How to Effectively Inspect Knurls

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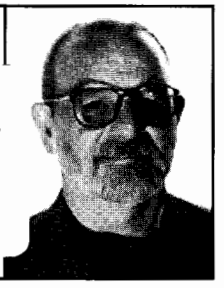


Knurl measurement can provoke major disagreement between parts suppliers and purchasers. What is the most objective way to determine acceptability of such products?

The question of how to effectively inspect knurls has come up many times in recent years. At first, the answer appears simple. Just measure over the knurls with a micrometer. What is the problem?

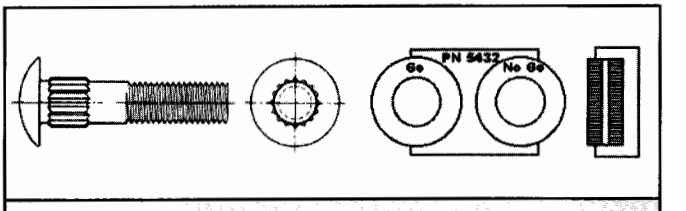
The problem is that it is difficult to find the exact circumferential major diameter of a knurl with normal measuring instruments like a micrometer. A micrometer will measure the major diameter only if the number of knurls is an even number. If the knurls are an odd number, the micrometer can never measure the major diameter. The micrometer will always yield a value smaller than the actual circumferential diameter of the major diameter if the number of knurls is uneven.

Even if the number of knurls is even, it is difficult to make a repeatable measurement because the micrometer has to find the exact high point at precisely 180° across the knurled part. Knurls do not usually fill out uniformly around a part, therefore the major diameter measurement may vary significantly at different location around a part.

These knurl-measurement difficulties are a source of frequent acceptability disagreements between suppliers and purchasers of knurled products. A more objective inspection technique is therefore needed for determining the acceptability of these products.

What is the Best Inspection Method for Knurls?

The simple and effective technique for inspecting the knurl on parts is the utilization of GO/NO GO cylindrical ring gages. GO/NO GO ring gages eliminate the difficulties associated with trying to orient a measuring device in a precise location. The



GO/NO GO cylindrical ring gages offer objective knurl inspection. To be acceptable, a knurled part must enter the GO ring diameter & not enter the NO GO ring diameter.

GO/NO GO gages eliminate the problems associated with trying to measure knurls of an uneven number. The acceptability decision is simple and all parties can agree on the results. To be acceptable, a knurled part must enter the GO ring diameter and must not enter the NO GO ring diameter.

The gage maker's tolerance Class X should be specified when purchasing GO/NO GO cylindrical ring gages for the inspection of knurls. This means that the ring diameter will have a tolerance as shown in the **Tables** below.

The suppliers of knurled products should seek an agreement with purchasers that the use of GO/NO GO ring gages will be the criteria for determining the acceptability of the knurled portion of the product before production begins. The use of GO/NO GO cylindrical ring gages for the inspection of knurls provides a very efficient and effective means of inspecting products and determining product acceptability.

For more information on this or other measurement challenges, contact the author or **Circle 208.** FTI

Tables: Class X Tolerances for GO/NO GO Cylindrical Ring Gages.

Gage Type	Knurl Major Diameter (Inches)	
	0.010" through 0.825"	0.826" through 1.510"
GO Diameter	Max. major diameter minus 0.00004"	Max. major diameter minus 0.00006"
NO GO Diameter	Min. major diameter plus 0.00004"	Min. major diameter plus 0.00006"

Gage Type	Knurl Major Diameter (Millimeters)	
	0.254 through 20.95 mm	20.96 through 38.35 mm
GO Diameter	Max. major diameter minus 0.0001 mm	Max. major diameter minus 0.00015 mm
NO GO Diameter	Min. major diameter plus 0.0001 mm	Min. major diameter plus 0.00015 mm

Greenslade & Company, Inc. *is a supplier of gages, tooling and other equipment to the fastener manufacturing industry.*

Joe Greenslade *is a regular contributor of articles to this magazine. He has been active in the fastener industry since 1970 and has held positions with major fastener producers.*