

**SCHAAF®**

## Hydraulic High-Pressure Technology

### TTG

The task of a bolt is to connect two or more components. This happens due to the axial bolt pretensioning force. But what is the axial pretensioning force? What is a thread? Basically, a thread is a sloping level which is wound up. If you screw a nut on the bolt thread, it follows this sloping level – the flank lead. When the nut reaches the flange you generate bolt elongation and flange compression by further screwing. This bolt elongation is the aforesaid pretensioning force and is a result of the stretched bolt material. Taking a close look at the pretensioning force generation, usually it has impact on the nut due to a torque. This equals a torsional stress on the bolt, which works against the bolt in its actual function. That is the reason why Bolt Tensioners, Hydraulic Nuts and Multiple Stud Nuts are used, which do nothing else than pretensioning the bolt purely axial and torsion-free.

In general although, any pretensioning force generation does not only elongate the bolt shaft, but also the thread. A distortion of the heavily loaded thread occurs, which does not comply with the original geometry of the nut anymore.

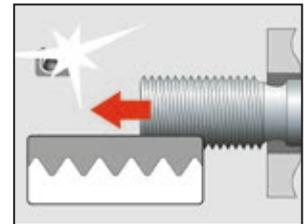
The patented idea of SCHAAF GmbH & Co. KG is to copy the profile of the highly pretensioned bolt thread in the nut area and to transfer it to the nut with the exact change of geometry. What is the result? The whole flank surface of the bolt has an equally exact contact with the nut with **TTG** thread. Therefore, there is no stress concentration as before in the first thread turns where nut and bolt touch. Instead, the pretensioning force distributes equally over the complete geometry. Highly stressed threads, which are mostly charged with additional dynamic load, receive a higher longevity, higher safety at same component size and with insignificant higher costs.

### Advantages

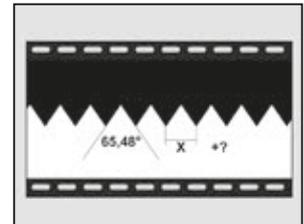
- Nut and bolt flanks have a 100 % contact at the pretensioning force and the load distributes equally on the complete thread bearing surface
- The permanent risk of fracture with highly stressed connections is significantly decreased
- Bolt fractions in the first thread turn can be avoided
- Low costs
- More resilient connections
- Higher machine safety
- Due to geometry displacements, tension launching is even possible in the upper part of the nut
- Due to nuts with TTG, bolts with the identical cross sections can be stressed, respectively pretensioned higher. The connection becomes safer
- TTG is independent of the nut material
- TTG improves every bolt connection

Regarding the outer geometry, nuts with **TTG** can have the same shape, only the main thread is adjusted to the bolt geometry.

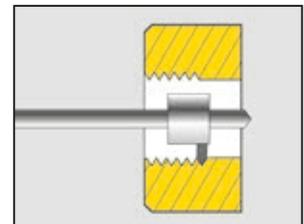
 All **SSV**, **HM** and **MSN** threads can be equipped with **TTG**. This enables a targeted equal force in the thread area for increase of longevity. Please see [www.schaaf-gmbh.com/ttg/](http://www.schaaf-gmbh.com/ttg/)



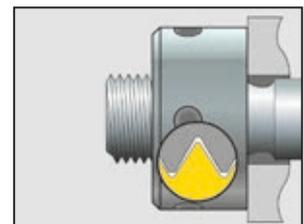
Take a picture of pretensioned bolt



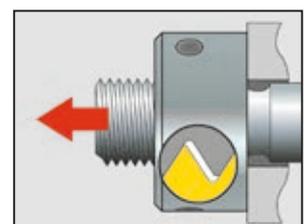
Determination of thread geometry



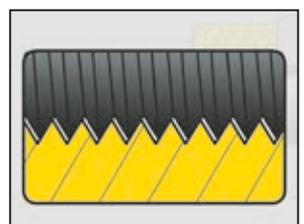
Manufacturing the nut after determination



Flank contact at untensioned bolt



100% flank contact with targeted equal force on the pretensioned bolt...



... over the complete area

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**SCHAAF has been developing and manufacturing high-pressure hydraulic tools since 1954.**

