



Thread Rolling

The thread rolling can use various methods. By using of a 2-rolls thread rolling machine with supporting blade between the dies, the profile of the workpiece will be formed out. At least 1-rolling slide has a feed movement to perform the forming process.

Infeed Thread Rolling

For Fastener Industry thread rolling mainly means: Infeed Thread Rolling. A workpiece is covered on whole formable length with a profiled Rolling Die that is moved with rolling force into material to coldform the thread. The rolling process has to be set-up with special attention to Rolling time as this is

influencing the number of workpiece revolutions. There simply has to be enough time to form the thread.

Regulations:

- Lead angle Rolling Die = Lead angle workpiece
- Swivel angle Rolling Die = 0° - no axial force component
- Thread profile consisting of Diameter and lead are directly mold into workpiece

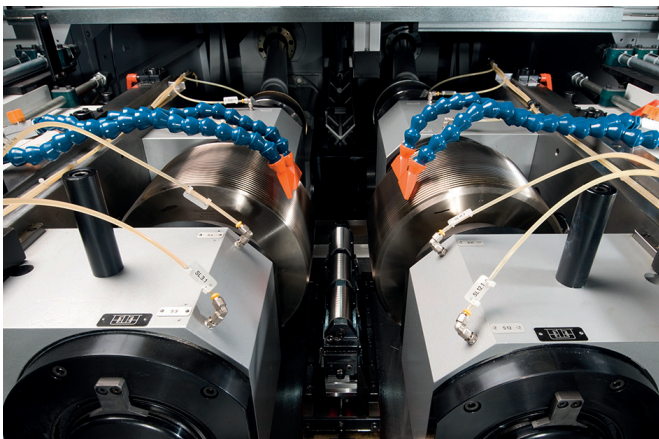


Fig. 1: Thread rolling machine 2-PR 100 CNC/AC

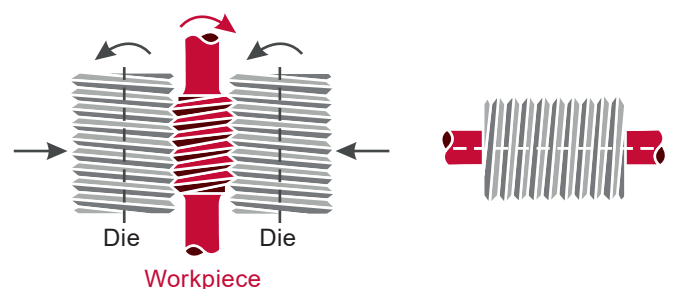


Fig. 2: Infeed Thread Rolling

Thrufeed Thread Rolling with Groove Dies

For **Thrufeed Rolling with Groove Dies** leadless grooves are ground into Thrufeed Dies. These grooves are made in fixed pitches according to steppings in compliance with DIN ISO 13. Besides due to this standard also the profile shape is defined by this pitch. During rolling the Groove Dies are swiveled in specific lead angle of workpiece shape and the needed profile is formed. Each workpiece rotation results in an axial movement = 1x lead.

Regulations:

- Lead angle Groove Dies = 0°
- Swivel angle Groove Dies = Lead angle workpiece; axial force component leads to workpiece movement
- Thread profile is already existing; lead is set-up by lead angle

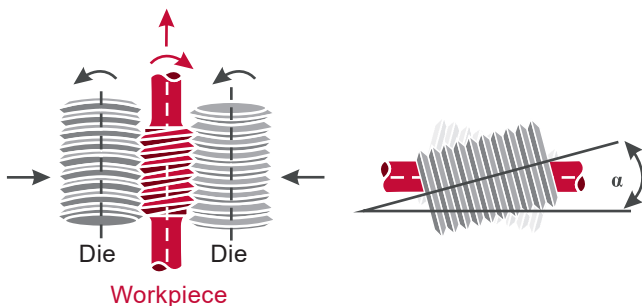


Fig. 3: Thrufeed Thread Rolling with Groove Dies

It is possible to form different nominal diameter threads with same lead by using same Groove Dies while changing swivel angle of Thread Rolling Machine. Unfortunately Grooves Dies are having some limitation if it comes to special deviations from standard procedures.

Advantages and Disadvantages

- + Reliable well known design
- + Universably usable
- + Reasonable cost
- Number of revolutions is depending on width of Groove Dies (heavily formable materials case high rolling forces due to big Dies)
- Rolling Die Run-in and Run-out cannot be applied on each process

Thrufeed Thread Rolling with pitch corrected Thrufeed Dies (TDU)

TDU Thread Rolling Dies are applied directly on current process and workpiece to ensure the best rolling process. Thrufeed speed, number of revolutions and rolling force is applied so operator can achieve high output rate, a long lifetime of Tooling and an excellent workpiece quality.

Technically this can be achieved by adjusting lead angle and width of Rolling Dies depending on needed number of revolutions of workpiece. Generally the technical advice is: the high the quality and the harder the material the more revolutions are needed for forming process. But this is limited by danger of material fatigue and embrittlement of workpiece material. Generally each workpiece rotation results in an axial movement $\ll 1x$ lead.

Regulations:

- Lead angle Rolling Die + Swivel angle Rolling Die = Lead angle workpiece
- Swivel angle $> 0^\circ$ and adjustable axial force component
- Thread profile (diameter and lead) are directly mold by Rolling die

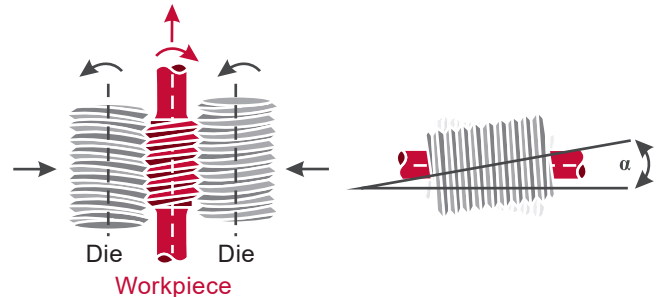


Fig. 4: Thrufeed Thread Rolling with pitch corrected Thrufeed Dies (TDU)

It is obvious that a high number of revolutions with decent thrufeed speed can be achieved while having a small swivel angle of machine, big lead angle of tooling and a normal width of Rolling Dies.

Advantages and Disadvantages

- + Rolling Dies are specially applied on process
- + Improvement of lifetime can be achieved by design change
- + Highest quality achievable
- Only single-use for one profile
- Design effort needed



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