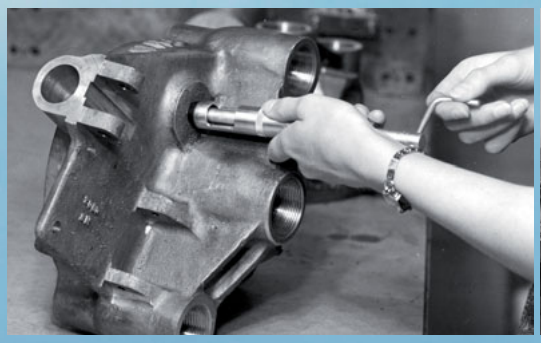
BÖLLHOFF

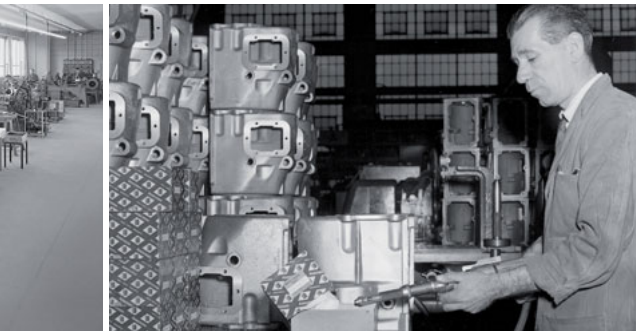
HELICOIL® Tangfree

The tangfree coil thread insert
for high-strength threads
– metric threads
– imperial threads: UNC and UNF



System modules – the fastener

System modules – the tool



Small pictures: First development steps of HELICOIL® technology

HELICOIL® thread inserts

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.

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

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 65 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.

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 HELICOIL® technology 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
  – Easy handling
  – Processing without 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

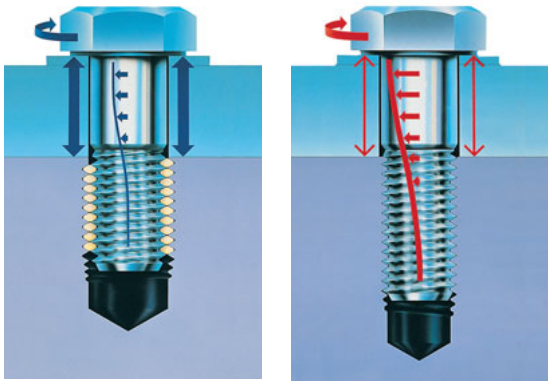
Improved quality
- Simplified quality assurance
- High-strength threads also for blind holes with small depth or pre-assembled subassemblies

For metric threads
- Comply with NA0276 standard
- Comply with DIN 8140 standard when installed

For imperial threads
- Comply with NAS1130 standard

Wear resistance

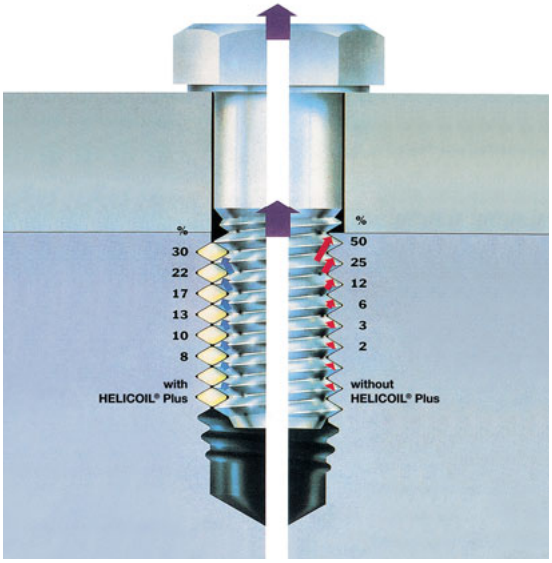
HELICOIL® Tangfree thread inserts are made of austenitic chrome-nickel steel (minimum tensile strength 1,400 N/mm^2). The high surface quality of the rolled thread ensures a high-strength, wear-resistant thread with an extremely small and constant thread friction torque. Therefore, a higher, constant 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 %.



Strength

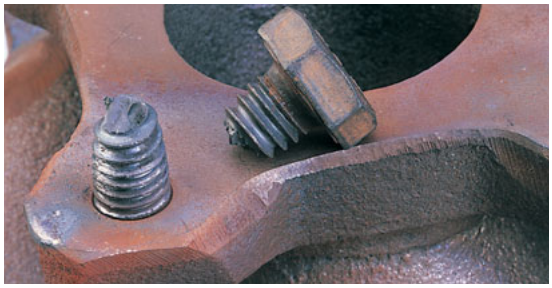
The elastic properties of the HELICOIL® Tangfree thread insert allow a uniform load and stress distribution. An optimum flank contact is achieved. Variable pitches and angles are compensated for over the entire length of the thread insert. Force transmission from bolt to nut thread is optimised. The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

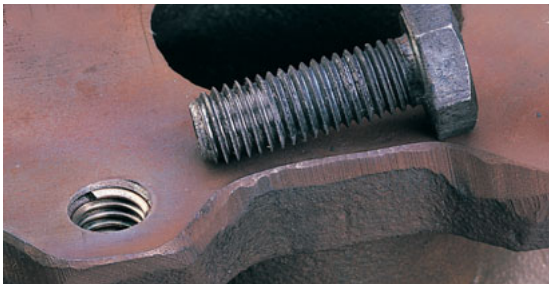
Due to the improved distribution of the preload-force, the fatigue strength of dynamically loaded screws is increased. This is why the HELICOIL® is also suitable for use in threads in high-strength materials, e.g. steel or cast iron alloys.



Corrosion and temperature resistance

The standard material of the HELICOIL® Tangfree prevents seizing of screws under environmental influences. HELICOIL® Tangfree thread inserts made 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.

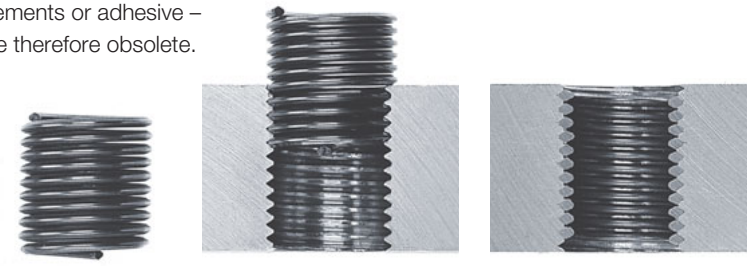




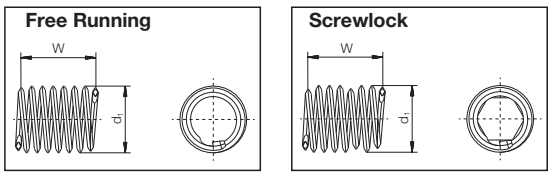
Tight fit

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



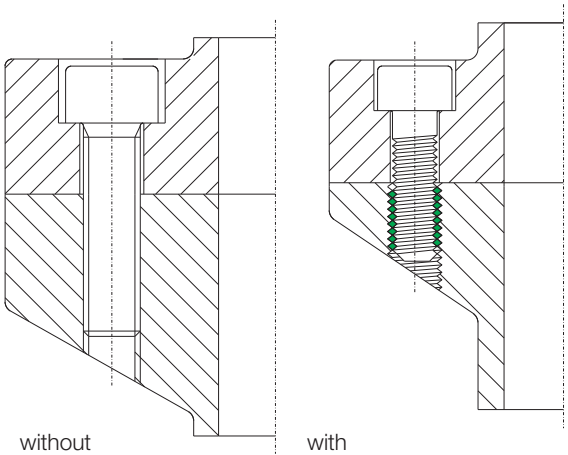
Thread technology and the polygonal-shaped thread of the HELICOIL® Tangfree Screwlock lead to a high degree of frictional locking and thus prevent the screw unscrewing and its losing. Additional locking of the joint with split pins, wires or washers is not required. Costs are reduced and installation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



without HELICOIL® Tangfree

with HELICOIL® Tangfree

HELICOIL® 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 HELICOIL® technology is a perfect addition to the HELICOIL® product family.

HELICOIL® Tangfree Screwlock**

HELICOIL® Tangfree Screwlock has the same advantages as HELICOIL® 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.

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

HELICOIL® 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 HELICOIL® 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 NAS1130 and NA0276 standard. For further standards, see page 12.

HELICOIL® Classic Free Running*

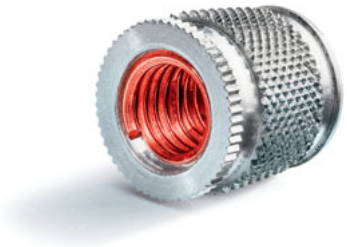
Every thread of the thread insert with precision-formed, rhombic profile is Free Running. The result is an internal thread true to gauge that can be used from both ends.
The dimensional stability of the ISO thread complies with DIN 13 6H as well as for special requirements with 4H and meets the demands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

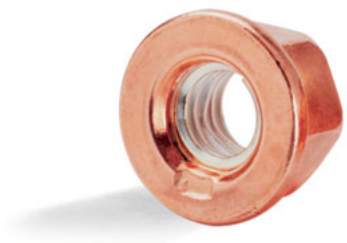
Efficient combination

HITSERT® Screwlock



The HITSERT® Screwlock combines the advantages of an aluminium HITSERT® 2 and a stainless steel HELICOIL® Screwlock (according NASM21209) thread insert for screwed connections with high requirements.
These two elements match perfectly to provide considerable benefits for screwed connections with high requirements. Locking of the screw is achieved with a polygonal-shaped thread of the HELICOIL® Screwlock. These threads have a locking effect on the flanks of the screw or bolt to be screwed in. The result is an elastically resilient frictional locking mechanism with the bolt or screw resisting self-loosening and unscrewing.

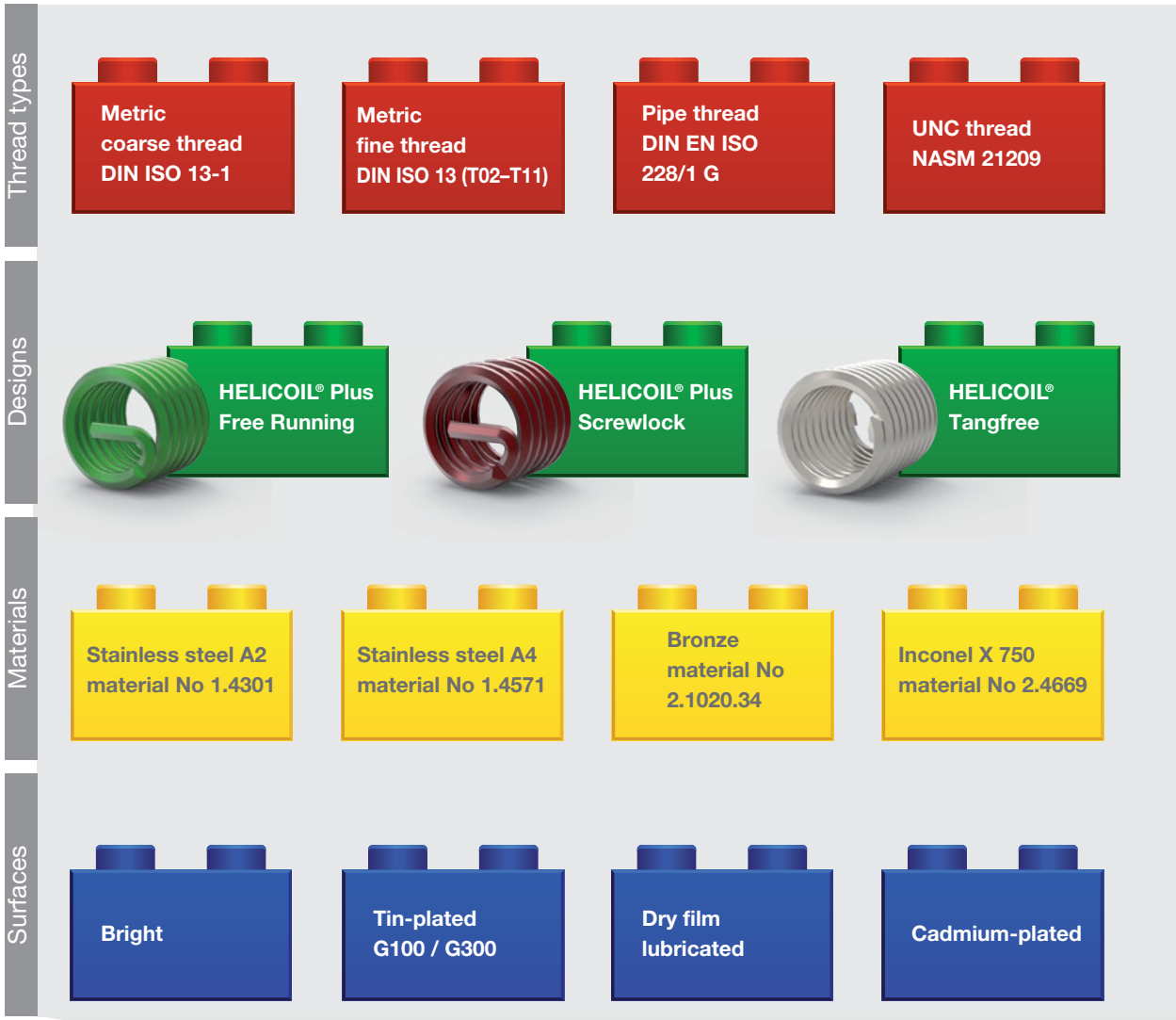
HELICOIL® Locknuts



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.

* Comply with DIN 8140 standard. For further standards, see page 12.
** Comply with NAS1130 and NA0276 standard. For further standards, see page 12.

The HELICOIL® has been tried and tested for more than 65 years and has become a renowned structural component. There is a solution to almost every task related to this thread technology.



HELICOIL® further catalogues

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

http://www.boellhoff.com/en/helicoil-plus

HELICOIL® Plus
Thread technology for high-strength fastenings – imperial threads
UNC, UNF, BSW, BSF, BSP/G, BA
Catalogue No. 0101

http://www.boellhoff.com/en/helicoil-plus-imperial

Thread types

UNF thread
NASM 21209

BSW BS 84

BSF BS 84

BA BS 93

Designs

HELICOIL®
Tangfree
Screwlock

HELICOIL®
Classic
Free Running

HELICOIL®
Classic
Screwlock

Materials

Nimonic 90
material No 2.4632

Aluminium
material No 3.4365

Surfaces

Silver-plated

Hard-coated

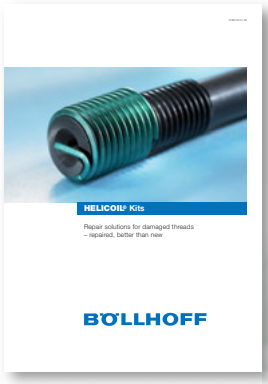
Coloured:
red, green, blue,
yellow

Primer-Free®2

Not all combinations
are viable.

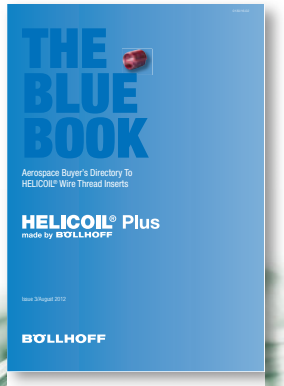
HELICOIL® Plus
Repairing of damaged
threads
Catalogue No. 0180

http://www.boellhoff.com/
en/thread-repair



THE BLUE BOOK
Aerospace Buyer's
Directory to HELICOIL®
Wire Thread Inserts
Catalogue No. 0130

http://www.boellhoff.com/
the-blue-book



Materials

The overview table shows the most common materials with specifications.

Materials ①	Temperature resistance	Minimum tensile strength at room temperature	Examples of use
Stainless steel A 2 X5 CrNi 18 10 material No 1.4301	low temperature –196 °C short-term 425 °C long-term 315 °C	1400 N/mm² *	■ Standard applications for all property classes and materials ③ ■ General lightweight construction e.g. of aluminium, magnesium or aluminium alloys ②
Stainless steel A 4 X6 CrNiMoTi 17 12 2 ④ material No 1.4571	low temperature –196 °C short-term 425 °C long-term 315 °C	1400 N/mm² *	■ Increased corrosion protection ■ Highly alloyed CrNi steel screws ③ ■ Low thread friction ■ General lightweight construction ■ Sea water/chlorine-containing water
Bronze CuSN 6 material No 2.1020.34	short-term 300 °C long-term 250 °C	900 N/mm² *	■ Copper workpieces ■ Moving threads ■ CrNi steel screws
Inconel X 750 NiCr 15 Fe 7 TiAl ④ material No 2.4669 Nimonic 90 NiCr 20 Co 18 Ti ④ material No 2.4632	short-term 750 °C long-term 550 °C short-term 900 °C long-term 600 °C	1150 N/mm² *	■ Thermal load in combination with corrosion protection ■ Aerospace technology ■ Aeroplane engines ■ Turbochargers

① Further materials, e.g. Nitronic 60, 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.

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

Thread	HELICOIL® Tangfree Free Running		HELICOIL® Tangfree Screwlock		Page
	Nominal diameters	Nominal lengths	Nominal diameters	Nominal lengths	
Metric ISO thread coarse thread	M 3 to M 14	1 d to 2 d	M 3 to M 10	1 d to 2 d	19
UNIFIED or American National Coarse threads	4–40 to 3/8"–16	1 d to 2 d	4–40 to 3/8"–16	1 d to 2 d	
UNIFIED or American National Fine threads	10–32 to 3/8"–24	1 d to 2 d	10–32 to 3/8"–24	1 d to 2 d	

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 NA0276 completely.
The prevailing torques are defined in MA1565.
HELICOIL® Tangfree in imperial dimensions UNC, UNF meet the standards of NAS1130. The prevailing torques are defined in NASM8846.

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									
Thread	M 3	M 4	M 5	M 6	M 8	M 10	M 16	M 18	M 20
1st cycle-on, max.	0.43	0.90	1.60	3.00	6.00	10.5	32.0	42.0	54.0
1st cycle-off, min.	0.12	0.18	0.29	0.45	0.85	1.5	4.5	6.0	7.5
5th cycle-off, min.	0.08	0.12	0.20	0.30	0.60	1.0	3.0	4.2	5.3

HELICOIL® Tangfree thread inserts comply with the requirements for prevailing torques according to the following standards:
- NASM8846 for imperial dimensions
- MA1565 for metric dimensions

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.

Strength of parent material	Screw property class								
Tensile strength R_m (N/mm²)*	3.6 / 4.6	4.8 / 5.6	5.8 / 6.6	6.8 / 6.9	8.8	9.8	10.9	12.9	14.9
to 100	1.5 d	1.5 d	2 d	2.5 d	3 d	3 d	–	–	–
> 100 – 150	1.5 d	1.5 d	2 d	2 d	2.5 d	2.5 d	2.5 d	2.5 d	3 d
> 150 – 200	1 d	1.5 d	1.5 d	1.5 d	2 d	2 d	2 d	2.5 d	2.5 d
> 200 – 250	1 d	1 d	1.5 d	1.5 d	1.5 d	1.5 d	2 d	2.5 d	2.5 d
> 250 – 300	1 d	1 d	1 d	1 d	1.5 d	1.5 d	1.5 d	2 d	2 d
> 300 – 350	1 d	1 d	1 d	1 d	1 d	1.5 d	1.5 d	1.5 d	2 d
> 350 – 400	1 d	1 d	1 d	1 d	1 d	1 d	1.5 d	1.5 d	1.5 d
> 400	1 d	1 d	1 d	1 d	1 d	1 d	1.5 d	1.5 d	1.5 d

The table of values to determine the nominal length applies to aluminium as well as to materials with a ratio from $\frac{\text{shear stress}}{\text{tensile stress}}$ = 0.6 to 0.7
Some iron cast alloys have a ratio ranging from $\frac{\text{shear stress}}{\text{tensile stress}}$ = 0.8 to 1.4 (source: VDI 2230)

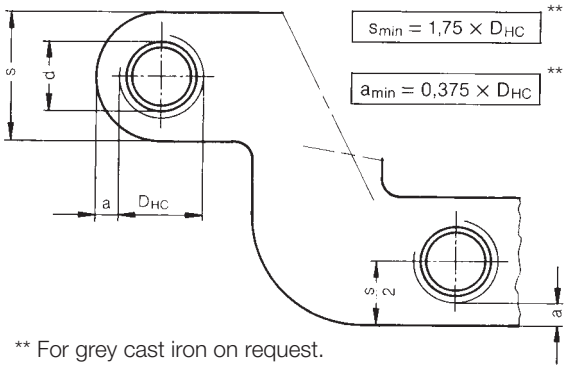
For these guide values, the screw is the weaker joint member.
Lengths can be shorter than the recommended nominal lengths if tests confirm this.
Intermediate lengths are also available.
Temperature limits for validity: aluminium alloys T_{max} = 300 °C, magnesium alloys T_{max} = 100 °C.
For the design 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.

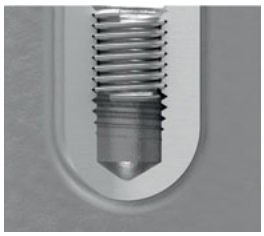
d = nominal Ø
D_{HC} = outside Ø of the receiving thread
a = residual wall thickness



** For grey cast iron on request.

Representation with the example of M 10 x 15:

HELICOIL® Plus



Blind hole for HELICOIL® with tang according to DIN 76 Part 1 (normal case)

HELICOIL® Tangfree

- Extremely short tapping possible if HELICOIL® thread is drilled according to MA1567 (case FB) metric or respectively to NASM33537 imperial. Core hole depth for milled thread on request
- Minimal remaining wall thickness at the bottom of the bore feasible
- Pushing with a tang break-off tool is avoided
  Benefits: Minimal wall thickness and weight reduction
- Design of very short thread domes possible

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

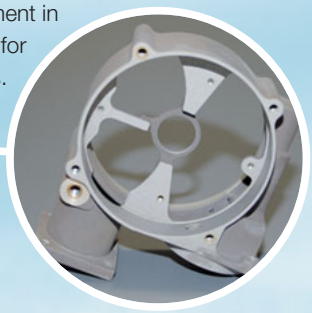
Cast aluminium gear box housing.
Tang break difficult due to small residual wall thickness.

Cast aluminium gear box housing.
Tang removal challenging due to heavy workpiece.

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

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 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

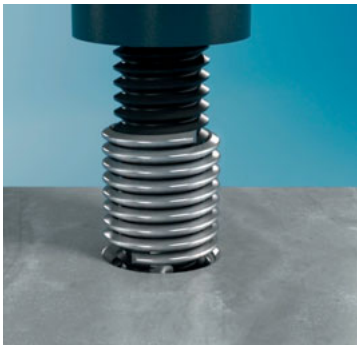
Today, chipless production of internal threads with forming taps is an efficient production method for many materials. This also applies to the HELICOIL® Tangfree.

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

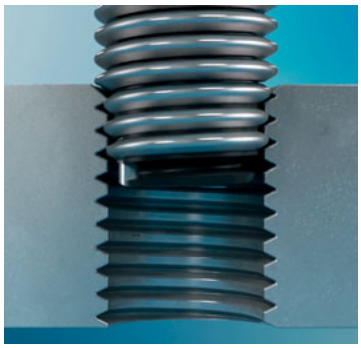
Grip of the blade into the notch of the HELICOIL® Tangfree



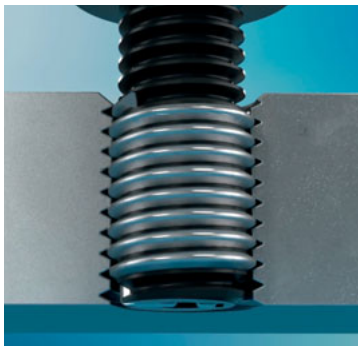
Locating the HELICOIL® Tangfree at the start of the thread

Installation

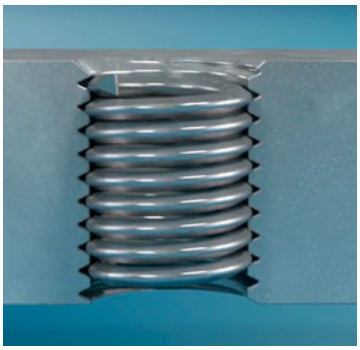
By turning the threaded mandrel or triggering the drive, the thread insert is screwed in. The HELICOIL® Tangfree must be installed at least 0.25 P below the surface in order to guarantee a correct installation (see page 18).



Screw-in the HELICOIL® Tangfree

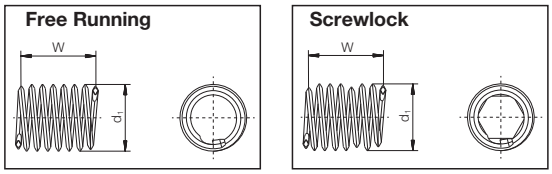


Unscrew the mandrel



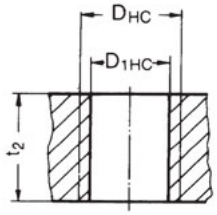
HELICOIL® Tangfree correctly installed (0.25 - 0.5 x P below the surface)

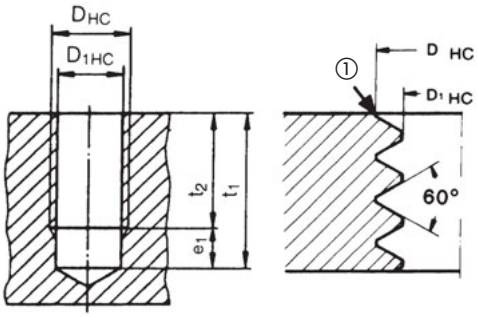
Free CAD download
We offer a free CAD download service. Download 3-D models of Böllhoff products and directly integrate them into your designs.
www.boellhoff.de/en/cad



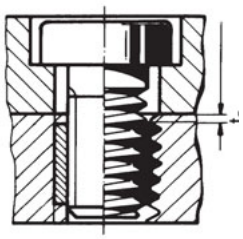
The control values of not installed thread inserts free running and screwlock are W and d_1.
The length can only be measured for installed thread inserts.

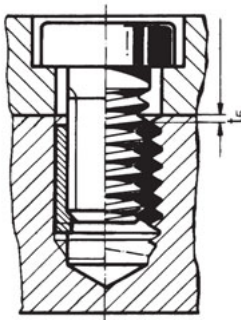
Holding thread





Assembly





① **If countersunk or burred:**
maximum outside diameter = D_{HC} 0/+0.1 mm.
The countersink is hardly visible on the HELICOIL® holding thread.

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.
e_1 = Core hole depth for standard threads

P	0.50	0.60	0.70	0.75	0.80	1.00	1.25	1.50	1.75	2.00
e_1	2.0	2.4	2.8	3.0	3.2	4.0	5.0	6.0	7.0	8.0

t_1 = Minimum depth of tap hole according to MA1567 thread form FB and NASM33537 for safe thread cutting ($t_1 = t_2 + e_1$)
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	P	t_2 min x d	t_2 min mm	W ±0.25	d_1 min.	d_1 max.	D_{1HC} min.	D_{1HC} max.	B	D_{HC} min.	HELICOIL® Tangfree Free Running	HELICOIL® Tangfree Screwlock
M 3	0.50	1	3.00	3.8	3.80	4.35	3.11	3.22	3.2	3.65	5130 003 0003	5132 003 0003
		1.5	4.50	6.4	3.80	4.35	3.11	3.22	3.2	3.65	5130 003 0045	5132 003 0045
		2	6.00	8.9	3.80	4.35	3.11	3.22	3.2	3.65	5130 003 0006	5132 003 0006
M 4	0.70	1	4.00	3.6	505	5.60	4.15	4.29	4.2	4.91	5130 004 0004	5132 004 0004
		1.5	6.00	6.1	5.05	5.60	4.15	4.29	4.2	4.91	5130 004 0006	5132 004 0006
		2	8.00	8.6	5.05	5.60	4.15	4.29	4.2	4.91	5130 004 0008	5132 004 0008
M 5	0.80	1	5.00	4.1	6.25	6.80	5.17	5.33	5.2	6.04	5130 005 0005	5132 005 0005
		1.5	7.50	6.9	6.25	6.80	5.17	5.33	5.2	6.04	5130 005 0075	5132 005 0075
		2	10.00	9.6	6.25	6.80	5.17	5.33	5.2	6.04	5130 005 0010	5132 005 0010
M 6	1.00	1	6.00	4.0	7.40	7.95	6.22	6.41	6.3	7.30	5130 006 0006	5132 006 0006
		1.5	9.00	6.8	7.40	7.95	6.22	6.41	6.3	7.30	5130 006 0009	5132 006 0009
		2	12.00	9.5	7.40	7.95	6.22	6.41	6.3	7.30	5130 006 0012	5132 006 0012
M 8	1.25	1	8.00	4.5	9.80	10.35	8.27	8.48	8.4	9.62	5130 008 0008	5132 008 0008
		1.5	12.00	7.4	9.80	10.35	8.27	8.48	8.4	9.62	5130 008 0012	5132 008 0012
		2	16.00	10.3	9.80	10.35	8.27	8.48	8.4	9.62	5130 008 0016	5132 008 0016
M 10	1.50	1	10.00	4.9	11.95	12.50	10.32	10.56	10.5	11.95	5130 010 0010	5132 010 0010
		1.5	15.00	8.0	11.95	12.50	10.32	10.56	10.5	11.95	5130 010 0015	5132 010 0015
		2	20.00	11.1	11.95	12.50	10.32	10.56	10.5	11.95	5130 010 0020	5132 010 0020
M 12	1.75	1	12.00	5.0	14.30	15.00	12.38	12.64	12.5	14.27	5130 012 0012	on request
		1.5	18.00	8.3	14.30	15.00	12.38	12.64	12.5	14.27	5130 012 0018	on request
		2	24.00	11.5	14.30	15.00	12.38	12.64	12.5	14.27	5130 012 0024	on request
M 14	2.00	1	14.00	5.0	16.80	17.50	14.43	14.73	14.5	16.60	5130 014 0014	on request
		1.5	21.00	8.6	16.80	17.50	14.43	14.73	14.5	16.60	5130 014 0021	on request
		2	28.00	11.9	16.80	17.50	14.43	14.73	14.5	16.60	5130 014 0028	on request

Dimensions	P	t_2 min x d	t_2 min mm	W ±0.25	d_1 min.	d_1 max.	D_{1HC} min.	D_{1HC} max.	B	D_{HC} min.	HELICOIL® Tangfree Free Running *	HELICOIL® Tangfree Screwlock
4-40 UNC	0.635	1	2.9	2.8	3.66	4.04	3.00	3.15	3.1	3.67	5130 065 6004	5132 065 6004
		1.5	4.3	4.8	3.66	4.04	3.00	3.15	3.1	3.67	5130 065 6006	5132 065 6006
		2	5.8	6.8	3.66	4.04	3.00	3.15	3.1	3.67	5130 065 6008	5132 065 6008
6-32 UNC	0.794	1	3.5	2.8	4.52	4.90	3.68	3.89	3.8	4.54	5130 067 6004	5132 067 6004
		1.5	5.3	4.8	4.52	4.90	3.68	3.89	3.8	4.54	5130 067 6006	5132 067 6006
		2	7.0	6.9	4.52	4.90	3.68	3.89	3.8	4.54	5130 067 6008	5132 067 6008
8-32 UNC	0.794	1	4.2	3.5	5.21	5.59	4.34	4.52	4.4	5.20	5130 068 6004	5132 068 6004
		1.5	6.3	6.0	5.21	5.59	4.34	4.52	4.4	5.20	5130 068 6006	5132 068 6006
		2	8.3	8.4	5.21	5.59	4.34	4.52	4.4	5.20	5130 068 6008	5132 068 6008
10-24 UNC	1.058	1	4.8	2.9	6.20	6.58	5.06	5.28	5.2	6.20	on request	on request
		1.5	7.2	5.0	6.20	6.58	5.06	5.28	5.2	6.20	on request	on request
		2	9.6	7.1	6.20	6.58	5.06	5.28	5.2	6.20	on request	on request
1/4-20 UNC	1.270	1	6.4	3.4	7.87	8.38	6.62	6.86	6.7	8.00	5130 074 6004	on request
		1.5	9.5	5.8	7.87	8.38	6.62	6.86	6.7	8.00	5130 074 6006	on request
		2	12.7	8.0	7.87	8.38	6.62	6.86	6.7	8.00	5130 074 6008	on request
10-32 UNF	0.794	1	4.8	4.1	5.99	6.50	5.00	5.16	5.1	5.86	5130 069 7004	5132 069 7004
		1.5	7.2	6.9	5.99	6.50	5.00	5.16	5.1	5.86	5130 069 7006	5132 069 7006
		2	9.6	9.5	5.99	6.50	5.00	5.16	5.1	5.86	5130 069 7008	5132 069 7008
1/4-28 UNF	0.907	1	6.4	5.0	7.77	8.28	6.55	6.72	6.7	7.53	5130 074 7004	5132 074 7004
		1.5	9.5	8.3	7.77	8.28	6.55	6.72	6.7	7.53	5130 074 7006	5132 074 7006
		2	12.7	11.4	7.77	8.28	6.55	6.72	6.7	7.53	5130 074 7008	5132 074 7008

*Delivery time on request.
Length > 2 d on request.

HELICOIL® Tangfree STRIPFEED® (magazined) available.

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

Your benefits at a glance:

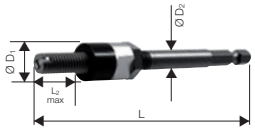
- Quick tool change
- Reduced tool costs
- Sizes M 3 to M 14

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

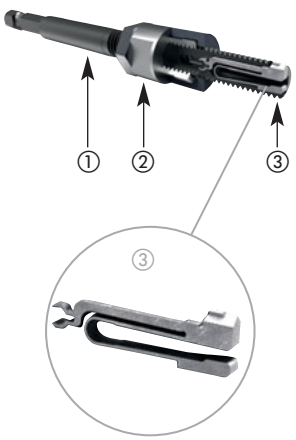
Delivery scope:

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



Thread diameter d	Free Running	Screwlock	L (mm)	$D_1 / L_2 / D_2$ (mm)
M 3	5160 430 3000*	5160 430 3002*	100	7 / 7.5 / 8
M 4	5160 430 4000 *	5160 430 4002 *	89	8 / 10 / 8
M 5	5160 430 5000 *	5160 430 5002 *	105	9.5 / 12.5 / 8
M 6	5160 430 6000 *	5160 430 6002 *	105	11 / 15 / 8
M 8	5160 450 8000 *	5160 450 8002 *	108	14.5 / 20 / 8
M 10	5160 451 0000 *	5160 451 0002 *	118	16 / 25 / 8
M 12	5160 451 2000 *	on request	125	20 / 30 / 8
M 14	5160 451 4000 *	on request	130	21 / 35 / 8
4-40 UNC	5160 436 5600 *	5160 436 5602 *	100	7 / 7 / 8
6-32 UNC	5160 436 7600 *	5160 436 7602 *	90	8 / 8.75 / 8
8-32 UNC	5160 436 8600 *	5160 436 8602 *	90	8 / 10 / 8
10-24 UNC	on request	on request		
¼-20 UNC	5160 437 4600 *	5160 437 4602 *	100	11 / 15.7 / 8
10-32 UNF	5160 436 9700 *	5160 436 9702 *	100	9.5 / 11.95 / 8

Wear parts*



Thread diameter d	Installation mandrel complete consisting of ① ② ③		Depth stop ②		Blade ③
	Free Running	Screwlock	Free Running	Screwlock	
M 3	5160 430 3020	5160 430 3022	5160 430 3025	5160 430 3026	5160 430 3023
M 4	5160 430 4020	5160 430 4022	5160 430 4025	5160 430 4026	5160 430 4023
M 5	5160 430 5020	5160 430 5022	4169 230 5010	5160 430 5026	5160 430 5023
M 6	5160 430 6020	5160 430 6022	4169 230 6010	4169 230 6020	5160 430 6023
M 8	5160 450 8020	5160 450 8022	4169 250 8010	4169 250 8020	5160 450 8023
M 10	5160 451 0020	5160 451 0022	4169 251 0010	4169 251 0020	5160 451 0023
M 12	5160 451 2020	on request	4169 251 2010	on request	5160 451 2023
M 14	5160 451 4020	on request	4169 251 4010	on request	5160 451 4023
4-40 UNC	5160 436 5620	5160 436 5622	5160 436 5625	5160 436 5626	5160 436 5623
6-32 UNC	5160 436 7620	5160 436 7622	5160 436 7625	5160 436 7626	5160 436 7623
8-32 UNC	5160 436 8620	5160 436 8622	5160 436 8625	5160 436 8626	5160 436 8623
10-24 UNC	on request	on request	on request	on request	on request
¼-20 UNC	5160 437 4620	5160 437 4622	5160 436 4625	5160 437 4626	5160 437 4623
10-32 UNF	5160 436 9720	5160 436 9722	5160 436 9725	5160 436 9726	5160 436 9723

*The wear parts are not compatible with the old tool type 5160 3XX XXXX.

Basically, there are three 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
- Installation tools with leader cartridge

Electrical installation tools

Type E-S 206

For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 2 to M 6 as well as UNC 2-56 to UNC 1/4"-20 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 as well as UNC 8-32 to UNC 3/8"-16 with corresponding installation mandrel (order separately)

Delivery scope:

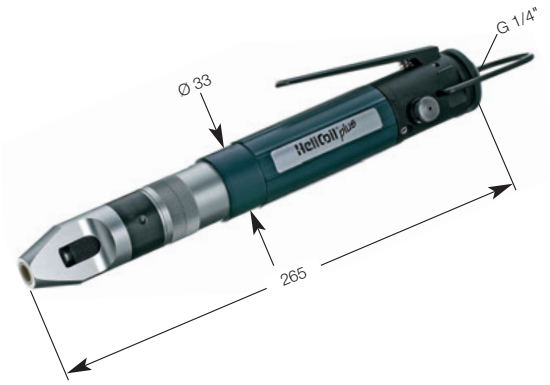
- Straight screwdriver with quick-change chuck 1/4" hexagon socket
- Speed control with ramp control on control device EDU 2AE
- Case

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



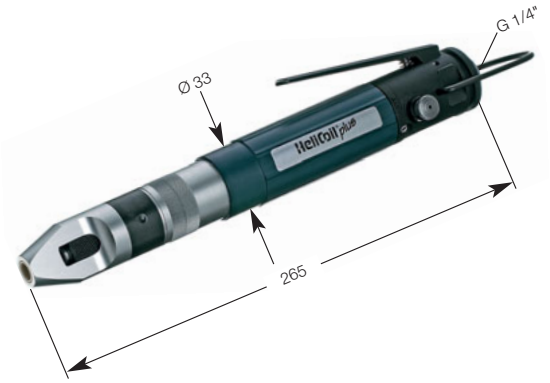
Type P-S 412

For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 4 to M 12 as well as UNC 8-32 to UNC 1/2"-13 with corresponding installation mandrel (order separately)

Technical data:

Idle speed:	1500 rpm at p = 6.3 bar Adjustable through air pressure
Air consumption:	5.5 l/s at p = 6.3 bar
Torque:	M = 1.2–4.5 Nm Steplessly adjustable shut-off clutch
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, UNC 7/16" and UNC 1/2"-13 with corresponding installation mandrel (order separately)

Technical data:

Idle speed:	950 rpm at p = 6.3 bar Adjustable through air pressure
Air consumption:	5.5 l/s at p = 6.3 bar
Torque:	M = 1.2–5.5 Nm Steplessly adjustable shut-off clutch
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.

Installation tools with leader cartridge

Pitch-controlled HELICOIL® Tangfree and HELICOIL® Plus installation tools for processing bulk material and magazined thread inserts.
The installation tools are equipped with a reversible compressed-air motor and a size-dependent exchange unit.
The HELICOIL® installation depth is adjusted with compensation washers.
We recommend this tool for medium and large-scale production.

Type E-PSG 256 with leader cartridge

For quick processing of HELICOIL® Tangfree and HELICOIL® Plus thread inserts M 2.5 to M 6 and UNC 4-40 to UNF 1/4"-28 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 26.

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 26.
Dimensions > M 10 on request.

HELICOIL® Tangfree accessories

Assemblies, wear and spare parts are suitable for the processing of bulk material and magazined (STRIPFEED®) HELICOIL® Tangfree thread inserts.

Assemblies

Exchange unit

Exemplary illustrations

Type	Thread diameter d	Exchange unit complete	
		Free Running	Screwlock
E-PSG 256	M 3	5160 370 3050	5160 370 3052
	M 4	5160 370 4050	5160 370 4052
	M 5	5160 370 5050	5160 370 5052
	M 6	5160 370 6050	5160 370 6052
E-PSG 714T	M 8	5160 280 8050	5160 280 8052
	M 10	5160 281 0050	5160 281 0052

Dimensions > M 10 on request.

Type	Thread diameter d	Exchange unit complete	
		Free Running	Screwlock
E-PSG 256	4–40 UNC	5160 376 5650	5160 376 5652
	6–32 UNC	5160 376 7650	5160 376 7652
	8–32 UNC	5160 376 8650	5160 376 8652
	10–24 UNC	auf Anfrage	auf Anfrage
	¼–20 UNC	5160 377 4650	5160 377 4652
	10–32 UNF	5160 376 9750	5160 376 9752
	¼–28 UNF	5160 377 4750	5160 377 4752

Wear and spare parts

Installation mandrel

Leader cartridge

Blade with spring and pin

Range of compensation washers

Exemplary illustrations

Type	Thread diameter d	Installation mandrel		Dowel pin for installation mandrel	Leader cartridge	Blade with spring and pin	Range of compensation washers
		Free Running	Screwlock				
E-PSG 256	M 3	5160 370 3020	5160 370 3022	5639 000 7003	5160 370 3032	5160 370 3024	0160 170 0060
	M 4	5160 370 4020	5160 370 4022	5639 000 7003	5160 370 4032	5160 370 4024	
	M 5	5160 370 5020	5160 370 5022	5639 000 7003	5160 370 5032	5160 370 5024	
	M 6	5160 370 6020	5160 370 6022	5639 000 7003	5160 370 6032	5160 370 6024	
E-PSG 714T	M 8	5160 280 8020	5160 280 8022	on request	5160 280 8032	5160 280 8024	0160 280 0060
	M 10	5160 281 0020	5160 281 0022	on request	5160 281 0032	5160 281 0024	

Type	Thread diameter d	Installation mandrel		Dowel pin for installation mandrel	Leader cartridge	Blade with spring and pin	Range of compensation washers
		Free Running	Screwlock				
E-PSG 256	4–40 UNC	5160 376 5620	5160 376 5622	5639 000 7003	5160 376 5632	5160 376 5624	0160 170 0060
	6–32 UNC	5160 376 7620	5160 376 7622	5639 000 7003	5160 376 7632	5160 376 7624	
	8–32 UNC	5160 376 8620	5160 376 8622	5639 000 7003	5160 376 8632	5160 376 8624	
	10–24 UNC	on request	on request	on request	on request	on request	
	¼–20 UNC	5160 377 4620	5160 377 4622	5639 000 7003	5160 377 4632	5160 377 4624	
	10–32 UNF	5160 376 9720	5160 376 9722	5639 000 7003	5160 376 9732	5160 376 9724	
	¼–28 UNF	5160 377 4720	5160 377 4722	5639 000 7003	5160 377 4732	5160 377 4724	

* Delivery time on request.

Dimensions > 2 d on request.

Parallel system type S for HELICOIL® Tangfree and HELICOIL® Plus installation tools

Type	Product characteristics		Item No
S 600	Work radius	130 mm – 450 mm	0182 080 0003 (see delivery scope)
	Work height	50 mm – 450 mm	
	Weight without tool	8 kg	
	Torque absorption	15 Nm max.	

Advantages:

- Rationalisation
- Quick and safe positioning especially for small dimensions ≤ M 5 or 8-32 UNC
- Easy handling, no operator fatigue (no return rotation forces)
- Absorption of screwdriver weight
- Can be used with electrical and pneumatic HELICOIL® installation tools

Delivery scope:

- 3-axis guiding system
- Tool holder
- 1 counterbalance 1 – 3 kg
- Base plate made of extruded aluminium profile with grooves, dimensions w x h x l: 240 x 40 x 500 mm

Screwdriver and control unit not included in delivery.

HELICOIL® extraction tool
M 3 to M 5

HELICOIL® extraction tool
M 6 to M 56

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:

	Steel	Aluminium R_m > 200 N/mm² **	Aluminium R_m < 200 N/mm² **
Flush-mounted HELICOIL®	OK	OK	OK
Deep-mounted HELICOIL®	OK	OK	limited

Nominal thread Ø	Item No
M 3	0180 603 0000
M 4	0180 604 0000
M 5	0180 605 0000
M 6	0180 606 0000
M 8	0180 608 0000
M 10	0180 610 0000
M 12	0180 612 0000
M 14	0180 614 0000

From M 16 on request

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

** 1 N/mm² equals 1 MPa

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