HELICOIL® tangfree

The tangfree coil thread insert
for a high-strength thread

MeFaCo
INDUSTRIAL FASTENERS AND TOOLS

BÖLLHOFF

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The HELICOIL® system

System modules – the fastener

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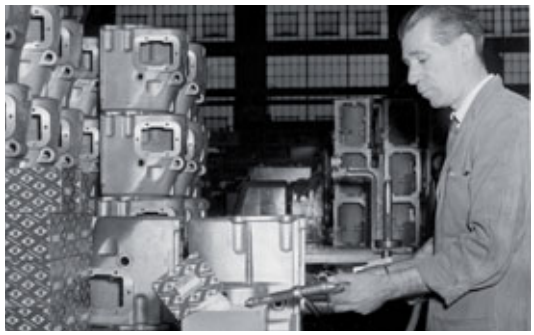


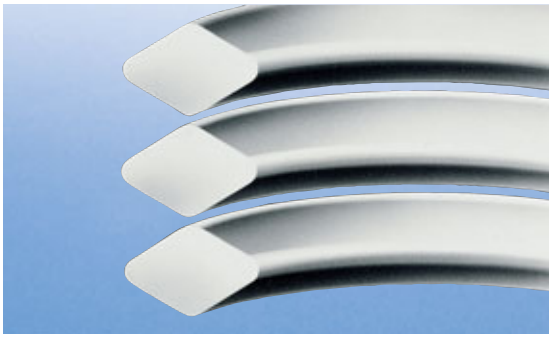
60 YEARS HELICOIL® made by BÖLLHOFF

Large picture (left): Application example HELICOIL® *plus*

HELICOIL® *thread inserts – approved and high-strength*

For over 60 years, HELICOIL® thread inserts have been creating high-strength threads in your low-strength materials.

The stainless steel coil thread inserts are formed into elastic spirals in proven quality from wire with rhombic profile. They feature high wear resistance and low thread friction within small tolerances.
HELICOIL® coil thread inserts by Böllhoff also stand for high surface finish and heat resistance.



Cross section of a HELICOIL® thread insert

HELICOIL® since 1954 – history of innovation

HELICOIL® technology with tang

After installation, the tang is broken off at the notch (predetermined breaking point) if through-hole threads are required.

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.

A comparison of the two systems

HELICOIL® tangfree without tang

- No tang break
- No tang removal
- Installation on both sides

Common advantages

- High-strength
- Corrosion and heat resistant
- Wear-free
- Uniform load and stress distribution

HELICOIL® plus with tang

- Robust installation
- Easy handling

HELICOIL® tangfree *thread inserts*

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

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
- Compliance with NA0276 or NAS1130 standard

The system in the focus

Your benefit: You obtain a complete system solution consisting of coil thread inserts and specially developed installation tools. This reduces your costs and assures the quality of the joints.

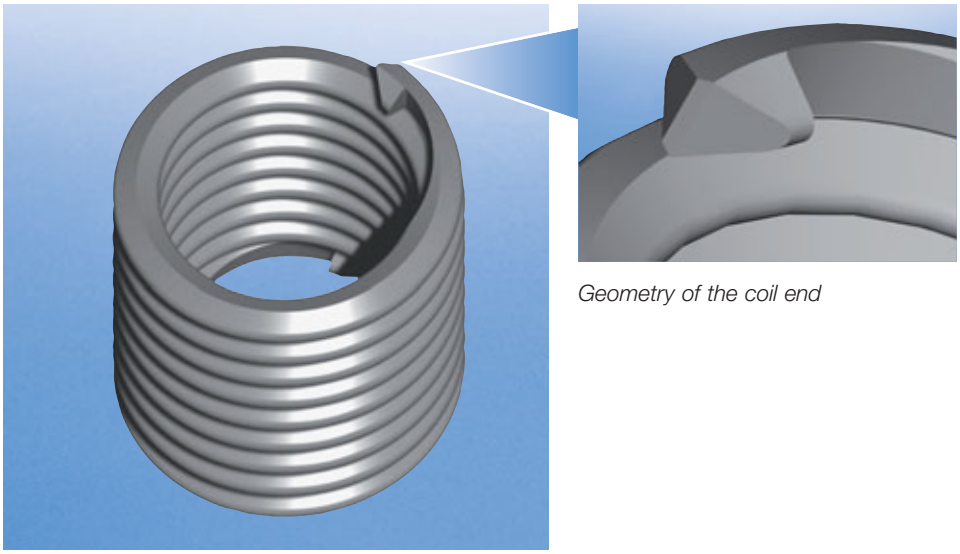
An overview of the installation tools is provided on pages 11 to 13.

Competence for your thread

Feel free to contact us for customised HELICOIL® tangfree thread inserts.
It is our expertise. Please do not hesitate to ask.

HELICOIL® tangfree *thread inserts*

The innovative production concept



Geometry of the coil end

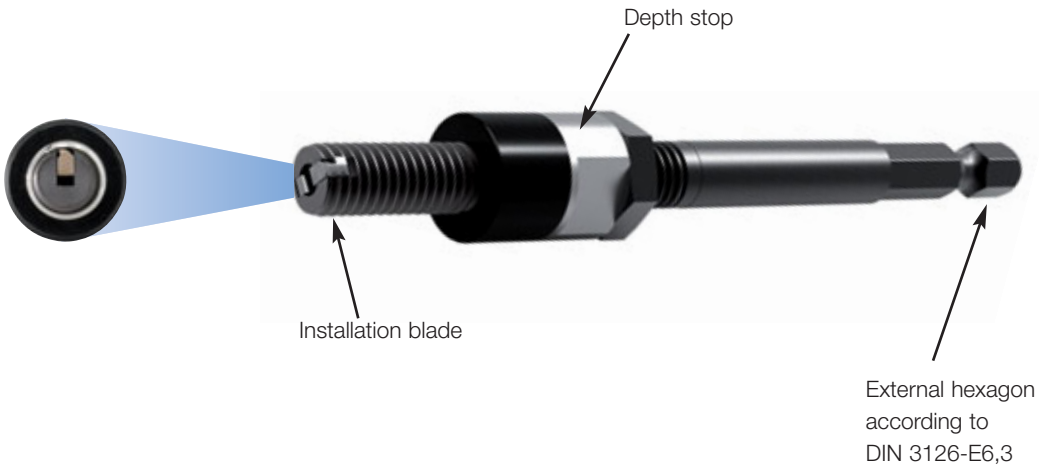
HELICOIL® tangfree: Innovative installation on both sides

The innovative coil of the insert allows installation from both ends with identical quality. Thanks to the reduced thread on both ends and to the inlet-optimised coil ends, the HELICOIL® tangfree thread insert can be installed without special alignment. The coil thread insert does not have a preferable end for installation. Therefore, the HELICOIL® tangfree does not need to be orientated for successful installation.

This ensures quick and safe installation. The HELICOIL® tangfree can be easily screwed onto the mandrel and smoothly enters the prepared tapped hole. During loading, the spring-mounted installation blade grips into the notch of the coil thread insert and securely installs it in the prepared tapped hole.

As a result of the optimised geometry of the HELICOIL® tangfree thread insert, tool wear is minimised. Tool blade life for HELICOIL® tangfree is longer and maintenance of the installation tools is easier than for the HELICOIL® tangless tool generation. Particularly the replacement of the tool blade has been optimised.

Installation tool



HELICOIL® tangfree *thread inserts*

The versions

HELICOIL® tangfree thread inserts are available in two versions: HELICOIL® tangfree free running and HELICOIL® tangfree screwlock.
Both versions can be screwed in like a screw with an installation mandrel.

HELICOIL® tangfree free running
Every thread of the thread insert has a precision-formed profile and is free running. The result is an internal thread true to gauge that can be installed from either end.

HELICOIL® tangfree free running version

HELICOIL® tangfree screwlock
HELICOIL® tangfree screwlock has the same advantages relating to thread technology as HELICOIL® tangfree free running. In addition, an integrated screw-locking area serves as a screw lock. Locking of the screw is achieved by one or several polygonal-shaped threads that clamp the flanks of the screwed-in screw. The result is an elastically resilient frictional locking.

HELICOIL® tangfree screwlock version

HELICOIL® plus thread inserts in compliance with aerospace and military standards

HELICOIL® tangfree thread inserts are fully compliant with NAS 1130 and NA 0276 standards. The prevailing torques are defined according to procurement specifications MA 1565 and NASM 8846.

Quality Management System

The Böllhoff Quality Management System (QMS) was awarded EN 9100 quality assurance certification on 5th January 2004 and is therefore an approved supplier to the European aerospace industry.

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.

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

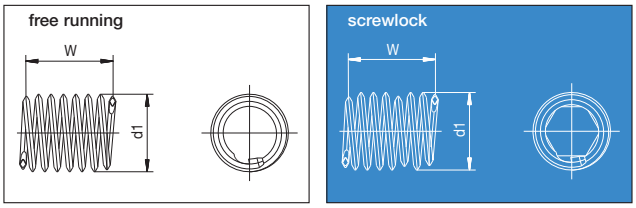
General industry

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

Aerospace industry

- Structural assemblies
- Aeroplane engines
- Cabin interior
- Repair of components

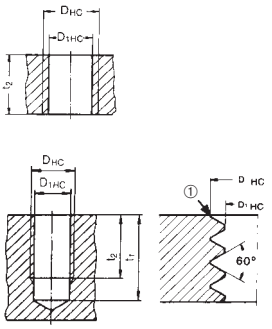
HELICOIL® tangfree *thread inserts*



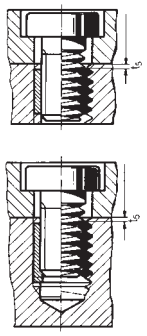
The control values of not installed thread inserts free running and screwlock are W and d_1. This length can only be measured for installed thread inserts.

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. Please note: D_{1HC} is decisive for selecting the correct twist drill diameter.
t_1 = Minimum depth of tap hole according to DIN 76 – Part 1 (guide value)
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

Holding thread



Assembly



- **If countersunk ① or burred: outside diameter of upset part = D_{HC} 0/+0.1 mm.**
- HELICOIL® tangfree stripfeed (magazined) and imperial sizes UNC and UNF are available on request.

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

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	0.5	1	3.00	3.750	3.80	4.35	3.11	3.22	3.20	3.65	5130 003 0003	5132 003 0003
		1.5	4.50	6.375	3.80	4.35	3.11	3.22	3.20	3.65	5130 003 0045	5132 003 0045
		2	6.00	8.875	3.80	4.35	3.11	3.22	3.20	3.65	5130 003 0006	5132 003 0006
M 4	0.7	1	4.00	3.625	5.05	5.60	4.15	4.29	4.20	4.91	5130 004 0004	5132 004 0004
		1.5	6.00	6.125	5.05	5.60	4.15	4.29	4.20	4.91	5130 004 0006	5132 004 0006
		2	8.00	8.625	5.05	5.60	4.15	4.29	4.20	4.91	5130 004 0008	5132 004 0008
M 5	0.8	1	5.00	4.125	6.25	6.80	5.17	5.33	5.20	6.04	5130 005 0005	5132 005 0005
		1.5	7.50	6.875	6.25	6.80	5.17	5.33	5.20	6.04	5130 005 0075	5132 005 0075
		2	10.00	9.625	6.25	6.80	5.17	5.33	5.20	6.04	5130 005 0010	5132 005 0010
M 6	1.0	1	6.00	4.000	7.40	7.95	6.22	6.41	6.30	7.30	5130 006 0006	5132 006 0006
		1.5	9.00	6.750	7.40	7.95	6.22	6.41	6.30	7.30	5130 006 0009	5132 006 0009
		2	12.00	9.500	7.40	7.95	6.22	6.41	6.30	7.30	5130 006 0012	5132 006 0012
M 8	1.25	1	8.00	4.500	9.80	10.35	8.27	8.48	8.40	9.62	5130 008 0008	5132 008 0008
		1.5	12.00	7.375	9.80	10.35	8.27	8.48	8.40	9.62	5130 008 0012	5132 008 0012
		2	16.00	10.250	9.80	10.35	8.27	8.48	8.40	9.62	5130 008 0016	5132 008 0016
M 10	1.5	1	10.00	4.875	11.95	12.50	10.32	10.56	10.50	11.95	5130 010 0010	5132 010 0010
		1.5	15.00	8.000	11.95	12.50	10.32	10.56	10.50	11.95	5130 010 0015	5132 010 0015
		2	20.00	11.125	11.95	12.50	10.32	10.56	10.50	11.95	5130 010 0020	5132 010 0020
M 12	1.75	1	12.00	5.000	14.30	15.00	12.38	12.64	12.50	14.27	5130 012 0012	on request
		1.5	18.00	8.250	14.30	15.00	12.38	12.64	12.50	14.27	5130 012 0018	on request
		2	24.00	11.500	14.30	15.00	12.38	12.64	12.50	14.27	5130 012 0024	on request
M 14	2.0	1	14.00	5.250	16.80	17.50	14.43	14.73	14.50	16.60	5130 014 0014	on request
		1.5	21.00	8.575	16.80	17.50	14.43	14.73	14.50	16.60	5130 014 0021	on request
		2.0	28.00	11.900	16.80	17.50	14.43	14.73	14.50	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	2.750	3.66	4.04	3.00	3.15	3.10	3.67	5130 065 6004	5132 065 6004
		1.5	4.3	4.750	3.66	4.04	3.00	3.15	3.10	3.67	5130 065 6006	5132 065 6006
		2	5.8	6.750	3.66	4.04	3.00	3.15	3.10	3.67	5130 065 6008	5132 065 6008
6-32 UNC	0.794	1	3.5	2.750	4.52	4.90	3.68	3.89	3.80	4.54	5130 067 6004	5132 067 6004
		1.5	5.3	4.750	4.52	4.90	3.68	3.89	3.80	4.54	5130 067 6006	5132 067 6006
		2	7.0	6.875	4.52	4.90	3.68	3.89	3.80	4.54	5130 067 6008	5132 067 6008
8-32 UNC	0.794	1	4.2	3.500	5.21	5.59	4.34	4.52	4.40	5.20	5130 068 6004	5132 068 6004
		1.5	6.3	6.000	5.21	5.59	4.34	4.52	4.40	5.20	5130 068 6006	5132 068 6006
		2	8.3	8.375	5.21	5.59	4.34	4.52	4.40	5.20	5130 068 6008	5132 068 6008
10-24 UNC	1.058	1	4.8	2.875	6.20	6.58	5.06	5.28	5.20	6.20	on request	on request
		1.5	7.2	5.000	6.20	6.58	5.06	5.28	5.20	6.20	on request	on request
		2	9.6	7.125	6.20	6.58	5.06	5.28	5.20	6.20	on request	on request
1/4-20 UNC	1.270	1	6.4	3.375	7.87	8.38	6.62	6.86	6.70	8.00	5130 074 6004	on request
		1.5	9.5	5.750	7.87	8.38	6.62	6.86	6.70	8.00	5130 074 6006	on request
		2	12.7	8.000	7.87	8.38	6.62	6.86	6.70	8.00	5130 074 6008	on request
10-32 UNF	0.794	1	4.8	4.125	5.99	6.50	5.00	5.16	5.10	5.86	5130 069 7004	5132 069 7004
		1.5	7.2	6.875	5.99	6.50	5.00	5.16	5.10	5.86	5130 069 7006	5132 069 7006
		2	9.6	9.500	5.99	6.50	5.00	5.16	5.10	5.86	5130 069 7008	5132 069 7008
1/4-28 UNF	0.907	1	6.4	5.000	7.77	8.28	6.55	6.72	6.70	7.53	5130 074 7004	5132 074 7004
		1.5	9.5	8.250	7.77	8.28	6.55	6.72	6.70	7.53	5130 074 7006	5132 074 7006
		2	12.7	11.375	7.77	8.28	6.55	6.72	6.70	7.53	5130 074 7008	5132 074 7008

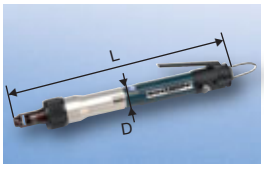
*Delivery time on request.
Length > 2 d on request.

HELICOIL® tangfree *installation tools*

HELICOIL® tangfree *installation tool with pre-winder cartridge*

and pneumatic drive – preferably for processing HELICOIL® tangfree stripfeed.
Processing of HELICOIL® tangfree loose is also possible. Length limitation thread inserts 2.0 x D.

Complete installation tool



Thread diameter d	free running	screwlock	D (mm)	L (mm)	Weight (kg)	Air connection (bar)	Air consumption (l/min.)
M 3	5160 370 3000	5160 370 3002	29	295	0.8	2.5 – 3.0	205
M 4	5160 370 4000	5160 370 4002					
M 5	5160 370 5000	5160 370 5002				3 – 4	
M 6	5160 370 6000	5160 370 6002					
M 8	5160 280 8000	5160 280 8002		310	1.3	4 – 5	282
M 10	5160 281 0000	5160 281 0002					

Thread diameter d	free running	screwlock	D (mm)	L (mm)	Weight (kg)	Air connection (bar)	Air consumption (l/min.)
4-40 UNC	5160 376 5600	5160 376 5602	29	295	0.8	2.5 – 3	205
6-32 UNC	5160 376 7600	5160 376 7602					
8-32 UNC	5160 376 8600	5160 376 8602				3 – 4	
10-24 UNC	on request	on request					
1/4-20 UNC	5160 377 4600	5160 377 4602				4 – 5	
10-32 UNF	5160 376 9700	5160 376 9702					
1/4-28 UNF	5160 287 4700	5160 287 4702		310	1.3	4 – 5.5	282

Assemblies

Motor

Basic tool

Exchange unit

Thread diameter d	Motor	Basic tool	Exchange unit complete free running	Exchange unit complete screwlock
M 3	0160 370 0000	5160 370 0040	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
M 8		5160 280 0040	5160 280 8050	5160 280 8052
M 10			5160 281 0050	5160 281 0052

Dimensions > M 10 on request.

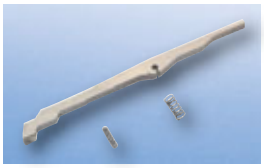
Thread diameter d	Motor	Basic tool	Exchange unit complete free running	Exchange unit complete screwlock
4-40 UNC	0160 370 0000	5160 370 0040	5160 376 5650	5160 376 5652
6-32 UNC			5160 376 7650	5160 376 7652
8-32 UNC			5160 376 8650	5160 376 8652
10-24 UNC			on request	on request
1/4-20 UNC			5160 377 4650	5160 377 4652
10-32 UNF			5160 376 9750	5160 376 9752
1/4-28 UNF		5160 280 0040	5160 287 4750	5160 287 4752

HELICOIL® tangfree *installation tools*

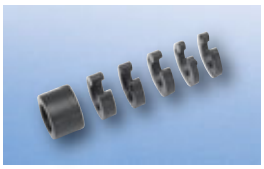
Wear and spare parts

Installation mandrel

Leader cartridge



Blade with spring and pin



Range of compensation washers

Thread diameter d	Installation mandrel free running	Installation mandrel screwlock	Dowel pin for installation mandrel	Leader cartridge	Blade (installation) with spring and pin	Range of compensation washers
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	
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	

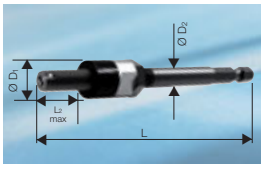
Thread diameter d	Installation mandrel free running	Installation mandrel screwlock	Dowel pin for installation mandrel	Leader cartridge	Blade (installation) with spring and pin	Range of compensation washers
4-40 UNC	5160 376 5620	5160 376 5622	5639 000 7003	5160 376 5632	5160 376 5624	0160 170 0060
6-32 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	
1/4-20 UNC	5160 377 4620	5160 377 4622	5639 000 7003	5160 377 4632	5160 377 4624	
10-32UNF	5160 376 9720	5160 376 9722	on request	5160 376 9732	5160 376 9724	
1/4-28UNF	5160 287 4720	5160 287 4722	on request	5160 287 4732	5160 287 4724	0160 280 0060

HELICOIL® tangfree *installation tools*

HELICOIL® tangfree *installation tool with 1/4" hex drive*

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



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	21/35/8
M 14	5160 451 4000	on request	130	24/40/8

Thread diameter d	free running	screwlock	L (mm)	$D_1/L_2/D_2$ (mm)
4-40UNC	5160 436 5600*	5160 436 5602	100	7/7/8
6-32UNC	5160 436 7600*	5160 436 7602	90	8/8.75/8
8-32UNC	5160 436 8600*	5160 436 8602	90	8/10/8
10-24UNC	on request	on request		
1/4-20UNC	5160 437 4600*	5160 437 4602	100	11/15.7/8
10-32UNF	5160 436 9700*	5160 436 9702	100	9.5/11.95/8

*Sale of installation mandrel for tool type 5160 3xx xxxx reserved.

Wear parts

Thread diameter d	Installation mandrel ① ② ③ free running	Installation mandrel ① ② ③ screwlock	Depth stop ② free running	Depth stop ② screwlock	Blade ③
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

Thread diameter d	Installation mandrel ① ② ③ free running	Installation mandrel ① ② ③ screwlock	Depth stop ② free running	Depth stop ② screwlock	Blade ③
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
1/4-20 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 369 726	5160 436 9723

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

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