HELICOIL® Tangfree

The tangfree coil thread insert for high-strength threads

- metric threads
- imperial threads: UNC and UNF
The HELICOIL® system

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Large picture (left): Application example HELICOIL® Plus
Can you imagine a world without screws? Even today, the screw is the most widely used fastening element for detachable joints. Optimised tightening methods and high-strength screws allow constant improvement. Considerably higher forces can be transmitted so that the dimension or total number of required screws can be reduced. However, only highly sustainable nut threads permit high-strength screw joints.

This is where our HELICOIL® thread technology is used.

Structural component – thread reinforcement and repair

HELICOIL® is thread reinforcement and repair. Threads are reinforced whenever low-strength materials (e.g. aluminium, aluminium-magnesium alloys and fibre-reinforced plastics) are used. The nut thread is wear-resistant even in cases of frequent use. HELICOIL® allows miniaturisation and lightweight construction for the development of production parts. The HELICOIL® thread insert has been tried and tested for more than 60 years and has become a widely used structural component.

Worldwide, HELICOIL® thread inserts are approved for economical and lasting repair of damaged or worn out threads.

Apart from repair of valuable individual components, parts used in large-scale production which have been rejected due to faults during thread production can be reintegrated into the production process.

Your advantages – an overview:

- High thread loading
- Increased quality and value
- Wear-resistant, low and constant thread friction
- Strong
- Corrosion and temperature resistant
- Cost-effective
- Tight fit
- Screw locking
Technology

The HELICOIL® thread insert is a wire with rhombic profile formed into an elastic spiral. It produces high-strength threads transferring forces from flank to flank into the holding thread.

The technology HELICOIL® with tang

Thanks to continuous optimisation, the HELICOIL® Plus is now much easier to install. “Plus” refers to the special start of the thread, compared to the HELICOIL® Classic. The HELICOIL® Plus is positioned and screwed in like a screw. To screw in the thread insert, all you need is an installation mandrel with thread dimensions similar to a tap of the same nominal diameter. However, existing tools of the commonly used design can still be used for installation. Thanks to the considerably wider range of tools to be used for installation, installation times are up to 20% shorter than for previous methods.

If through-hole threads are required, after installation, the tang can be broken off at the notch (predetermined breaking point).

HELICOIL® Plus are thread inserts produced according to consistent material and quality specifications and meet the requirements of national standardisation as well as aeronautical and military standards. Apart from that, leading large-scale users base their manufacturing standards on this system.

The HELICOIL® technology without tang

No tang is required for the installation of these thread inserts – therefore, tang break or tang removal are not required. The up-to-date HELICOIL® coil thread insert technology is called HELICOIL® Tangfree. Together with the corresponding installation tools, the HELICOIL® Tangfree coil thread perfectly fits into the HELICOIL® product family.

The advantages

HELICOIL® Tangfree – a major step forward in HELICOIL® technology.

- **Innovative installation**
  - Installation from both ends with identical quality
  - No preferable end
  - No directional orientation

- **Tangfree thread insert**
  - No tang break – no tang removal
  - No risks from tangs left in component
  - Reduced installation time due to less process steps
  - Reduced testing and documentation effort

- **Compatibility**
  - For the HELICOIL® Tangfree holding threads apply the same guidelines as for the other HELICOIL® types

- **Low tool wear**
  - Minimum wear of tool blade
  - Easy maintenance

- **Improved quality**
  - Simplified quality assurance
  - High-strength threads also for blind holes with small depth or pre-assembled subassemblies

- **For metric threads**
  - Comply with NA 0276 standard
  - Comply with DIN 8140 standard when installed

- **For imperial threads**
  - Comply with NAS 1130 standard
Corrosion and temperature resistance

HELICOIL® Tangfree thread inserts are made of austenitic chrome-nickel steel (minimum tensile strength 1,400 N/mm²). The high surface quality of the rolled thread ensures a high-strength, wear-resistant thread with an extremely small and constant thread friction torque. Therefore, a higher, constant preload-force is achieved for repeated cycles at the same tightening torque. The utilisation of the yield point of high-strength screws is improved. Torsion stress is considerably reduced. Compared to tapped threads, the surface roughness of the HELICOIL® Tangfree is reduced by 90%.

Wear resistance

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Strength

The elastic properties of the HELICOIL® Tangfree thread insert allow a uniform load and stress distribution. An optimum flank contact is achieved. Variable pitches and angles are compensated for over the entire length of the thread insert. Force transmission from bolt to nut thread is optimised. The quality of the screw joint is considerably increased – for static as well as dynamic operating loads.

Due to the improved distribution of the preload-force, the fatigue strength of dynamically loaded screws is increased. This is why the HELICOIL® is also suitable for use in threads in high-strength materials, e.g. steel or cast iron alloys.

Corrosion and temperature resistance

The standard material of the HELICOIL® Tangfree prevents seizing of screws under environmental influences. HELICOIL® Tangfree thread inserts of nickel-based materials are available for thermally highly stressed screw joints. Elasticity and spring force remain constant. For materials particularly susceptible to corrosion, such as magnesium, the HELICOIL® Tangfree made of hard-coated high-strength aluminium is used. This prevents contact corrosion caused by galvanic action.
Tight fit

When not installed, the outside diameter of the HELICOIL® Tangfree exceeds the receiving thread by a defined amount. In combination with the high spring force of the material, this difference in dimension results in radial expansion and therefore in the tight and clearance-free fit in the nut thread. Additional locking elements or adhesive – as are common for fixed bushes — are therefore obsolete.

If you use impact wrenches, please contact us. We will be happy to help you.

Screw locking

Thread technology and the polygonal-shaped thread of the HELICOIL® Tangfree Screwlock lead to a high degree of frictional locking and thus prevents the screw unscrewing and its losing. Additional locking of the joint with split pins, wires or washers is not required. Costs are reduced and installation is easier.

Friction

Thread friction and its scatter range can be reduced if a HELICOIL® is used. The dispersion range can be restricted. (For example: If the thread friction value μG of a property class 10.9 carbon steel screw, screwed into a tapped nut thread ranges between 0.12 and 0.18, the μG values range between 0.11 and 0.13 if a coil thread insert is used.) For a torque-controlled screw tightening application, the screw preload-force can be adjusted more precisely and the yield point of the screw utilised more efficiently. Simultaneously, the preload force is increased during screw breakage due to reduced torsional stress.

Downsizing

Engineers can choose almost any material. The HELICOIL® Tangfree corresponds to today’s trend toward lightweight construction (e.g. aluminium and magnesium) because this method of thread reinforcement combines minimum space requirements and high strength. High-strength screws are therefore also perfectly suitable for low-shear materials. A reduced number of joints and smaller screw sizes save material, installation space and weight – at high fatigue strength. These are definite advantages of the HELICOIL® system.
HEICOIL® thread technology

HEICOIL® Tangfree Free Running**

You do not need a tang to install these thread inserts. Therefore, tang break and removal are not required. Combined with the matching installation tools, the current innovation status in the HEICOIL® technology is a perfect addition to the HEICOIL® product family.

HEICOIL® Tangfree Screwlock**

HEICOIL® Tangfree Screwlock has the same advantages as HEICOIL® Tangfree. In addition, there is a screw-locking area. The screw is locked by one or several polygonal-shaped threads clamping the flanks of the screwed in screw. The elastically resilient frictional locking results in prevailing torques similar to the specifications of ISO 2320. These screw locking torques meet the demands of technical delivery terms regarding international standard specifications. HELICOIL® Tangfree Screwlock can only be used with screws of higher property classes (8.8 and higher). Common lubricants according to the manufacturers’ recommendations shall be used for highly alloyed screws. This thread insert is widely used in the aviation industry.

HEICOIL® Plus Free Running*

Every thread of the thread insert with precision-formed, rhombic profile is Free Running. The result is an internal thread true to gauge that can be used from both ends. The dimensional stability of the ISO thread complies with DIN 13 6H as well as for special requirements with 4H and meets the demands on international standard specifications.

The advantages of the HEICOIL® Plus system are particularly apparent with respect to processing and tools and result in shorter cycle times. Simply order the separate catalogue No. 0100.

HEICOIL® Plus Screwlock*

This thread insert has an additional screw-locking area. One or several polygonal-shaped threads clamp the flanks of the installed screw. The elastically resilient frictional locking results in prevailing torques similar to the specifications of ISO 2320. These screw locking torques meet the demands of technical delivery terms regarding international standard specifications. However, the prevailing torques can also be adjusted as required for the corresponding application, e.g. for securing of setting screws. HELICOIL® Plus Screwlock can only be used with screws of higher property classes (8.8 and higher). Common lubricants according to the manufacturers’ recommendations should be used for highly alloyed screws. The advantages of the HEICOIL® Plus system are particularly apparent with respect to processing and tools and result in shorter cycle times. Simply order the separate catalogue No. 0100.

* Comply with DIN 8140 standard. For further standards, see page 12.
** Comply with NAS 1130 and NAS 0276 standard. For further standards, see page 12.
HELICOIL® Classic Free Running*

Every thread of the thread insert with precision-formed, rhombic profile is Free Running. The result is an internal thread true to gauge that can be used from both ends. The dimensional stability of the ISO thread complies with DIN 13 6H as well as for special requirements with 4H and meets the demands on international standard specifications.

HELICOIL® Classic Screwlock*

This thread insert has an additional screw-locking area. One or several polygonal-shaped threads clamp the flanks of the installed screw. The elastically resilient frictional locking results in prevailing torques similar to the specifications of ISO 2320. These screw locking torques meet the demands of technical delivery terms regarding international standard specifications. However, the prevailing torques can also be adjusted as required for the corresponding application, e.g. for securing of setting screws. HELICOIL® Classic Screwlock can only be used with screws of higher property classes (8.8 and higher). Common lubricants according to the manufacturers’ recommendations should be used for highly alloyed screws.

HELICOIL® Locknuts

HELICOIL® locknuts consist of a nut body and an integrated HELICOIL® Plus Screwlock thread insert. One or several polygonal-shaped threads clamp the flanks of the screwed in screw resulting in elastically resilient frictional locking. The achieved prevailing torques are similar to the specifications of ISO and meet the demands of technical delivery terms regarding international standard specifications. Moreover, they can also be adjusted as required for the corresponding application. HELICOIL® nuts are available in different materials. Simply order the separate catalogue No. 0560.

RIVKLE® Aero

RIVKLE® Aero combines a high-strength stainless steel blind rivet nut and a HELICOIL® Screwlock. These two perfectly matching fasteners provide considerable benefits for screwed connections on thin-walled components with high mechanical requirements. Due to the polygonal-shaped thread of the HELICOIL® Screwlock thread insert, there is a locking effect on the flanks of the screw or bolt to be screwed in. As a result, there is a highly elastically resilient frictional locking so that the screw is locked to prevent self-unscrewing. Simply order the separate catalogue No. 2307.

* Comply with DIN 8140 standard. For further standards, see page 12.
** Comply with NAS 1130 and NAS 0276 standard. For further standards, see page 12.
The HELICOIL® has been tried and tested for more than 60 years and has become a renowned structural component. There is a solution to almost every task related to this thread technology.

<table>
<thead>
<tr>
<th>Thread types</th>
<th>Designs</th>
<th>Materials</th>
<th>Surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric coarse thread</td>
<td>HELICOIL® Plus Free Running</td>
<td>Stainless steel A2 material No 1.4301</td>
<td>Bright</td>
</tr>
<tr>
<td>DIN ISO 13 1</td>
<td>HELICOIL® Plus Screwlock</td>
<td>Stainless steel A4 material No 1.4571</td>
<td>Tin-plated G100 / G300</td>
</tr>
<tr>
<td>Metric fine thread</td>
<td>HELICOIL® Plus Tangfree</td>
<td>Bronze material No 2.1020.34</td>
<td>Dry film lubricated</td>
</tr>
<tr>
<td>DIN ISO 13 (T02-T11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe thread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIN EN ISO 228/1 G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNC thread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NASM 21209</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe thread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNC thread</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NASM 21209</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HELICOIL® further catalogues**

**HELICOIL® Plus**
Thread technology for high-strength fastenings – metric threads
Catalogue No. 0100

**HELICOIL® Plus**
Thread technology for high-strength fastenings – imperial threads
UNC, UNF, BSW, BSF, BSP/G, BA
Catalogue No. 0101
http://www.boellhoff.de/en/helicoil-plus-imperial
HELICOIL® Plus
Repairing of damaged threads
Catalogue No. 0180
http://www.boellhoff.de/en/thread-repair

HELICOIL®
Tangfree Screwlock

HELICOIL®
Classic Free Running

HELICOIL®
Classic Screwlock

Not all combinations are viable.

THE BLUE BOOK
Aerospace Buyers Directory to HELICOIL® Wire Thread Inserts
Catalogue No. 0130
http://www.boellhoff.de/the-blue-book
HELICOIL® Tangfree thread technology

Materials

The overview table shows the most common materials with specifications.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Temperature resistance</th>
<th>Minimum tensile strength at room temperature</th>
<th>Examples of use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel A 2 X5 CrNi 18 10 material No 1.4301</td>
<td>low temperature –196°C short-term 425°C long-term 315°C</td>
<td>1400 N/mm² *</td>
<td>Standard applications for all property classes and materials 3; General lightweight construction e.g. of aluminium, magnesium or aluminium alloys</td>
</tr>
<tr>
<td>Stainless steel A 4 X6 CrMoTi 17 12 2 material No 1.4571</td>
<td>low temperature –196°C short-term 425°C long-term 315°C</td>
<td>1400 N/mm² *</td>
<td>Increased corrosion protection; Highly alloyed CrNi steel screws; Low thread friction; General lightweight construction; Sea water/chlorine-containing water</td>
</tr>
<tr>
<td>Bronze CuSn 6 material No 2.1020.34</td>
<td>short-term 300°C long-term 250°C</td>
<td>900 N/mm² *</td>
<td>Copper workpieces; Moving threads; CrNi steel screws</td>
</tr>
<tr>
<td>Inconel X 750 NiCr 15 Fe 7 TiAl material No 2.4669 Nimonic 90 NiCr 20 Co 18 Ti material No 2.4632</td>
<td>short-term 750°C long-term 550°C short-term 900°C long-term 600°C</td>
<td>1150 N/mm² *</td>
<td>Thermal load in combination with corrosion protection; Aerospace technology; Aeroplane engines; Turbochargers</td>
</tr>
</tbody>
</table>

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1 Further materials and surfaces on request.
2 If magnesium alloys are used outdoors, we recommend special measures for corrosion protection.
3 If CrNi screws are used, you should use a suitable coating or standard lubricant.
4 Delivery on request.

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Note: Data only apply to uncoloured HELICOIL® Tangfree.
Up to M 5, the applied colour is temperature-resistant from –18°C to +200°C.
From M 6, the applied colour is temperature-resistant from –5°C to +120°C (+150°C short-term).

*1 N/mm² equals 1 MPa

Thread types

<table>
<thead>
<tr>
<th>Thread</th>
<th>HELICOIL® Tangfree Free Running</th>
<th>HELICOIL® Tangfree Screwlock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric ISO thread coarse thread</td>
<td>Nominal diameters</td>
<td>Nominal lengths</td>
</tr>
<tr>
<td>M 3 to M 14</td>
<td>1 d to 2 d</td>
<td>M 3 to M 10</td>
</tr>
</tbody>
</table>

HELICOIL® Tangfree thread inserts comply with diverse requirements and standards from general and aerospace industries.
HELICOIL® Tangfree in metric dimensions meet the standard DIN 8140 when installed and NAS 0276 completely.
The prevailing torques are defined in MA 1565.
HELICOIL® Tangfree in imperial dimensions UNC, UNF meet the standards of NAS 1130. The prevailing torques are defined in NASM 8846.

Prevailing torques for HELICOIL® Screwlock – metric

Guide values for prevailing torques according to ISO 2320
Valid for coarse threads
Values in Nm for property class 8

<table>
<thead>
<tr>
<th>Thread</th>
<th>M 3</th>
<th>M 4</th>
<th>M 5</th>
<th>M 6</th>
<th>M 8</th>
<th>M 10</th>
<th>M 12</th>
<th>M 14</th>
<th>M 16</th>
<th>M 18</th>
<th>M 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st cycle-on, max.</td>
<td>0.43</td>
<td>0.90</td>
<td>1.60</td>
<td>3.00</td>
<td>6.00</td>
<td>10.5</td>
<td>15.5</td>
<td>24.0</td>
<td>32.0</td>
<td>42.0</td>
<td>54.0</td>
</tr>
<tr>
<td>1st cycle-off, min.</td>
<td>0.12</td>
<td>0.18</td>
<td>0.29</td>
<td>0.45</td>
<td>0.85</td>
<td>1.5</td>
<td>2.3</td>
<td>3.3</td>
<td>4.5</td>
<td>6.0</td>
<td>7.5</td>
</tr>
<tr>
<td>5th cycle-off, min.</td>
<td>0.08</td>
<td>0.12</td>
<td>0.20</td>
<td>0.30</td>
<td>0.60</td>
<td>1.0</td>
<td>1.6</td>
<td>2.3</td>
<td>3.0</td>
<td>4.2</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Prevailing torques according to aerospace standards or other metric threads:
- NASM 8846 for imperial dimensions
- MA 1565 for metric dimensions
HELICOIL® Tangfree design guidelines

Determination of nominal length

Guide values to determine the minimum length of the HELICOIL® Tangfree thread insert depending on parent material and screw property class, valid for 20°C.

<table>
<thead>
<tr>
<th>Strength of parent material</th>
<th>Screw property class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength Rm (N/mm²)*</td>
<td>3.6</td>
</tr>
<tr>
<td>≤ 100</td>
<td>1.5 d</td>
</tr>
<tr>
<td>&gt; 100 – 150</td>
<td>1.5 d</td>
</tr>
<tr>
<td>&gt; 150 – 200</td>
<td>1 d</td>
</tr>
<tr>
<td>&gt; 200 – 250</td>
<td>1 d</td>
</tr>
<tr>
<td>&gt; 250 – 300</td>
<td>1 d</td>
</tr>
<tr>
<td>&gt; 300 – 350</td>
<td>1 d</td>
</tr>
<tr>
<td>&gt; 350 – 400</td>
<td>1 d</td>
</tr>
<tr>
<td>&gt; 400</td>
<td>1 d</td>
</tr>
</tbody>
</table>

The table of values to determine the nominal length applies to aluminium as well as to materials with a ratio from shear stress = 0.6 to 0.7

Some iron cast alloys have a ratio ranging from shear stress = 0.8 to 1.4 (source: VDI 2230)

For these guide values, the screw is the weaker joint member.

Lengths can be shorter than the recommended nominal lengths if tests confirm this. Intermediate lengths are also available.

Temperature limits for validity: aluminium alloys $T_{max} = 300°C$, magnesium alloys $T_{max} = 100°C$.

For the design of screw joints under thermal stress, the changes of temperature-dependent material parameters must be taken into account.

* 1 N/mm² equals 1 MPa

Minimum wall thickness

(related to outside diameter of the HELICOIL® receiving thread)

The minimum wall thickness mainly depends on individual operating data.

These define material strength and length of thread engagement. The indicated guide value formulas apply to aluminium, cast and wrought alloys and a length of thread engagement of the HELICOIL® Tangfree of 1.5 d.

\[
d = \text{nominal } \phi \\
D_{HC} = \text{outside } \phi \text{ of the receiving thread} \\
a = \text{residual wall thickness}
\]

Diagrammatic representation with the example of M 10 x 15:

HELICOIL® Tangfree thread insert installed

Normal blind hole situation (as for HELICOIL® with tang and tapping required)

- Extremely short tapping possible, if HELICOIL® thread is milled
- Minimal remaining wall thickness feasible
- Pushing with a tang break-off tool is avoided

Benefits: Minimal wall thickness and weight reduction
**Fields of application for HELICOIL® Tangfree thread inserts**

**Automotive industry**
- Gear box housings with assembled gears
- Cylinder head fitting screw joint
- Braking system
- Steering box

**General industry**
- Electronic industry: switch cabinets, controls, measuring equipment, controllers
- Tool manufacturing
- Mobile telephony

**Aerospace industry**
- Structural assemblies
- Aeroplane engines
- Cabin interior
- Repair of components

---

Cast aluminium gear box housing. Tang break difficult due to small residual wall thickness.

Controller. Three-phase servo motor with electronic positioning unit. Loose tangs would result in faults.

Cast aluminium gear box housing. Tang removal challenging due to heavy workpiece.
Cast aluminium component. Completely lined thread at small tap hole depth.

Thread reinforcement in light metal housings for actuators and attachments.

Repair of components.
HELICOIL® Tangfree installation

HELICOIL® Tangfree thread inserts can be easily and economically installed because there are only a few basic rules to observe. There is a broad range of installation tools for efficient installation – for individual applications as well as for large-scale production. Installation phases are as follows:

**Drilling**

Common twist drills are used.
Notes on diameter and tapped hole depth are given on page 19.
Prior to tapping, counter-bore 90° and deburr. Outside diameter of maximum countersink = \( D_{HC} + 0.1 \) mm.
On the cut holding thread, the countersink is hardly visible.

**Tapping**

To tap the HELICOIL® Tangfree holding thread, system-dependent original HELICOIL® taps must be used. Recommendations for suitable manual and machine taps are given in our main catalogue No. 0100. The trueness to gauge of the holding thread must be checked with HELICOIL® thread plug limit gauges.

**Form tapping**

Today, chipless production of internal threads with forming taps is an efficient production method for many materials. This also applies to the HELICOIL® Tangfree.
Insertion of the thread insert

The installation can be done with hand-operated, machine tools. Depending on the tool principle, the HELICOIL® Tangfree thread insert is screwed onto the installation mandrel or inserted into the leader cartridge. Then, the tool is placed over the tapped hole.

Spin-on the HELICOIL® Tangfree

Grip of the blade into the notch of the HELICOIL® Tangfree

Locating the HELICOIL® Tangfree at the start of the thread

Installation

By turning the threaded mandrel or triggering the drive, the thread insert is screwed in. The HELICOIL® Tangfree must be installed at least 0.25 P below the surface in order to guarantee a correct installation (see page 18).

Screw-in the HELICOIL® Tangfree

Unscrew the mandrel

HELICOIL® Tangfree correctly installed (0.25 - 0.5 x P below the surface)

Free CAD download

We offer a free CAD download service. Download 3-D models of Böllhoff products and directly integrate them into your designs.

www.boellhoff.de/en/cad
The control values of not installed thread inserts free running and screwlock are \( W \) and \( d_1 \). This length can only be measured for installed thread inserts.

### Holding thread

- **If countersunk or burred:**
  - Maximum outside diameter = \( D_{HC} \), \( 0/0.1 \) mm.
  - The countersink is hardly visible on the HELICOIL® holding thread.
- HELICOIL® Tangfree Stripfeed (magazined) and imperial sizes UNC and UNF are available on request.

All dimensions in mm. Subject to technical change without notice.

- \( d \) = Nominal thread diameter
- \( P \) = Thread pitch
- \( d_1 \) = Outside diameter of thread insert prior to installation
- \( W \) = Number of threads prior to installation
- \( D_{HC} \) = Outside diameter of holding thread
- \( D_{1HC} \) = Crest diameter
- \( B \) = Suitable twist drill diameter.
- \( t_1 \) = Minimum depth of tap hole according to DIN 76 – Part 1 for safe thread cutting (\( t_1 = t_2 + e_1 \))

<table>
<thead>
<tr>
<th>( P )</th>
<th>0.20</th>
<th>0.25</th>
<th>0.30</th>
<th>0.35</th>
<th>0.40</th>
<th>0.45</th>
<th>0.50</th>
<th>0.60</th>
<th>0.70</th>
<th>0.75</th>
<th>0.80</th>
<th>1.00</th>
<th>1.25</th>
<th>1.50</th>
<th>1.75</th>
<th>2.00</th>
<th>2.50</th>
<th>3.00</th>
<th>3.50</th>
<th>4.00</th>
<th>4.50</th>
<th>5.00</th>
<th>5.50</th>
<th>6.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>( e_1 )</td>
<td>1.3</td>
<td>1.5</td>
<td>1.8</td>
<td>2.1</td>
<td>2.3</td>
<td>2.6</td>
<td>2.8</td>
<td>3.4</td>
<td>3.8</td>
<td>4.0</td>
<td>4.2</td>
<td>5.1</td>
<td>6.2</td>
<td>7.3</td>
<td>8.3</td>
<td>9.3</td>
<td>11.2</td>
<td>13.1</td>
<td>15.2</td>
<td>18.4</td>
<td>20.8</td>
<td>22.4</td>
<td>24.0</td>
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- \( t_2 \) = The nominal length of the thread insert corresponds to the minimum length of the full holding thread for blind holes or to the minimum plate thickness for a through hole.
- \( t_5 \) = Distance of the thread insert to the joint face = min. 0.25 to 0.5 \( P \), if \( t_2 \) corresponds to the abovementioned minimum value.

The HELICOIL® Tangfree enables very short holding threads, since no axial space for the tang break-off is required.
### Dimensions

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<tr>
<th>Dimensions</th>
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<th>W ± 0.25</th>
<th>d₁ min.</th>
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<th>D₁ HC min.</th>
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* Delivery time on request.
Length > 2 d on request.
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## Installation

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HELICOIL® Tangfree installation tools

HELICOIL® Tangfree installation tool with 1/4" hex drive

The HELICOIL® Tangfree installation mandrels are suitable for the following tools:
- Electrical installation tools
  Type E-S 206 and E-S 410
- Pneumatic installation tools
  Type P-S 412 and P-S 1216

Compatible with the hexagon holder of the HELICOIL® Plus installation tools which allows the use of well-established HELICOIL® Plus installation tools.

Complete installation tool

Delivery scope:
- Installation mandrel
- Packaging
- Telescoping sleeve
- Operating instructions
- Tool for blade change

<table>
<thead>
<tr>
<th>Thread diameter ( d )</th>
<th>Free Running</th>
<th>Screwlock</th>
<th>( L ) (mm)</th>
<th>( D_1/L_z/D_2 ) (mm)</th>
</tr>
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<tbody>
<tr>
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Your benefits at a glance:
- Quick tool change
- Reduced tool costs
- Sizes M 3 to M 14

Wear parts

<table>
<thead>
<tr>
<th>Thread diameter ( d )</th>
<th>Installation mandrel complete consisting of ①②③</th>
<th>Depth stop ②</th>
<th>Blade ③</th>
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* The wear parts are not compatible with the old tool type 5160 3XX XXXX.
Basically, there are two types of installation tools. Installation tools are chosen based on the volume of HELICOIL® Tangfree and HELICOIL® Plus thread inserts to process, the location of the tapped holes in the workpiece and the thread size. Hence, there are:

- Electrical installation tools
- Pneumatic installation tools

### Electrical installation tools

**Type E-S 206**  
For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 2 to M 6 with corresponding installation mandrel (order separately)

**Delivery scope:**
- Straight screwdriver with 1/4" hexagon
- Torque steplessly adjustable
- Case

**Technical data:**
- Idle speed: 720 rpm
- Output voltage: 35 V DC
- Torque: M = 0.45 – 0.95 Nm  
  Steplessly adjustable shut-off clutch
- Tool holder: 1/4" hexagon socket with radial bearing
- Weight: 0.31 kg
- Item No: 4160 220 0000

The installation mandrels for all available sizes are provided on page 22.

**Type E-S 410**  
For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 4 to M 10 with corresponding installation mandrel (order separately)

**Delivery scope:**
- Straight screwdriver with quick-change chuck 1/4" hexagon socket
- Speed control with ramp control on control device EDU 2AE
- Case

**Technical data:**
- Idle speed: 1200 rpm (steplessly adjustable)  
  Automatic change-over of the direction of rotation when reaching the screw-in depth
- Torque: 0.9 to 3 Nm  
  Torque steplessly adjustable on the control device
- Tool holder: Quick-change chuck 1/4" hexagon socket with radial bearing for installation mandrel
- Weight: 0.57 kg
- Item No: 4160 540 0000

The installation mandrels for all available sizes are provided on page 22.
Pneumatic installation tools

**Type P-S 412**
For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 4 to M 12 with corresponding installation mandrel (order separately)

**Technical data:**
- **Idle speed:** 1500 rpm at p = 6.3 bar
- **Air consumption:** 5.5 l/s at p = 6.3 bar
- **Torque:** M = 1.2 – 4.5 Nm
- **Tool holder:** 1/4” hexagon socket with radial bearing
- **Weight:** 0.8 kg
- **Item No:** 4160 270 0010

HELICOIL® Plus installation mandrels depending on the size with depth stop must be ordered separately, see page 22.

---

**Type P-S 1216**
For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 12 to M 16 with corresponding installation mandrel (order separately)

**Technical data:**
- **Idle speed:** 950 rpm at p = 6.3 bar
- **Air consumption:** 5.5 l/s at p = 6.3 bar
- **Torque:** M = 1.2 – 5.5 Nm
- **Tool holder:** 1/4” hexagon socket with radial bearing
- **Weight:** 0.8 kg
- **Item No:** 4160 180 0010

HELICOIL® Plus installation mandrels depending on the size with depth stop must be ordered separately, see page 22.
## Assemblies

<table>
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Dimensions > M 10 on request.

## Wear and spare parts

### Installation mandrel

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<tr>
<td>M 6</td>
<td>5160 370 6032</td>
</tr>
<tr>
<td>M 8</td>
<td>5160 370 8032</td>
</tr>
<tr>
<td>M 10</td>
<td>5160 370 8032</td>
</tr>
</tbody>
</table>

### Blade with spring and pin

<table>
<thead>
<tr>
<th>Thread diameter (d)</th>
<th>Blade with pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 3</td>
<td>5160 370 3042</td>
</tr>
<tr>
<td>M 4</td>
<td>5160 370 4042</td>
</tr>
<tr>
<td>M 5</td>
<td>5160 370 5042</td>
</tr>
<tr>
<td>M 6</td>
<td>5160 370 6042</td>
</tr>
<tr>
<td>M 8</td>
<td>5160 370 8042</td>
</tr>
<tr>
<td>M 10</td>
<td>5160 370 8042</td>
</tr>
</tbody>
</table>

### Range of compensation washers

<table>
<thead>
<tr>
<th>Thread diameter (d)</th>
<th>Range of compensation washers</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 3</td>
<td>0160 170 0060</td>
</tr>
<tr>
<td>M 4</td>
<td>0160 170 0060</td>
</tr>
<tr>
<td>M 5</td>
<td>0160 170 0060</td>
</tr>
<tr>
<td>M 6</td>
<td>0160 170 0060</td>
</tr>
<tr>
<td>M 8</td>
<td>0160 170 0060</td>
</tr>
<tr>
<td>M 10</td>
<td>0160 280 0060</td>
</tr>
</tbody>
</table>

* Delivery time on request.

Dimensions > 2 d on request.
**Type E-PSG 256 with leader cartridge**
For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 2.5 to M 6 with exchange unit

**Delivery scope:** See type E-S 410

**Technical data:**
- **Idle speed:** 1200 rpm (steplessly adjustable)
- **Automatic change-over of the direction of rotation when reaching the screw-in depth**
- **Torque:** 0.9 to 3 Nm
- **Torque steplessly adjustable on the control device**
- **Tool holder:** Connection for leader cartridges of P-PSG 256
- **Weight:** 0.75 kg
- **Item No:** 0160 470 0000

The exchange units for all available sizes are provided on page 22.

---

**Type E-PSG 714T with leader cartridge**
For quick processing of HELICOIL® Tangfree thread inserts M 7 to M 10 with exchange unit

**Delivery scope:** See type E-S 410

**Technical data:**
- **Idle speed:** 850 rpm (steplessly adjustable)
- **Automatic change-over of the direction of rotation when reaching the screw-in depth**
- **Torque:** 0.5 to 6 Nm
- **Torque steplessly adjustable on the control device**
- **Tool holder:** Connection for leader cartridges of P-PSG 714
- **Weight:** 1.00 kg
- **Item No:** 5160 380 0000

The exchange units for all available sizes are provided on page 22. Dimensions > M 10 on request.

---

**Type P-PSG 256T**
For quick processing of HELICOIL® Tangfree thread inserts M 2.5 to M 6 with corresponding leader cartridge (order separately)

Available in 2018
HELICOIL® extraction tool

For manual and machine disassembly of HELICOIL® thread inserts M 3 to M 14 (larger sizes on request).

**Delivery scope:**
- Extracted tool
- Adapter for 1/4" hexagon
- Operating instructions
- Telescoping sleeve

Deep-installed HELICOIL® thread inserts can be extracted without damaging the parent thread:

<table>
<thead>
<tr>
<th></th>
<th>Steel: Rm &gt; 200 N/mm² **</th>
<th>Aluminium: Rm &gt; 200 N/mm² **</th>
<th>Aluminium: Rm &lt; 200 N/mm² **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush-mounted HELICOIL®</td>
<td>OK</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>Deep-mounted HELICOIL®</td>
<td>OK</td>
<td>OK</td>
<td>limited</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nominal thread Ø</th>
<th>Item No</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 3</td>
<td>0180 603 00</td>
</tr>
<tr>
<td>M 4</td>
<td>0180 604 00</td>
</tr>
<tr>
<td>M 5</td>
<td>0180 605 00</td>
</tr>
<tr>
<td>M 6</td>
<td>0180 606 00</td>
</tr>
<tr>
<td>M 8</td>
<td>0180 608 00</td>
</tr>
<tr>
<td>M 10</td>
<td>0180 610 00</td>
</tr>
<tr>
<td>M 12</td>
<td>0180 612 00</td>
</tr>
<tr>
<td>M 14</td>
<td>0180 614 00</td>
</tr>
</tbody>
</table>

From M 16 on request

The tool can be assembled using a tap wrench, ratchet or cordless screwdriver. The tool comes complete with an adapter for a cordless screwdriver.

**1 N/mm² equals 1 MPa**
Böllhoff International with companies in:
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