

# THREAD ROLLING VS. THREAD CUTTING:

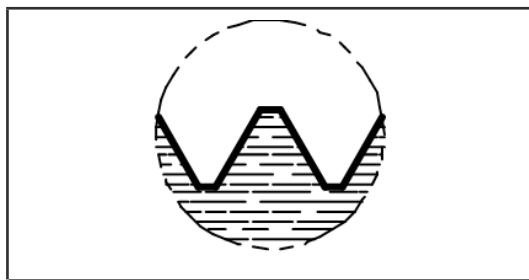
Which Works Best for Your Application?



## WHAT IS THREAD ROLLING?

Thread rolling is a cold metal forging process that forms threads into the mirror image of a roller die. This process is different from metal cutting, grinding, and chasing because it does not remove any metal to create the desired profile. Instead, thread rolling uses hardened steel dies to displace and mold ductile metals.

The tooth form of the hardened steel dies protrudes into the outside diameter of plain cylindrical blanks to reform the surface. The extreme pressure from the dies causes the blank material to displace radially outward into the crests of the thread pattern, thus producing a part with a thread mirroring that of the die.



Cut-Thread



Roll-Thread

Many manufacturers prefer thread rolling to traditional thread cutting because the hardening process of rolling actually strengthens the thread profile, as opposed to disrupting the natural structural integrity of a material by cutting into it. For the same reason, rolled threads are often much smoother and resistant to damage during handling than cut threads.

## MATERIAL SELECTION & APPLICATION CONSIDERATIONS

The decision to cut or roll a material depends on its physical properties and rollability. In general, materials that roll well will not cut well, and vice versa. Materials suitable for rolling typically need an elongation factor — a property indicating if a material can be plastically deformed — of at least 12%.

Thread rolling changes the physical properties of a material by hardening and compressing it, resulting in stronger wear and fatigue resistance, as well as enhanced shear, tensile, and yield strength. Some materials, such as cast iron, are too hard or brittle for the thread rolling process to change their shape; a viable thread rolling metal must be able to flow.

A manufacturer may prefer thread cutting if the workpiece material lacks the need for blank accuracy, threading must be done up to a shoulder, or the job is just a short run.

# ADVANTAGES OF THREAD ROLLING VS. THREAD CUTTING

Although modern thread cutting has been a standard metal forming process for hundreds of years and is still the preferred method for some specific jobs, the cold thread rolling process offers a mounting list of benefits.

USE THREAD ROLLING FOR...	USE THREAD CUTTING FOR...
	
<p><b>REDUCING COSTS</b></p> <ul style="list-style-type: none"> <li>Rolling stock is smaller in diameter than full size cutting stock, without any of the wasted material.</li> <li>Significantly shorter labor times result in lower costs.</li> <li>Lower tooling costs from higher quantity produced per roll and lower tooling cost per thread.</li> </ul>	<p><b>MATERIALS WITH HIGH TENSILE STRENGTH</b></p> <ul style="list-style-type: none"> <li>Rolled materials must be ductile with at least 12% elongation factor. Hardened, brittle materials, such as cast iron and some aerospace metals, will not spread to fill the die threads and therefore must be cut.</li> <li>150 kilopounds per square inch (ksi) is typically the cutoff at which material is considered too strong for rolling.</li> </ul>
<p><b>REDUCING LEAD TIMES</b></p> <ul style="list-style-type: none"> <li>Cold working increases tensile strength at least 30% more than cut threads, which increases the strength of the thread.</li> <li>Rolled threads improve fatigue strength by 50 to 75%. Threads show no loss of fatigue strength even when heated up to 500° Fahrenheit for several hours.</li> <li>Rolled surface feeds per minute are up to 10 times faster than cutting; Thread cutting requires an average of 10 passes, compared to just 1 pass needed for rolling.</li> <li>Rolling is a chipless operation, with no chip disposal required.</li> </ul>	<p><b>MATERIALS CONTAINING LEAD</b></p> <ul style="list-style-type: none"> <li>Any sort of lead inclusion tends to squeeze the parent material in flakes during rolling, causing an inferior finish and contaminating the coolant.</li> </ul>
<p><b>SUPERIOR QUALITY AND ACCURACY</b></p> <ul style="list-style-type: none"> <li>Rolled surface finishes will be 32 micro-inches or less, compared to cut threads, which are rarely less than 63 micro-inches.</li> <li>Rolling inherently maintains the accuracy of the original setup during long runs of high speed production.</li> <li>Thread form geometry produces a much more accurate thread form.</li> </ul>	<p><b>LARGER MATERIALS</b></p> <ul style="list-style-type: none"> <li>In addition to hardened materials, thread cutting is the preferred method for thick blanks that will not roll to fill the die thread.</li> </ul>

## WHAT TO LOOK FOR IN A THREAD ROLL MANUFACTURER

If you've confirmed that thread rolling is the best solution for your application, you have several options when it comes to selecting a thread roll manufacturer. Here are some considerations to factor in:



**INNOVATION AND QUALITY.** Top quality and accuracy can't be ensured if your manufacturer's equipment is out of date. Look for a well-established thread rolling manufacturer that guarantees precision quality from all its thread rolling solutions.



**ACCESS TO KNOWLEDGEABLE ENGINEERS.** Your thread rolling manufacturer is your partner, not your supplier. It should provide instant access to engineers that will work with you every step of the way, from part design and specifications to installation.



**CUSTOMIZATION.** Your manufacturer should understand that your tooling needs come in a variety of sizes and styles. The most supportive manufacturers don't just rely on an online catalog — they also offer custom tool and attachment services.



**FAST DELIVERY.** Downtime costs add up for every day your machine isn't running. Make sure your manufacturer offers in-stock items, ensuring quick delivery to match your production schedule.

## ABOUT CJWINTER

CJWinter is the leading manufacturer of thread rolling solutions. Founded 60 years ago, CJWinter's extensive experience in the screw machining and turning industries covers a full spectrum of durable, flexible, and reliable thread rolling solutions. We offer a comprehensive line of thread rolls, attachments, tools and machine dies, and cold rolling tools for CNC, multi-spindle, Swiss, rotary transfer (Hydromat) and thread rolling machines (Tesker, Kinefac, A22).

**CJWinter's knowledgeable and experienced engineering team helps you manufacture products faster, easier and with higher quality. We offer:**

- Innovation and quality
- Instant access to technical support
- Special designs to optimize your process
- 80% of our thread roll orders ship in 24 hours

For more information about CJWinter and our thread rolling solutions, visit our website today.

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