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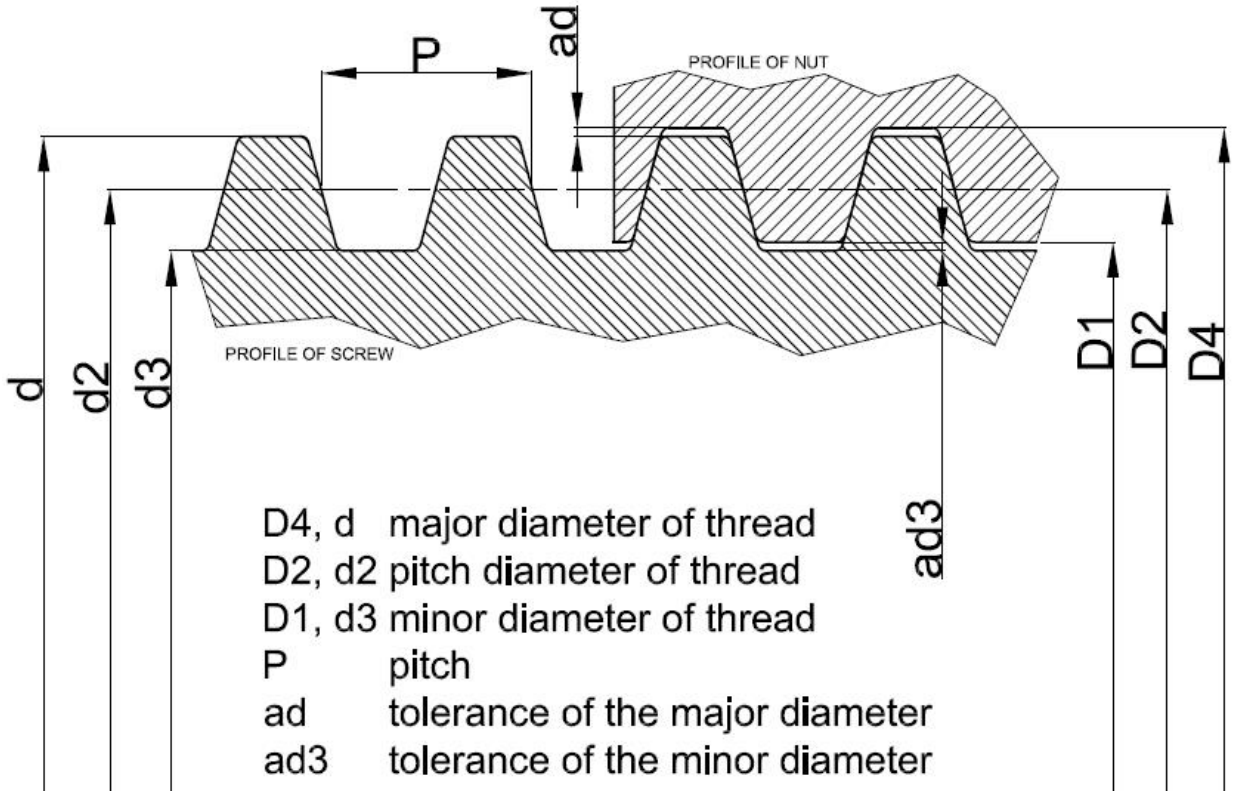
Trapezoidal thread

The method of trapezoidal thread

The trapezoidal thread is used as a lead screw. It can be divided into two basic groups according to the method of production:

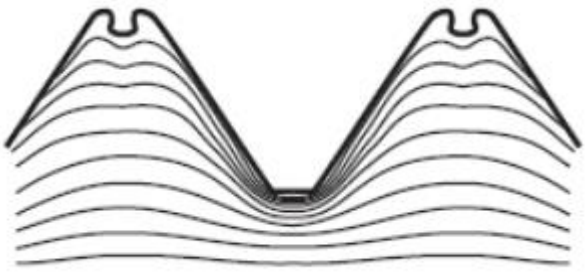
- Cold rolled thread (rolling process)
- Machined thread

The most important dimension for the trapezoidal thread is the pitch diameter of the thread (d2 for external thread / D2 for internal thread), which is also the functional dimension and it has a significant effect on the functionality of the screw-nut.

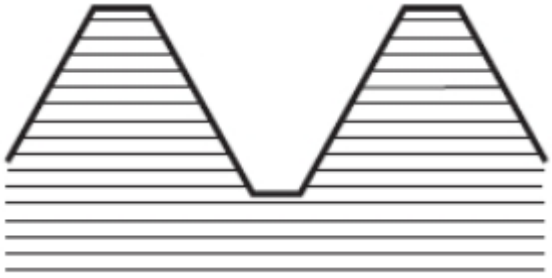


Picture 1: Sketch of a screw – nut, detail of thread

The profile of the external trapezoidal thread



Picture 2: Rolled thread



Picture 3: Machined thread

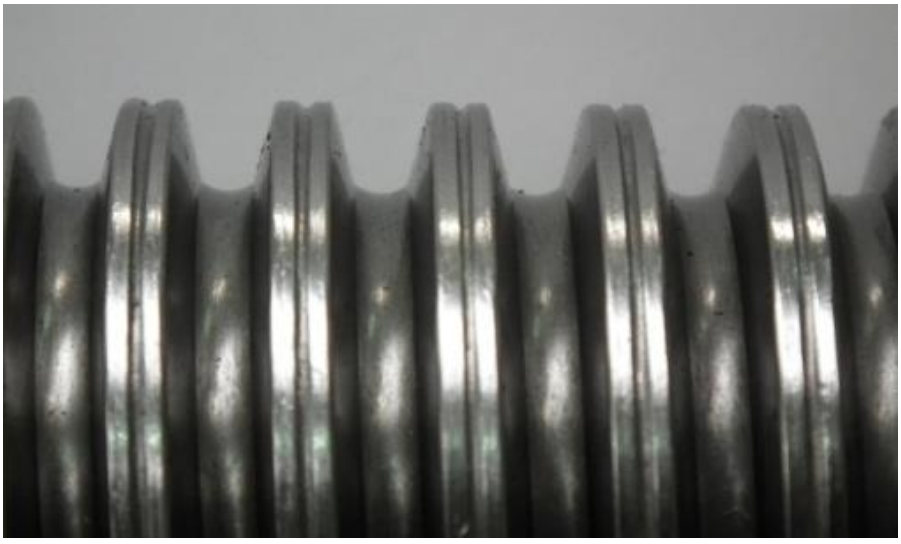
Affect of the appearance

The main factors that affect the final appearance of the the trapezoidal thread are the raw material and the manufacturing process. Picture 1 above shows that the exact dimension and surface of the major (outside) diameter of thread of a rod does not directly affect the functionality. "Surface defects" in the form of grooves on the outside surface of the thread can not be considered a functional problem. Rolled thread in comparison to machined thread has many advantages: there is no interruption of continuous fibers in the material, it has better sliding properties as well as longer life under alternating stress, and better corrosion resistance.

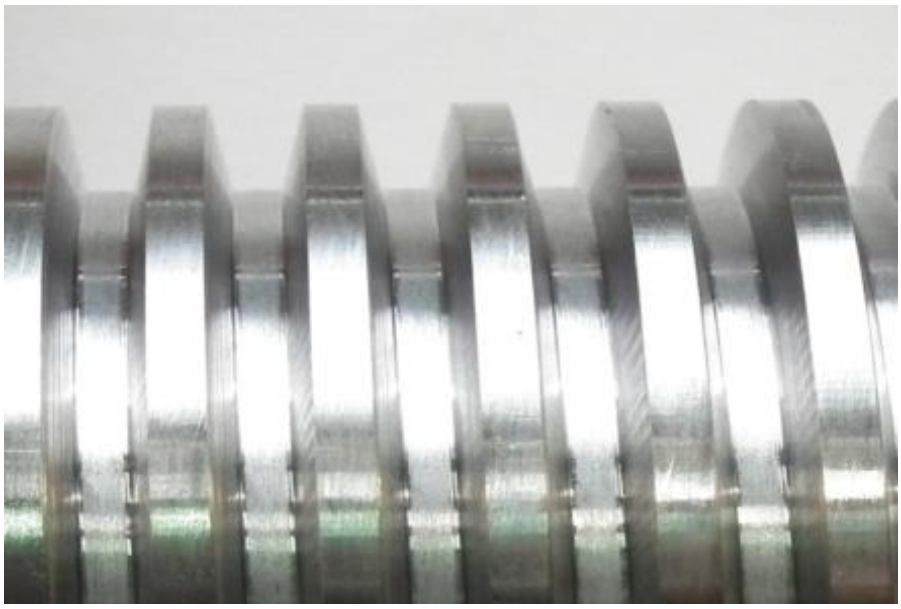
Appearance of the finished product

The following three pictures show the possible design of the surface of trapezoidal thread.

Picture 4: Rolled thread – smooth surface



Picture 5: Rolled thread with the groove on the outside surface



Picture 6: Machined thread

The minor (inner) diameter d_3 of the rolled trapezoidal thread

The difference in production method of rolling or machining is not only the difference in appearance, but it can also mean a difference in some dimensions. The DIN 103 standard, part 4 allows for with technological limitations and enables the reduction of the minor thread diameter d3 = 0.15 * P, where P = pitch of thread.

*Example: Screw size Tr20x4-7e, for the tolerance 7e are table dimension: d_3 = 15.500 to 15.074 mm, there is the possibility of reducing the minor diameter of 0.15 * 4 = 0.6 mm for rolled thread. The minor diameter d_3 can then be between 14.474 and 14.900mm.*

References

Standard ISO 2901, ISO 2902, ISO 2903, ISO 2904, DIN 103
Fertigungsverfahren 4: Umformtechnik, Wilfried König und Fritz Klocke

20/07/2016.LJ