

【Consultation】



I've heard that processing a thread with a roll tap does not produce chips and the tool life is better than with a cutting tap. I am planning to switch from a cutting tap to a roll tap to take advantage of the extra benefits. Can you please tell me about features and processing points I should look for before I start using roll taps?

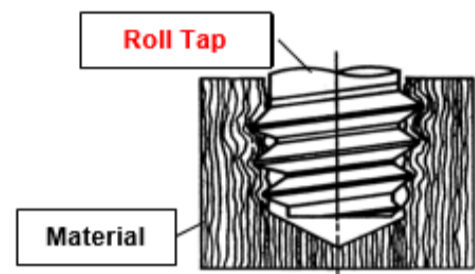
【Answer】

Switching to a roll tap will give you a lot of benefits not available in a cutting tap. Please refer to the basic information below before changing over to roll taps. I think you will find many of the features and benefits of using roll taps listed below.



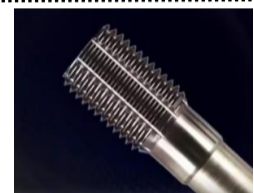
A roll tap is a metal forming tap for internal threads that moves the material by plastic deformation.

The figure on the right is an artists drawing showing the internal screw thread being formed with a roll tap. When the end of a roll tap enters into the workpiece material, the tap begins to form the "V" shape of the internal thread. As the tap enters further into the material, it also forms the minor diameter part of the internal thread by raising the plastic deformed material into the shape of the thread.



The main features of a roll tap compared to a cutting tap.

- ◆ A roll tap does not create any chips when processing a thread. There are no chips to interfere with the tapping process, which makes it suitable for tapping blind holes.
- ◆ It does not require a flute to act as a chip chamber that can cause breakage. A roll tap has a large cross section because there are no flutes, so the chips do not interfere with the threading process. This feature makes it very strong and not easily broken.
- ◆ The internal thread and the accuracy of the pitch diameter precision is very good because the internal thread is cold formed by plastic deformation. A roll tap produces an internal thread with a good surface finish that has less variation in pitch diameter.
- ◆ Using roll taps makes producing threads with higher efficiency and longer tap tool life possible. With roll taps, high speed machining is possible and longer tool life is achieved. The taps tool life can be further improved by applying surface treatment.



Roll Tap

Main points to consider when using roll taps

- ◆ Tapping torque is 2 to 3 times higher than a cutting tap. Please check the machines mechanical power to be sure it is adequate. Also, please be sure to hold the workpiece securely, so it will not move during machining.
- ◆ The range of the workpiece is limited to materials with good elasticity. If the material is a general aluminum or a soft to mild steel material, there should be no problems encountered. It can not be applied to cast iron because of the materials low elasticity. It is difficult to process heat treated steel and high hardness materials exceeding 35 HRC.
- ◆ It is essential to manage the tolerance of the pilot hole diameter to about 5% of pitch. A much more accurate pilot hole diameter control is required than a cutting tap. Example; A M6 x 1 roll tapping pilot hole tolerance management of about 50 μm is required.
- ※ In the case of a cutting tap, the pilot hole tolerance is 236 μm (0.236 mm).
- ◆ When using a cutting tap, burrs occur on the end face of the pilot hole. These burrs are smaller when using a roll tap. It may be necessary to chamfer the beginning of the prepared pilot hole to eliminate the burrs.
- ◆ A U-shaped dimple called seam or tine occurs on the minor diameter from the plastic deformation of the material when roll tapping. This seam is not seen on the minor diameter when using a cutting tap. The photo on the right clearly shows the seam is within the proper range of the thread and the function of the screw will not be impaired.

These are the features and application points to keep in mind.



Seam



Internal thread shape after being processed with a roll