**METRIC THREAD**

**PITCH DIAMETER TOLERANCES**  
from M3 up to M180

Ref. DS 680, DS 681, DS 682, DS 683 & DS 684

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**SCREW THREAD TOLERANCE DENOMINATIONS AND THEIR RELEVANCE FOR METRIC THREADS**

Metric threads have the same tolerance build-up as for axles and holes. The number is the tolerance size and the letter is the position of the tolerance to to nominal. The number and the letter are also reversed. The number for a thread pitch diameter tolerance gives a significantly larger tolerance than for an similar sized axle or hole. The tolerance is also larger for a nut than for a screw – even with the "same" letter. Nuts (internal threads) have always a capital letter and screws (external threads) always a small letter. A nut with an "H" tolerance has the same min. pitch diameter as a mating screw has with an "h" tolerance has as max. pitch diameter.

If a drawing states M36x4-6H/6g, then this means that the nut is to be M36x4-6H, and the screw M36x4-6g. This means that the nut’s minimum pitch diameter size shall equal the nominal pitch diameter, and the screw’s pitch diameter size shall be a few hundredths of a millimetre under nominal pitch diameter.

**Surface Coating**

When a thread is to be surface coated it should be specified (apart from coating thickness) thread pitch diameter tolerances for both before and after surface coating – especially is the machining and surface coating is carried out by two different companies.

Note that a surface coating of, for example 10μm (0.010mm), on a 60° thread will change the pitch diameter by approximately 40μm (0.040mm) as all four thread flanks will be coated.

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The following information is for a standard ISO metric screw thread M16x2 - 6H/6g ref. ISO 965-3 and shows the tolerance difference between the three diameters the pitch diameter having the smallest tolerance.

<table>
<thead>
<tr>
<th>Standard</th>
<th>D</th>
<th>16,000</th>
<th>Standard</th>
<th>d</th>
<th>16,000</th>
<th>Measuring an external thread is usually easier to do than an internal thread. This is probably the reason for internal thread having a larger tolerance than external.</th>
</tr>
</thead>
<tbody>
<tr>
<td>M16x2 NUT (6H)</td>
<td>D₂</td>
<td>14,701 + 0.212 - 0</td>
<td>M16x2 BOLT (6g)</td>
<td>d₂</td>
<td>14,701 - 0.038 - 0.198</td>
<td>Note the pitch diameter tolerance – nut 0.212 and the bolt 0.160</td>
</tr>
<tr>
<td>D₁</td>
<td>13,835 + 0.375 - 0</td>
<td>d₁</td>
<td>13,546 - 0.038 - 0.327</td>
<td>As a thread is usually measured in 0.01mm, it is most practical to round the result to the nearest 0.01mm. If a measurement result is sought to 0.001mm then the flank angle and pitch should also be measured.</td>
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<td></td>
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</tbody>
</table>

The actual pitch diameter D₂ for an internal thread should never be less than the nominal pitch diameter. The actual pitch diameter d₂ for an external thread should never be larger than the nominal pitch diameter.