



Birmingham Fastener Manufacturing

December 11, 2000

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ROLLED THREADS VS. CUT THREADS

The following analysis was performed to prove that the strength of a product which has threads rolled as opposed to cut is greater. Many customers have asked this question "Aren't the rolled thread products weaker because the bar diameter is smaller?" The answer to that question is NO!! The strength of a bar of steel of smaller diameter without threads would be weaker, but a threaded bar breaks in its weakest point, which is in the root of the thread. The thread root diameter is smaller than the bar stock on cut or roll thread products. This is why the bar diameter is not relevant when considering ultimate tensile strength. What is relevant is the work that has been performed in the weakest point on the threaded product. For a cut thread product, no work has been done on the material. Metal removal is used to form the thread. For a rolled thread product, the threaded section is formed by metal movement (rearrangement), which is work done on the material (cold work). This cold work is what makes rolled threads stronger. This can be proven with a simple tensile test.

One bar of 0.797" diameter ASTM A36 material was cut into eight pieces of equal length. Four pieces were machined to 0.680" diameter for roll threading $\frac{3}{4}$ "-10 UNC 2A threads and four pieces were machined to 0.750" diameter for cut threading $\frac{3}{4}$ "-10 UNC 2A threads. The pieces were labeled 1 through 4 for the rolled threads and 5 through 8 for the cut threads and sent to an outside testing source for tensile test. The results are summarized here and listed on the following page.

Average Tensile Load	Rolled Thread	27,900 lbf
	Cut Thread	26,125 lbf
Average Tensile Stress	Rolled Thread	83,600 psi
	Cut Thread	78,225 psi

The strength of the rolled thread, based on tensile load and stress, in this analysis was 7% higher than that of cut thread. All samples met the requirements of ASTM A36.



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RESULTS OF ANALYSIS

<u>Sample #</u>	<u>Tensile Load (lbf)</u>	<u>Tensile Stress (psi)</u>	<u>Failure Location</u>
1	27,900	83,600	Threads
2	28,200	84,600	Threads
3	27,900	83,400	Threads
4	27,600	82,800	Threads
Roll Thread Average	27,900	83,600	
5	25,900	77,600	Threads
6	25,700	76,900	Threads
7	26,500	79,300	Threads
8	26,400	79,100	Threads
Cut Thread Average	26,125	78,225	

Tested By: Materials Technology - Birmingham, AL
Test Method: ASTM F606
Date Tested: 12/07/2000
Raw Material Used: 0.797" Diameter ASTM A36 Round Bar - Heat # 8523492

Respectfully Submitted,

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Manager, Quality Assurance