**Technical Information**

**Protrusion of Threads from Nuts**

The necessary protrusion of threads from nuts is very often the subject of heated discussion. The examiners from the competent monitoring body, e.g. the TÜV, very frequently request that three turns of thread protrude from the nut. With extension bolts, a critical situation can result if more than 3 turns of thread protrude from the nut, as it is not possible to assess the load bearing capability of the joint due to the fact that you cannot see how far the extension shank has penetrated into the nut. There are clear rules pertaining to the protrusion of threads:

**DIN 79:2001-03** defines the protrusion of threads from nuts as 2 x P with hexagon nuts and 3 x P with self-locking hexagon nuts. (P = thread pitch)

**Section 8.3.1, Flange connections, of EN 13480:2002-05** prescribes the following configuration: “Nuts must be screwed down onto the bolt so that at least one full thread turn of the bolt protrudes.”

Despite this, the issue should not be left at that; seen from a technical point of view, a nut that is completely screwed down (“filled”) is always sufficient, particularly when the usual nuts with

![Diagram of thread load transmission](image)

H = D are used.

The load transmission within the nut is not homogeneous! The threads closer to the contact surface bear the majority of the load. When the local yield point is exceeded, the load distribution becomes more favorable. The threads closest to the nut’s contact surface bear most of the load at the joint, meaning that we can assume that a “filled” nut gives a sufficient degree of safety.
In particular, it makes sense to fill nuts with the total number of thread turns or, as in DIN EN 13480, to leave only one thread turn protruding from the nut, when the bolted joint is painted with a protective coating following assembly, in order to protect it against corrosion. When using threaded bolts, simply filling a nut can be very interesting; however, it requires a risk analysis in accordance with TRBS 1111. This process should be documented in writing.

When loosening the joint, the coatings are rarely removed from the protruding turns of thread; instead, an attempt is generally made to twist the nut past the coating. In some cases, the nut then becomes wedged, particularly if there are many protruding turns of thread.

**Tip:** Never center the threads protruding from threaded bolts – although this looks good, it does not fulfill any real purpose. It is better to tighten the nut that will be removed during disassembly so that it has only one thread protruding, or to screw it down fully in order to ensure that it can be removed in the next dismantling process (inspection).

Visit www.flangevalid.com for further interesting information on a range of topics. Of course, I will also be happy to provide prompt technical advice myself.

All the best from Germany,

Peter Thomsen

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Issued June 5, 2010