

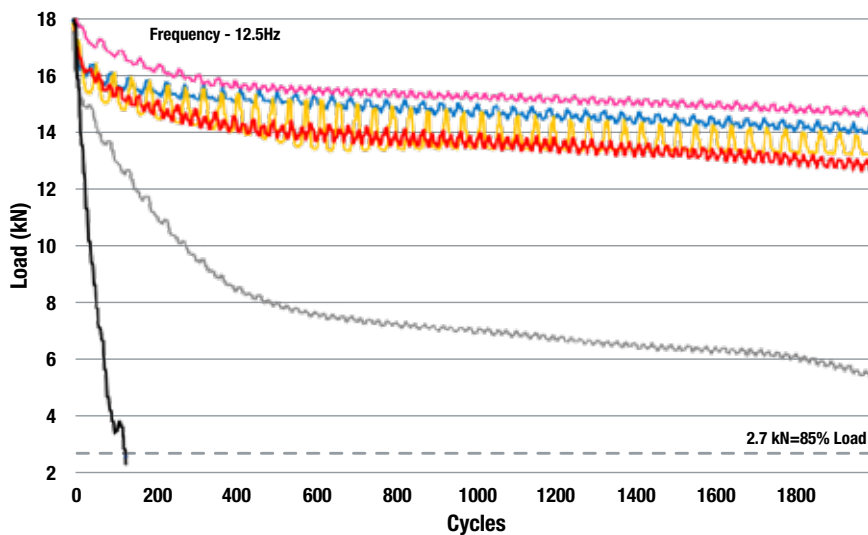


UTILIZING A PRE-APPLIED PATCH SOLUTION OVER SPLIT RING WASHERS

Up to **50% MORE** Clamp Load Retention After Vibration Cycling
 Over **40% REDUCTION** in Fastening Manufacturing Time
 Over **10% REDUCTION** in Assembly Costs
REDUCE Part Numbers, Weight, and Complexity, While Improving Quality

Split ring washers have been viewed as a solution to prevent loss of clamp load in high vibration environments, but testing has proven them ineffective. Junkers vibration data shows that using a reactive or inert thread locker results in a superior solution, benefiting overall performance and reducing the total assembled cost of the joint.

Clamp Force Retention vs. Vibration Material Comparison



Load Retention

- ND TA Series Microspheres 80.8%
- ND Epoxy Microspheres 78.2%
- Nylon Patch 76.3%
- Vibra-Tite VC3 71.2%
- Split-Ring Washer 31.5%
- Blank 0.0%



Junkers Test Unit

Hardware	Qty	Cost/Ea	Total Cost
Hex Bolt	1	\$0.55	\$0.55
Hex Nut	1	\$0.15	\$0.15
Split Lock Washer	1	\$0.11	\$0.11
Flat Washer	2	\$0.14	\$0.27
Hardware Cost / Assembly			\$1.08
Assembly Time (sec)			7.5
Shop Burden Rate / HR			\$75.00
Number of Assemblies			50,000
Total Hours of Assembly			104
Total Cost of Assembled Joint			\$61,673

Hardware	Qty	Cost/Ea	Total Cost
Hex Bolt w/Patch	1	\$0.55	\$0.55
Hex Nut	1	\$0.15	\$0.15
Flat Washer	1	\$0.14	\$0.27
Hardware Cost / Assembly			\$1.02
Assembly Time (sec)			4.25
Shop Burden Rate / HR			\$75.00
Number of Assemblies			50,000
Total Hours of Assembly			59
Total Cost of Assembled Joint			\$55,437

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