BÖLLHOFF

The aerospace industry meets 360° joining technology

Böllhoff, your expert for the aerospace industry

“Remove before flight” – who doesn’t want to fly safely? We also take a second look and support you when it comes to fulfilling the requirements of the current development trends of the aerospace industry.
To increase the energy efficiency and save resources, aeronautical engineers and engine manufacturers also systematically analyse and optimise the production processes. For decades, we have been a partner for the industry and offer special joining solutions. Get on the early plane with us and give your developments the necessary drive.

We are right where you need us — by your side.

Table of contents

Our InfoPoint provides additional information in the form of further brochures and/or videos at the end of this brochure.

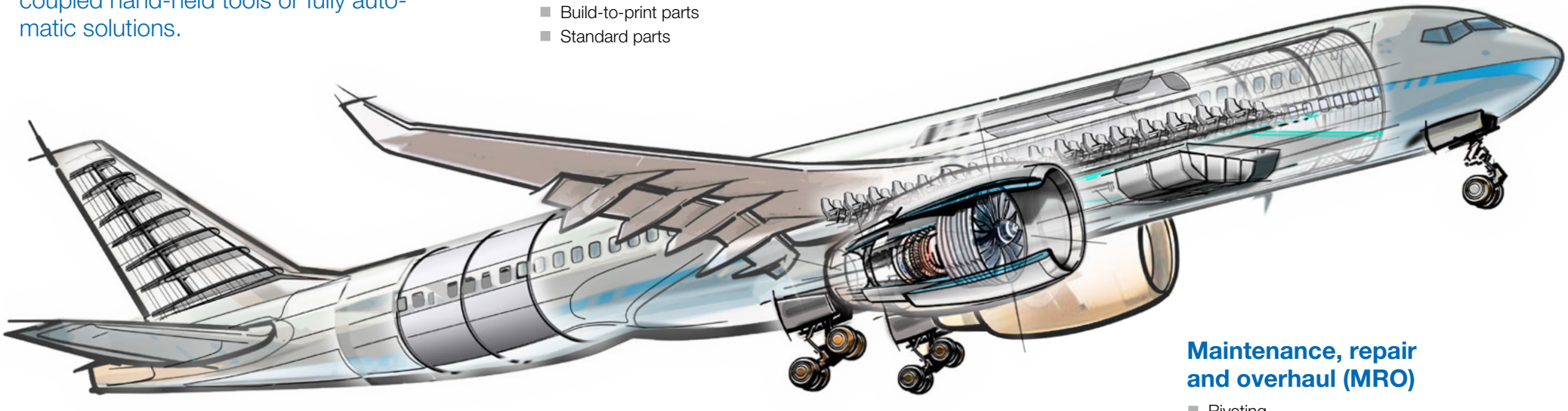
We also supply the assembly solutions for our fasteners. Please do not hesitate to contact us for information about our complete range of processing systems for example: hand-held tools, robot-coupled hand-held tools or fully automatic solutions.

Systems / equipment

- Riveting
- Thread creation
- Thread reinforcement
- Build-to-print parts
- Standard parts

Cabin interior

- Riveting
- Thread creation
- Thread reinforcement
- Adhesive technology
- Decoupling
- Quick-release systems
- Build-to-print parts
- Standard parts



Maintenance, repair and overhaul (MRO)

- Riveting
- Thread creation
- Thread reinforcement
- Build-to-print parts
- Standard parts

Airframe / aero structure

- Riveting
- Thread creation
- Build-to-print parts
- Standard parts

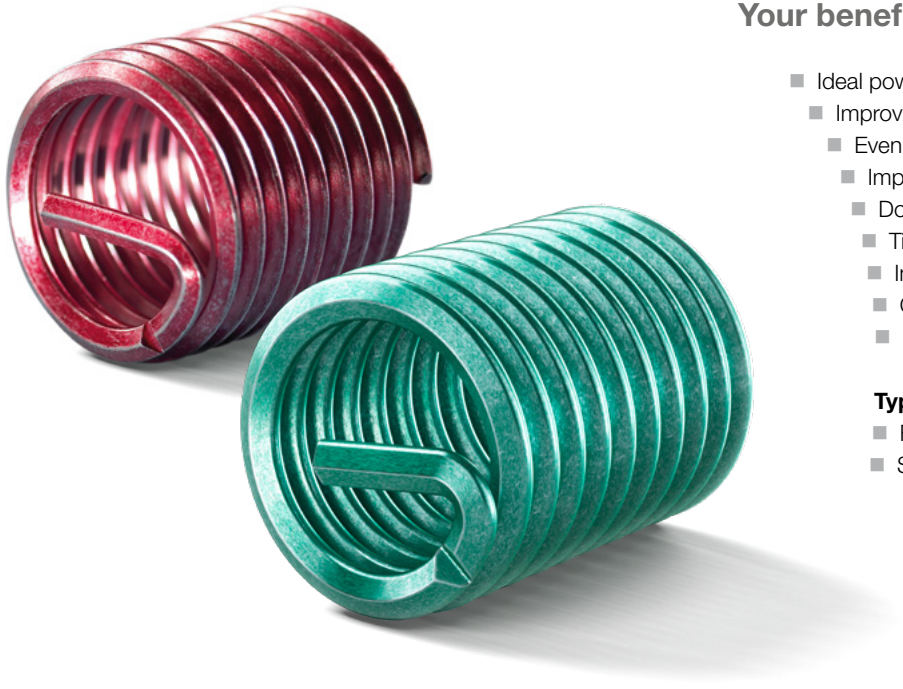
Engine

- Thread reinforcement
- Build-to-print parts
- Standard parts

The HELICOIL® Plus thread insert, which is made from a wire with rhombic profile, is formed into an elastic spiral.
As to the Free Running version, thread by thread it is a completely free running coarse thread.
The result is a true-to-gauge internal thread including the last thread which is in every case threadable.
It produces high-strength threads transferring forces from flank to flank into the holding thread. The special thread start allows to position it like a screw and screw it in.
To screw in the thread insert, all you need is the respective installation mandrel of similar size as a tap.

All stages in the HELICOIL® evolution are highly reliable and German and international property rights have been applied for.

You receive a complete system solution consisting of wire thread inserts and specially developed installation tools. This ensures the high quality of the screw joint at maximum utilisation of the lightweight construction potential.



Your benefits:

- Ideal power transmission
- Improved quality of the screw joint
- Even load and tension distribution
- Improved preload forces due to low thread friction
- Downsizing and lightweight construction
- Tight fit
- Increased fatigue strength
- Corrosion and temperature resistance
- No FOD problems

Types

- Free Running
- Screwlock

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.

Thread types*

Metric coarse thread DIN ISO 13 1	**Metric fine thread** DIN ISO 13 (T02-T11)	**Pipe thread** DIN EN ISO 228/1G	**UNC thread** NASM 21209	**UNF thread** NASM 21209	**BSW BS 84**	**BSF BS 84**	**BA BS 93**

Designs*

						
HELICOIL® Smart Free Running	**HELICOIL® Plus Free Running**	**HELICOIL® Plus Screwlock**	**HELICOIL® Tangfree Free Running**	**HELICOIL® Tangfree Screwlock**	**HELICOIL® Classic Free Running**	**HELICOIL® Classic Screwlock**

Materials*

Stainless steel A2 material No 1.4301 material No 1.4310	**Stainless steel A4** material No 1.4571	**Bronze** material No 2.1020.34	**Inconel X 750** material No 2.4669	**Nimonic 90** material No 2.4632	**Aluminium** material No 3.4365

Surfaces*

Bright	**Tin-plated** G100 / G300	**Dry-film lubricated**	**Cadmium-plated**	**Silver-plated**	**Hard-coated**	**Coloured** red, green, blue, yellow

* Not all combinations are available.

HELICOIL® Plus 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. Prior to tapping, counter-bore 90° and deburr. Outside diameter of **countersink = D_{HC} + 0.1 mm.**
On the cut holding thread, the countersink is hardly visible.

Tapping

To tap the HELICOIL® Plus holding thread, system-dependent original HELICOIL® taps must be used. Recommendations for suitable manual and machine taps are given in our 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® Plus.

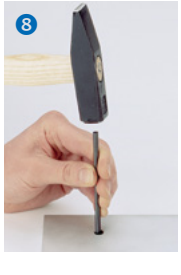
D_{HC} = outside Ø of the receiving thread

Insertion of the thread insert

The installation can be done manually, automatically or with machine tools.
The HELICOIL® Plus thread insert is screwed onto the installation mandrel with the tang down ❶, inserted into the leader cartridge ❷ or placed on the fly-over tool ❸. Then, the tool is placed over the tapped hole.

Installation

By turning the threaded mandrel ❹, the mandrel ❺ or the fly-over tool ❻, respectively, manually or triggering the drive, the thread insert is screwed in. It must be installed at least 0.25 P below the surface.



Breaking off the tang

To produce a through-hole thread, the tang is broken off at the notch. For that, a tang break-off tool is used ❼ and ❽. For threads from M14 (fine and normal pitch), the tang can be removed with long nose pliers ❾.
For blind-hole threads, the tang does not have to be removed if the maximum screw-in depth t_3 of the screw is observed.

We also supply the assembly solutions for our **HELICOIL®** thread inserts

Your benefit:

You obtain a complete system solution consisting of coil thread inserts and specially developed installation tools. This assures the quality of the joints.

In the following you find one of our systems.

HELICOIL®

Type E-PSG electrical straight screwdriver with leader cartridge

Fast and precise processing of all HELICOIL® types.

Your benefits at a glance:

- Automatic reverse upon reaching the insertion depth
- Continuous adjustment: speed/torque
- Existing tool systems can be used (exchange unit)
- Easy handling
- Ergonomic and compact design
- Low-noise operation

Application example – Aircraft seat elements made of high-strength aluminium

The requirements:

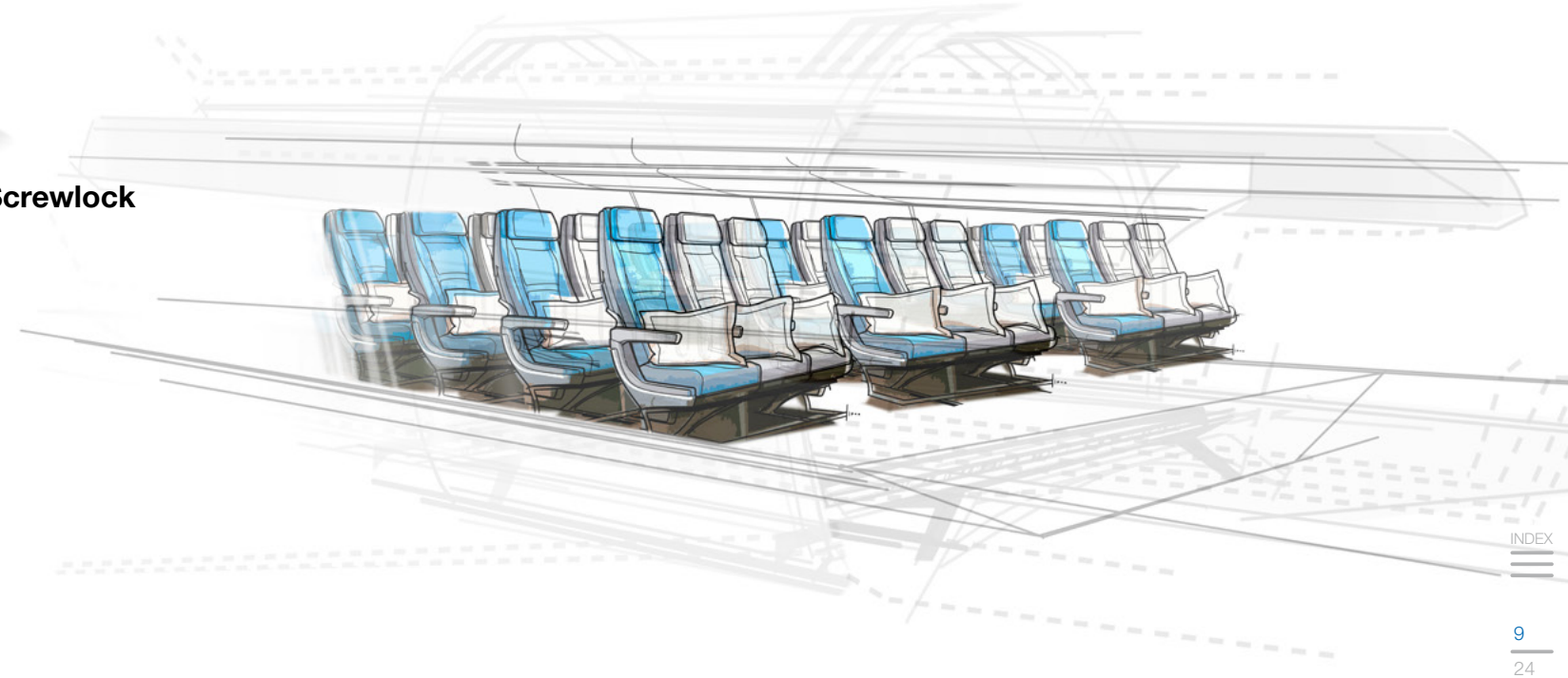
- Wear-resistant thread with integrated screw locking feature on safety relevant components used in the aircraft industry
- Frequently repeated screw loosening / tightening
- Meeting aerospace standard LN 9499

The benefits:

- High-strength and wear-resistant coil thread inserts
- Resistant to corrosion and temperature
- Assembly systems, tools and products from a single source
- Available with imperial and metric dimensions and in special versions

Our solution:

HELICOIL® Plus Screwlock



The technology:

Adhesive bonding, when welding is not an option. Fastening elements with a socket made of transparent plastic are bonded to the customer component using light-curing adhesive. The most important aspects are the short cycle times, the material-friendly process and the flexibility regarding the fastening elements.

Generally, all geometries which can be produced through injection moulding can be realised. Screwed connections on plastic mouldings, detachable and non-detachable snap connections, adhesive SNAPLOC® fasteners, etc. can be applied to materials such as CFRP, FRP, glass, lacquer, cathodic dip coating, plastic such as PC-ABS, PA and blends.

Your benefits:

- Full mechanical load capacity immediately after irradiation
- Short curing times (< 4 seconds)
- Fastening elements cannot be seen on the visible side on plastic or thin-walled components (design)
- Flexible use also after surface treatment

Types:

- Studs and standoffs
- Insulation attachment
- Wiring management

For this joining technology, the ONSERT® SL ONE was our key for a new participation in the manual process technology.

Whether for prototypes, small series, repair or working on points which are difficult to access, the ONSERT® SL ONE is the solution. You can use it to efficiently bond our diverse ONSERT® fasteners within seconds – wherever and whenever you want.

Your benefits:

- Slim and compact design
- Flexible bonding of different ONSERT® fasteners
- Ergonomic and easy to use
- Combined visual and acoustic process control
- Low weight

Included in the delivery scope:

- Storage case
- ONSERT® SL ONE UV-LED-curing lamp
- Charging cable
- Li-ion battery, 3.7 V, 5,500 mAh, protected
- Goggles
- Dosing piston
- 5 spare O-rings for the protective screen
- Operating instructions

The requirements:

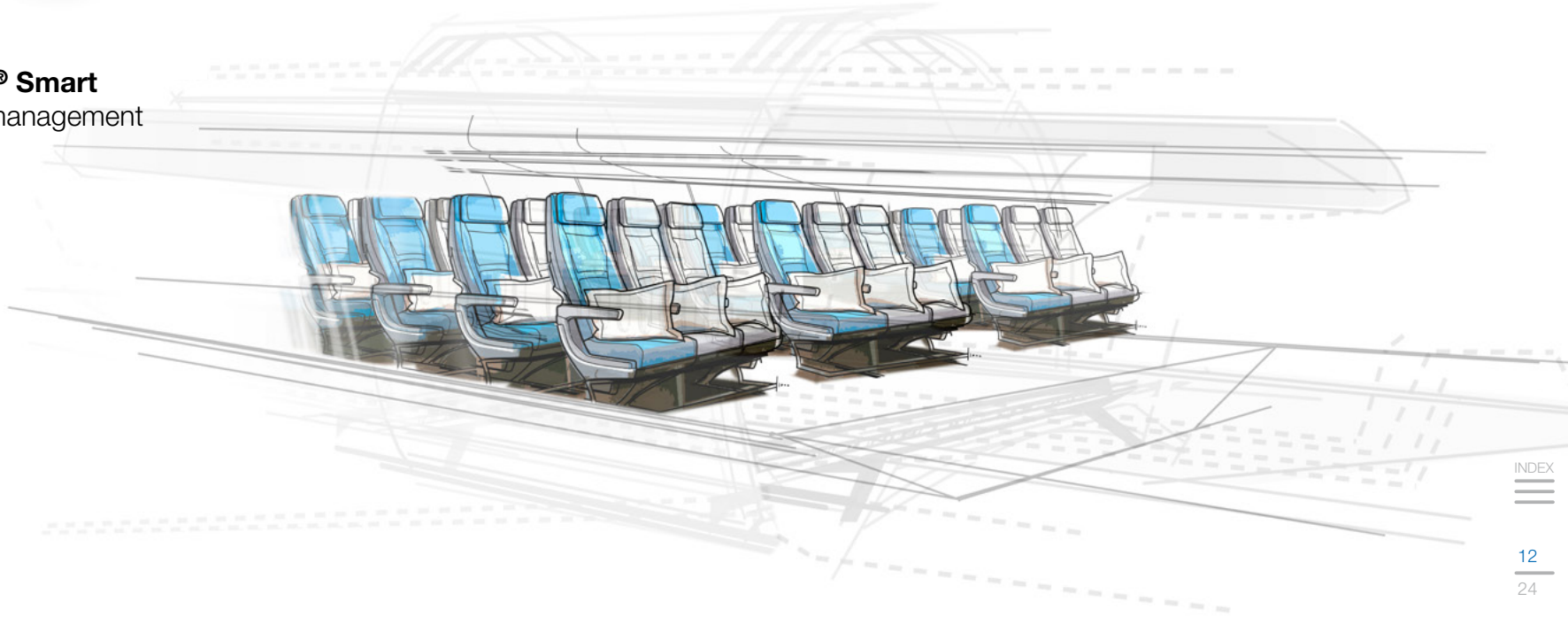
- Weight reduction of the seat structure
- Development of a more efficient bonding process
- Non-visible bonding of the fastening elements

Our solution:

ONSERT® Smart
for cable management

The benefits:

- Short cycle times
- Material-friendly process
- Design freedom of the fastening elements
- Suitable for different heights and cable diameters
- Flexible
- Weight-saving
- The plastic and the adhesive meet the requirements of FAR Part 25, § 25.583 (60 seconds vertical burn)



Noise- and vibration-decoupling

SITEC®
Example SITEC® Rivet
Blind rivet nuts

Blind rivet nuts for noise- and vibration-decoupling.

Your benefits at a glance:
- High-strength thread body on thin-walled components
- Noise- and vibration-decoupling
- Thermal and electrical insulation
- Easy installation

SNAPLOC®
Decoupling plug-in connections

Fasteners and fastening systems for noise- and vibration-decoupling.

Your benefits at a glance:
- Fast and easy installation/removal
- Noise- and vibration-decoupling
- Tolerance compensation in the centre distances
- Variable fastening options
- Easy integration

Tolerance compensation

FLEXITOL®
Tolerance compensation systems

An economic engineering solution for continuous tolerance compensation.

Your benefits at a glance:
- High performance reliability
- Only one-sided accessibility required
- Easy integration into different applications
- High-end product quality
- Fast and easy installation
- No warpage during installation

Customer-specific development parts

TEPRO®
Customer-specific thermoplastic development parts and assemblies

Solutions for almost every application. We are just the right point of contact for customised solutions that also fulfil high requirements. We develop and produce these products for the aviation industry, the automotive industry and many more.

Your benefits at a glance:
- Focus on individual customer benefit
- Customised products
- In-house development, design and prototyping
- Modern tool manufacture
- Modern injection moulding machines

Not to forget:
As always, we also support you with our know-how for many other joining solutions – **just talk to us.**

Thread creation

RIVKLE®
Blind rivet nuts and studs

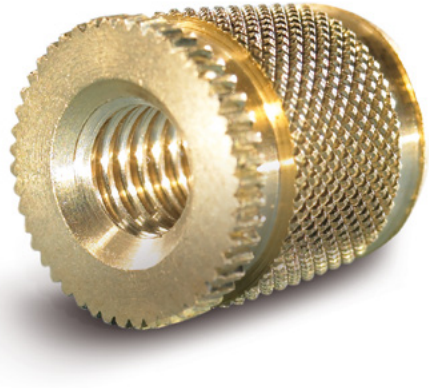
Blind rivet nuts and studs to fasten high-strength nut and stud threads on thin-walled components.

Your benefits at a glance:
- Stable thread on thin-walled components
- Installation in case of one-sided accessibility (blind installation)
- Flexible use in every production step
- No thermal stress on the workpiece – and therefore no warpage

AMTEC®
Thread inserts

High-strength brass thread inserts for plastic components – after moulding.

Your benefits at a glance:
- Shorter moulding cycles
- Reduced manufacturing costs for plastic components
- Secure, stress-free anchorage
- High pull-out and torsion values
- Unrestricted number of reuses as opposed to self-tapping screws



The technology:

The RIVNUT® Aero is a high-strength, self-locking blind rivet nut for blind installation in aerospace applications. Concentrated technology, designed to meet the high requirements of the aerospace industry.
The body is made of AISI 316L stainless steel to ensure corrosion resistance and optimum mechanical characteristics. The wire thread insert prevents thread disengagement thanks to its screw locking function and permits maximum mechanical performance of the joint. The silver-plated thread prevents binding. The electrophoretic coating applied to the body prevents galvanic corrosion, when used on aluminium parent material.

Your benefits:

- High-strength fastening point: equivalent to class 12 steel nut
- Blind setting – no need for access from both sides
- No maintenance, screw locking, easy to replace
- No need to provide for a maintenance hole during the design phase

Fasteners and mechanical parts

From a drawing to series production

- Serial production for mid-size batches
- Prototyping
- Customer co-design parts for cost optimisation
- Assembly

Our competencies:

- Raw material processing: aluminium, steel, stainless steel, titanium, nickel-based, …
- Turning bars up to Ø 70 mm or in mandrill up to Ø 390 mm
- Milling parts up to 800 x 600 x 500 mm
- Part length up to 1,000 mm
- Forging
- Established subcontracting management for heat and surface treatment

- Non-threaded fasteners:
  washers / bushes / spacers
- Threaded fasteners:
  nuts / self-locking nuts / fittings / screws / bolts
- Surface treatment:
  cadmium plating / passivation / silver plating

Qualified standard parts lists:
- Airbus QPL (ABS, AS, ASNA, MS, NAS, NFL, NSA, …)
- Airbus Helicopters (ASNA, DHS, EN, ECS, …)

Additional standards:
- EN
- ISO
- NFL
- …

New standard parts:
- Development competence for new standard parts including qualification process

Your aerospace expert

Your partner to succeed in joining –
and what that means for you:

Development and design competencies

- Dedicated experts for innovation, product, project and design management
- Trend scouting
- Design thinking
- FMEA
- Feasibility studies
- R & D activities (FEM, moldflow analysis)
- Multiple CAD software, e.g. Catia V5, Ansys, Creo Parametric
- Customer-tailored developments
- Application engineering and technical consulting
- Prototyping and additive manufacturing
- Value stream analysis, e.g. cost optimisation
- In-house laboratory accredited according to DIN EN ISO/IEC 17025

Production

- Technical production know-how
- Fourteen modern production facilities worldwide
- Major production technologies
  - Injection moulding
  - Cold- and hot-forming
  - Turning and milling processes
  - Thread rolling
  - Wire profiling and winding
  - Surface treatment (passivation, cadmium, silver coating)
  - Mechanical and plant engineering
- Zero-defect philosophy
- Qualified production staff and continuous internal training
- Company training centre

Qualification

- Quality management systems – requirements for
  - EN 9100 Aviation, Space and Defence Organizations and
  - IATF 16949 Automotive Industries
- DIN EN 9145 requirements for Advanced Product Quality Planning (APQP) and Production Part Approval Process (PPAP)
- FAIR EN 9102
- In-house laboratory accredited according to DIN EN ISO/IEC 17025
- Environmental management DIN EN ISO 14001
- Energy management systems DIN EN ISO 50001
- Occupational health and safety management systems DIN ISO 45001 (replaces OHSAS 18001)
- Product qualification for customers and third parties

Supply

- Supply chain solutions
- Worldwide network within the group
- Large warehouses in France, Germany and the United Kingdom
- Proximity to customers thanks to global presence
- Supporting sales and after sales services
- Repair kits
- Customised packaging

Catalogues

Product catalogues

HELICOIL® Plus

Thread technology for high-strength fastenings – metric threads
Catalogue No 0100

https://www.boellhoff.com/en/pdf/helicoil-plus

HELICOIL® Plus

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

https://www.boellhoff.com/en/pdf/helicoil-plus-imperial

HELICOIL® Tangfree

The tangfree coil thread insert for high-strength threads
– metric threads
– imperial threads: UNC and UNF
Catalogue No 0150

https://www.boellhoff.com/en/pdf/helicoil-tangfree

HELICOIL®
E-PSG 256 Quick Exchange

Quick and process-reliable switch of different dimensions
Catalogue No 0114

https://www.boellhoff.com/en/pdf/helicoil-quick-exchange

RIVNUT® Aero

Blind rivet nuts for aerospace
Catalogue No 2317

https://www.boellhoff.com/en/pdf/rivnut-aero

ONSERT®

Quick and process-reliable bonding of fastening elements with light-curing adhesives
Catalogue No 0250

https://www.boellhoff.com/en/pdf/onsert

Catalogues

Product catalogues

SITEC®

Fastening elements for vibration and noise decoupling
Catalogue No 2500

https://www.boellhoff.com/en/pdf/sitec

SNAPLOC®

Vibration and noise decoupling plug-in connections
Catalogue No 4350

https://www.boellhoff.com/en/pdf/snaploc

FLEXITOL®

Systems for stepless tolerance compensation
Catalogue No 0590

https://www.boellhoff.com/en/pdf/flexitol

TEPRO®

Engineering plastic products and subassemblies
Catalogue No 4720

https://www.boellhoff.com/en/pdf/tepro

Product catalogues / Aerospace-specific catalogue

RIVKLE®

Blind rivet nuts and studs
Catalogue No 2307

https://www.boellhoff.com/en/pdf/rivkle

AMTEC®

Precision thread inserts for after-moulding joining in plastic components
Catalogue No 0200

https://www.boellhoff.com/en/pdf/amtec

Aerospace

The aerospace industry meets 360° joining technology
Catalogue No 0951

https://www.boellhoff.com/en/pdf/aerospace

Videos

Fastener videos

HELICOIL® Plus Free Running

Thread inserts for metal

https://www.boellhoff.com/video/helicoil-plus

HELICOIL® Plus Screwlock

Thread inserts for metal with screw-locking

https://www.boellhoff.com/video/helicoil-plus-screwlock

HELICOIL® Tangfree Free Running

Thread inserts for metal without a tang

https://www.boellhoff.com/video/helicoil-tangfree

HELICOIL® Tangfree Screwlock

Screw-locking thread insert without a tang for metals

https://www.boellhoff.com/video/helicoil-tangfree-screwlock

ONSERT®

Quick and process-reliable bonding of fastening elements with light-curing adhesives

https://www.boellhoff.com/video/onsert

SITEC®

Fastening elements for vibration- and noise-decoupling

https://www.boellhoff.com/video/sitec-rivet

SNAPLOC®

Vibration- and noise-decoupling plug-in connections

https://www.boellhoff.com/video/snaploc

Videos

Fastener videos

FLEXITOL®

Systems for stepless tolerance compensation

https://www.boellhoff.com/video/flexitol-metal

RIVKLE®

Blind rivet nuts - Riveting process

https://www.boellhoff.com/video/rivkle-riveting-process

AMTEC®

Thread technology for plastics

https://www.boellhoff.com/video/hitsert2-with-sealing-ring

Installation videos / Aerospace-specific video

HELICOIL® Plus

Installation with electronical tool HELICOIL® E-PSG 256 Quick Exchange

https://www.boellhoff.com/video/helicoil-installation-with-e-psg-256

The aerospace industry meets 360° joining technology

https://www.boellhoff.com/video/aerospace

BÖLLHOFF

Passion for successful joining.

Böllhoff Group
Competence leader in 360° Joining Technology

Find your local partner at www.boellhoff.com or contact us at info@boellhoff.com.

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