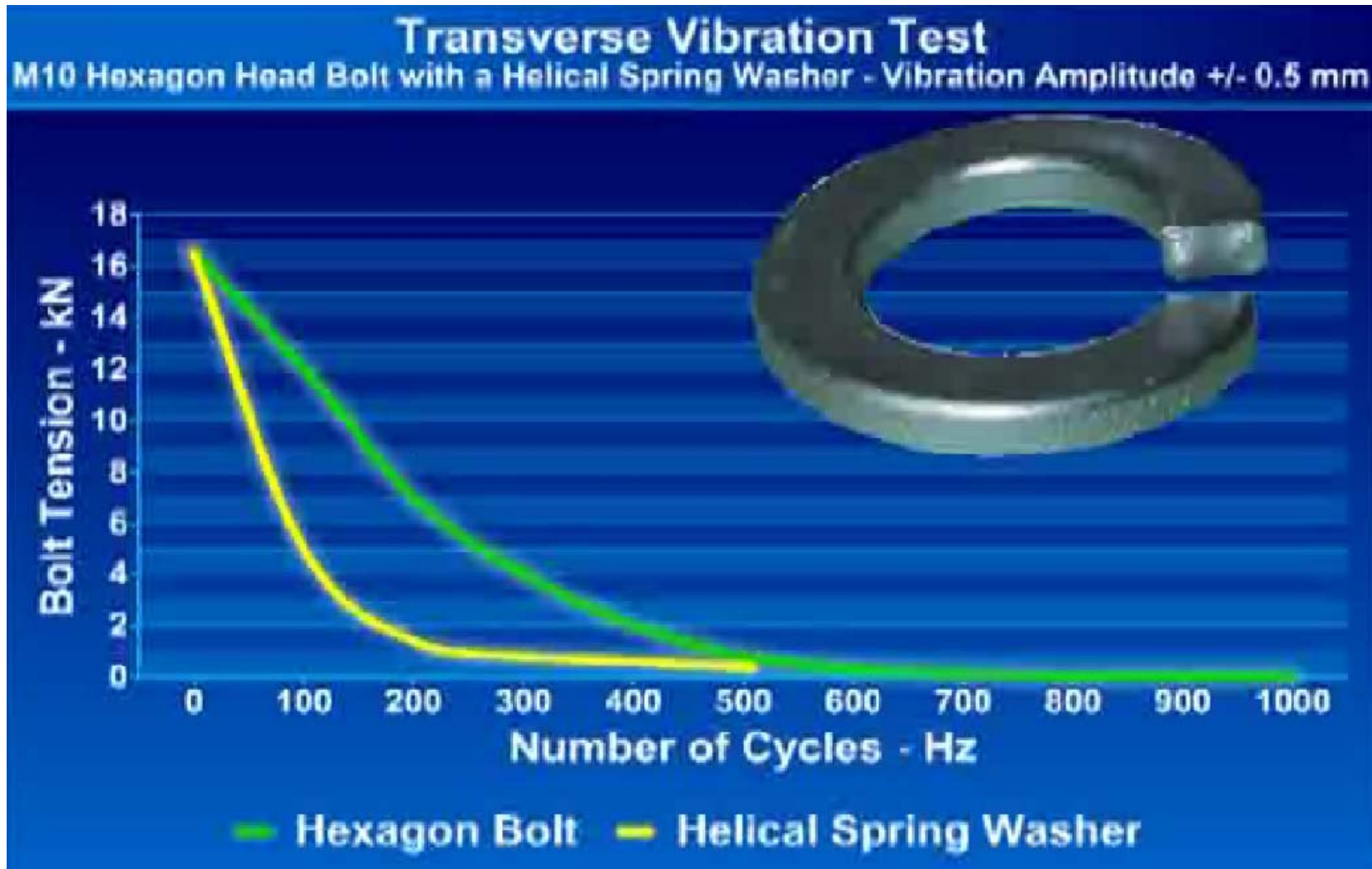




Let's See What NASA Have to Say About This

- Do you think NASA is concerned about fasteners coming loose under vibration when they send astronauts out into space?
- NASA Reference Publication 1228 (1990) “Fastener Design Manual” addresses fastener material selection, platings, lubricants, corrosion, **locking methods**, washers, inserts, thread types and classes, fatigue loading, and fastener torque.
- The section on lockwashers states:
 - “The typical helical spring washer ... serves as a spring while the bolt is being tightened. However, the washer is normally flat by the time the bolt is fully torqued. At this time it is equivalent to a solid flat washer, and its locking ability is nonexistent. **In summary, a lockwasher of this type is useless for locking.**”





(Click on the graph to view the vibration test video)