BOLLHOFF

RIVKLE®

Blind rivet nuts and studs for the automotive industry





General presentation of the RIVKLE® product line

An optimized assembly solution for improved performance
The RIVKLE® technology
A tailor-made solution
The standard RIVKLE® product line
Additional functions of the RIVKLE® fasteners
Essential functions
Complementary functions
Setting of RIVKLE® fasteners
RIVKLE® Powertool - Hand setting tools
RIVKLE® Automation - Hand setting tools

We have designed this document as a practical guide for the exclusive use of companies working in the automotive industry. Thus, we provide readers with our technical expertise and know-how in the design of reliable and cost-effective assembly solutions. This catalog contains the necessary essential information to understand how we comprehend the functional problems encountered by our customers and presents the solutions we offer, both in terms of components and in terms of setting systems.

Our team, throughout the world, is at your disposal to answer any questions.

We hope you enjoy reading.

RELIABILITY



■ 100% conforming rivet nuts

100% of the RIVKLE® fasteners intended for the automotive market undergo optical sorting before packaging. This allows us to meet your requirements and to optimize the availability rate of your automatic setting machines.

■ Controlled setting

The technologies implemented in BÖLLHOFF tools allow you to make sure that 100% of the RIVKLE® fasteners are conforming after setting.

The setting parameters of each installed fastener can be transmitted to your production line in real time.

Components comply with the rules applicable to threaded joints

Obtain robust assemblies thanks to components which, after setting, are comparable to class 8 nuts (or even class 10 or 12 for HRT versions) or to class 8.8 screws (stud version).

After setting, RIVKLE® blind rivet nuts comply with the rules applicable to threaded joints. These rules guarantee, among other things, that in the case of over-tightening, the screw will fail, leaving the nut re-usable.

) SIMPLICITY



■ A safe and environmentally-friendly solution

Reduce your environmental costs with this assembly solution which requires no exhaust or cooling.

■ Minimal equipment and expertise required

You can easily integrate the RIVKLE® solution into your production process, as it does not require your operators to have any particular qualifications or safety equipment.

■ Simple to use

The RIVKLE® technology can be integrated quickly and easily thanks to easy-to-use setting methods and simple tool adjustment procedures.



PERFORMANCE



■ Fasteners suited to high production rates

Optimize your production rates by combining the RIVKLE® components with the BÖLLHOFF setting solutions which allow you to install up to 40 RIVKLE® fasteners per minute (based on BÖLLHOFF test procedures).

■ A repeatable solution

Ensure the reliability of your assemblies by using components with a repeatable setting behavior in combination with setting tools with well-known repeatability (CPk > 1.66).

■ A competitive global solution

Reduce the costs of your assemblies thanks to a cost per installed RIVKLE® fastener that is usually more competitive than alternative solutions: manpower, energy, maintenance, investment, floor area.

VERSATILITY



■ RIVKLE® can be set at every stage of your production process

You can integrate RIVKLE® at any stage of your production process, either before or after surface coating. In fact, the RIVKLE® components are supplied with a surface treatment which complies with the strictest customer requirements, and the setting operation does not alter the support or the component's surface treatment.

Moreover, as the RIVKLE® components can be set either with hand tools or with automatic setting units on robots, the RIVKLE® technology can fit into all your production environments.

■ Compatibility with all application materials

The RIVKLE® components are compatible with metal (steel, light alloys) as well as polymers (composites, plastics, etc.), and they can be integrated into the majority of the parts used in vehicles.

■ Installation with access from only one side

Simplify your design and integrate RIVKLE® into many of your applications, as these fasteners can be installed with access on only one side.

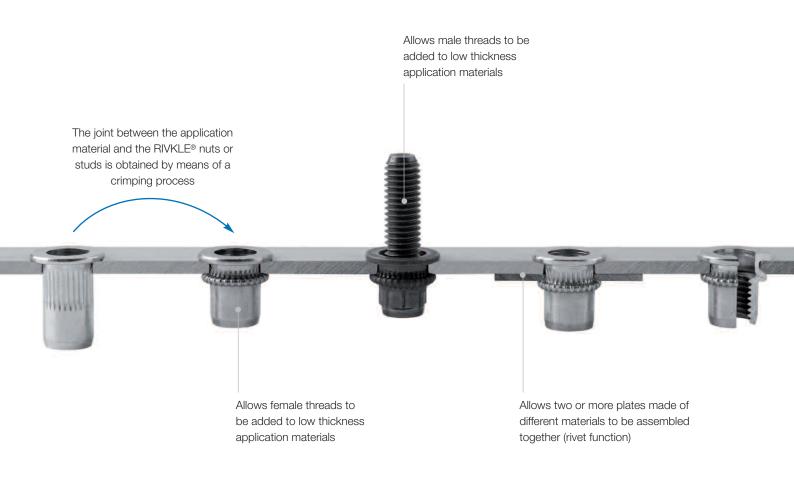
The dimensions and the accessibility of your parts do not hinder the use of the RIVKLE® solution.

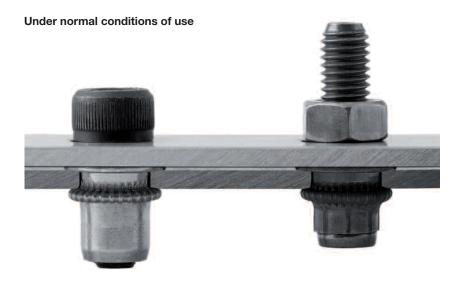




The **RIVKLE®** technology

RIVKLE® blind rivet nuts and studs are the most versatile solutions to add reusable high-strength male or female threads to low thickness application materials.





The RIVKLE® blind rivet nut and stud technology can be configured as you wish and tailored to the required environment.

Our experts will assist you in designing the RIVKLE® fastener that will meet your requirements by carefully selecting the useful product characteristics (head shape, material, body end).

BODY		> BODY
HEAD	+	
BODY END	+	
MATERIAL	+	
DIAMETER	+	
GRIP THICKNESS	+	
PLATING	+	
ADDITIONAL FUNCTIONS	+	CYLINDRICAL CYLINDRICAL HEXAGONAL SEMI- SLOTTED KNURLED HEXAGONAL



DIAMETER



M3	M4	M5
M6	M8	M10
M12	M14	M16



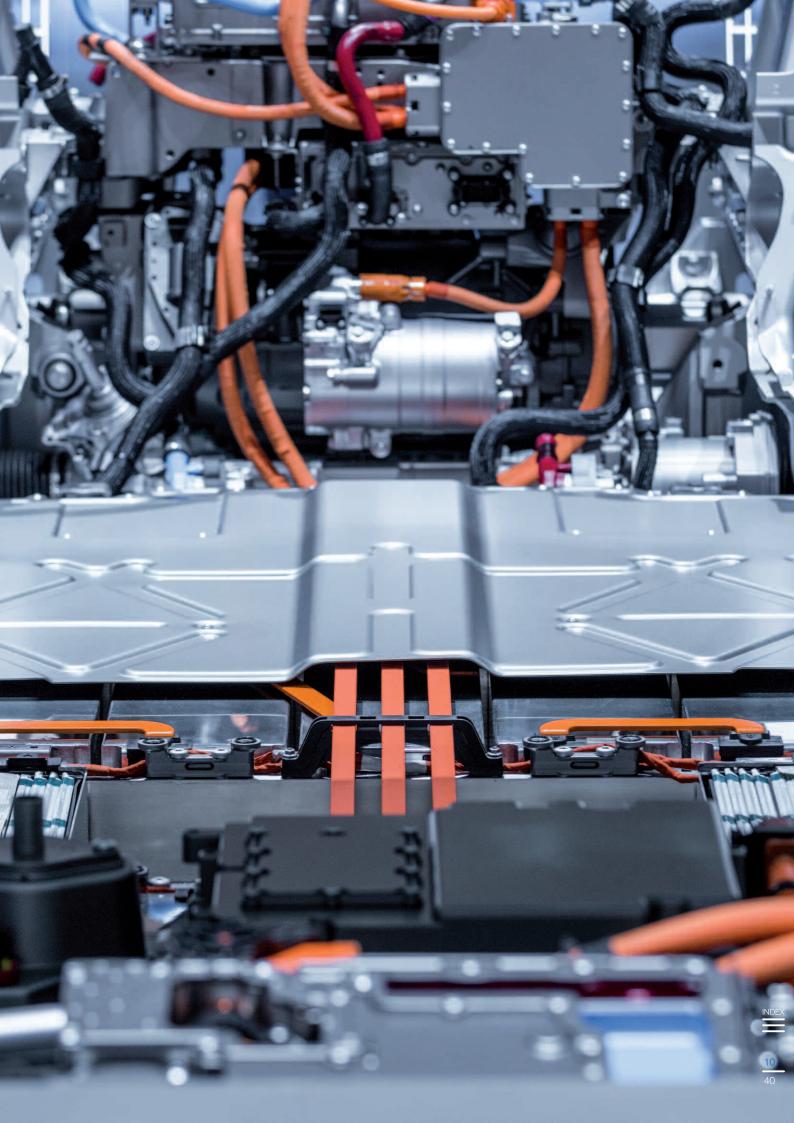
+ MATERIAL

+ GRIP THICKNESS

+ PLATING

+ ADDITIONAL FUNCTIONS





The standard RIVKLE® product line offers many variants. It is possible to change the characteristics of a nut or a stud so that it can be integrated into your automotive application (e.g.: plating).

RIVKLE® hexagonal nuts



- Head type: flat / thinBody end: open / closed
- Materials: steel / aluminium / stainless steel

RIVKLE® knurled cylindrical nuts



- Head type: flat / thinBody end: open / closed
- Materials: steel / aluminium / stainless steel

RIVKLE® hexagonal



- Head type: flat / thin
- Materials: steel / stainless steel

RIVKLE® cylindrical



- Head type: flat / thin
- Materials: steel / stainless steel

RIVKLE®

ADDITIONAL FUNCTIONS





RIVKLE® Spacer

Function

Ensures a spacer function within the assembly

Characteristics

- Combination of two functions: rivet nut and spacer.
- Overthickness of the head obtained without reworking during the RIVKLE® manufacturing process.



RIVKLE® Fir tree stud

Function

Allows snap-on clips to be attached without tools

Characteristics

- Crimped blind rivet stud
- Fir tree thread



RIVKLE® HRT

Function

Adds a blind rivet nut with high mechanical strength

Characteristics

- Specific material and/or process to improve the strength of the installed product
- Compatibility with class 10.9 and class 12.9 screws (class 8.8 for the aluminium version)
- Specific design to ensure easy installation

Variants

- All RIVKLE® variants, including sealing
- Spacer head adaptable to all requirements (diameter, thickness)

Variants

- All RIVKLE® stud body variants
- With or without pilot point
- Possibility of scratch protection

Variants

- Steel: class 10 or 12 equivalent
- Aluminium: class 8 equivalent



RIVKLE® SFC

Function

Preserves soft or brittle application materials (composites / plastics, etc.)

Characteristics

- Deformation specifically studied to eliminate the radial loads and ensure better distribution of the axial loads
- Bulge seating on a perimeter away from the axis of the hole



RIVKLE® Seal Ring

Function

Ensures leak tightness with pressurised or non-pressurized liquids

Characteristics

- Seal placed in a groove under the head
- Possibility of resistance to different environments (temperature and product)
- Resistance level in compliance with standard ISO 20653, IPX7



RIVKLE® PN slotted body

Function

Provides high pull-out resistance on soft application materials of variable thicknesses

Characteristics

- Slotted body undergoing a petalshaped deformation on the blind side of the application material, thereby forming an abutment with a significant diameter
- Wide setting range, for grip thicknesses varying up to 6.6 mm

Variants

Steel or stainless steel nut or stud, with standard, elliptic or hexagonal head

Variants

- NBR seal: O-RING in nitrile
- FKM seal: O-RING in fluorocarbon

Variants

Steel, stainless steel, aluminium

The key to light assemblies

An advantage for weight saving in vehicles

This rivet nut adds a high-strength female thread in polymer materials without causing damage to the application material. RIVKLE® SFC is suitable for flexible and brittle materials and can be integrated into any plastic parts without the need for particular precautions. After setting, thanks to its specific deformation, the bulge ensures uniform distribution of the grip forces.



RIVKLE® SFCSmart For Composites

Advantages

- Make simpler designs without worrying about the edge distances of your parts
- Use wider tolerances when drilling the holes (relief angle, etc.)
- No more constraints regarding the compatibility between the materials and the assembly components



For absolute robustness

High strength and reduced dimensions for your structural assemblies.

This blind rivet nut was designed to provide highstrength female threads after setting while retaining optimum dimensions.



RIVKLE® HRTHigh Resistance Thread

Advantages

- Extend the use of blind rivet nuts to applications involving high mechanical stresses.
- Add high-strength female threads to complex parts allowing access from only one side.
- In its aluminium version, this rivet nut provides full compatibility with class 8.8 screws.



Tightness in all circumstances

Preserve your assemblies from external influences.

This insert leaves no room for compromise and ensures sealing against all fluids while retaining the performance of RIVKLE® over time (metal-to-metal contact). All our products are proof tested with air pressure in accordance with stringent procedures (ATEQ) and comply with the IPX7 requirement (ISO 20653).



RIVKLE® Seal Ring

Advantages

- Simplify your sealed assemblies with a solution directly integrated into your RIVKLE® nuts or studs.
- Ensure systematic and repeatable sealing and preserve the mechanical performance of your assemblies.
- Keep enjoying the advantages of simple and quick setting methods, either manual or automatic.



Controlled spacing for your assemblies

Our robust solution to accurately control the position of the components to be assembled.

By changing the head diameter and thickness of RIVKLE® nuts or studs, these can perform a spacer function in your assemblies, in addition to their basic functions. For example, it becomes possible to control the compression force during the screwing operation (seal, plastic parts, etc.) or to ensure accurate spacing (roof racks, etc.).



RIVKLE® Spacer

Advantages

- You can be assured that the spacer is always aligned with the female thread and thus provides accurate and repeatable spacing.
- You have a robust seating point which is integral with the product.
- You can optimise your assembly costs while enjoying the installation characteristics of standard RIVKLE® fasteners.



Advantages

Crimping Fir tree thread

Fir tree studs without constraints in terms of materials or accessibility.

This product is a forged crimped stud with inclined thread Fir tree thread, crimped in the body of a RIVKLE® blind rivet nut. This combination adds the advantages of the rivet nut technology to the advantages of tool-less mounting on inclined thread studs. This product can be installed using the standard BÖLLHOFF manual and automatic tools and thus makes it possible to install stud clip-on plastic fasteners anywhere.



RIVKLE® Stud Fir tree threads

Extend the use of Fir tree threads to all materials, including those with little or no compatibility with welding (HSS plates, aluminium, plastics and composites).

- Extend the use of Fir tree threads to complex parts thanks to the possibility of performing the installation with access to only one side.
- You can install Fir tree threads at every stage of your production process, and in particular on finished parts (paint, cataphoresis, etc.).



The universal solution for supports with extreme variations

Extreme versatility in terms of thickness and diameter

The main difference of this RIVKLE® fastener is its slotted body which allows a petal-shaped deformation during the setting operation, thereby forming a large-size abutment. Its specific design allows it to accept large variations of the thickness of the support and/or variations of the diameter of the hole.



RIVKLE® PN

Advantages __

- A great number of applications can be covered with a single product.
- You can counterbalance the variations of thickness and hole diameter which result from your process (plastic parts, plies, etc.).
- Secure your assemblies on thin plates or soft materials thanks to a large-size abutment.



Electrical insulation



Thanks to a plastic ring molded in or added to its head, a RIVKLE® fastener can electrically insulate a part for the cataphoresis painting process.

Earth ground function



Set before cataphoresis and with ribs underhead blind rivet nuts and studs are able to provide an earth ground function and thus drive electricity in your assemblies.

Clip function / Indexing



With their shouldered heads, the RIVKLE® blind rivet nuts and rivet studs can receive plastic clips.

This kind of design allows large-size parts to be positioned or indexed during your assembly operations.

Scratch protection



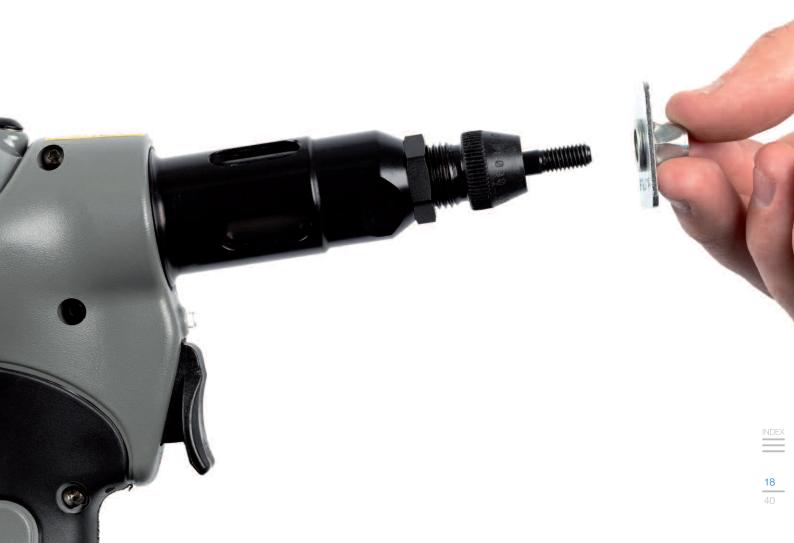
A drop of resin is applied to the end of the stud to prevent any risk of scratching your parts during handling.

Stronger anti-turn function



The combination of a knurled body with ribs under the head allows you to optimize the anti-turn resistance of your assemblies on soft materials.

SETTING OF **RIVKLE®** FASTENERS

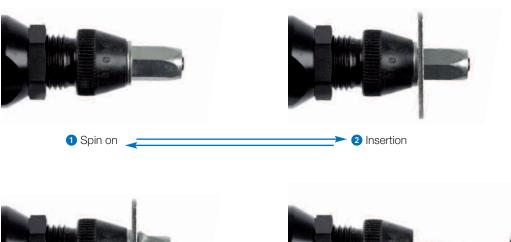


Pull setting method

The BÖLLHOFF setting tools use the pull setting method to set the RIVKLE® assembly components.

This method consists of 4 steps

- 1 (or 2) Spin on
- 2 (or 1) Insertion of the component into the support
- 3 Upset
- 4 Spin off









4 Spin off

Our pressure setting method

Today, all the BÖLLHOFF setting tools use the pressure setting method. With this setting method, a tension force is applied in order to generate the deformation of the RIVKLE®.



Advantages

- Ensures a constant setting quality, particularly for applications with variable thicknesses.
- Allows the use of preventive controls.
- $\hfill \blacksquare$ Quick and simple adjustment of the setting tools.
- Prevents damage to the setting tool or the RIVKLE® in the event of a 2nd setting cycle.
- Increased mandrel life.

Process control

The RIVKLE® technology guarantees that each fastener will be properly set during the process.

This non-destructive test is carried out as a background task during the setting process. This validation of the setting parameters and conditions is available on the hand setting tools and the automatic setting tools as well.



Hand setting tools

The **RIVKLE® FC340 Force Controller** is the most reliable solution to allow you to check that your hand setting tools are correctly adjusted and deliver the suitable setting forces for your application.



This tool is available with or without calibration certificate.

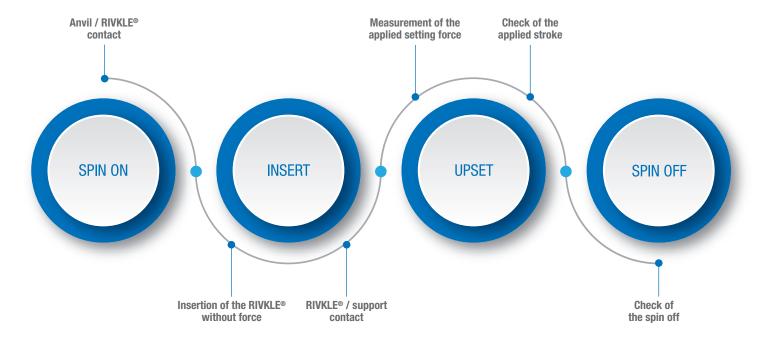


Process control – Automatic setting tools

Our automatic setting machines are equipped with advanced monitoring devices which allow them to check in advance that the required conditions for proper setting are complied with, in order to achieve a 100% compliant setting.

The tools communicate in real time with the production environment and act as high-performance components of the production line.

All the information collected before and after the setting operation is transmitted in real time to your production line to optimize the management of your parts flow.









RIVKLE® P1007

Maximum stroke	7.0 mm
Maximum setting force	13 kN (up to M6 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	1.8 kg
Noise level	< 70 dB (A)
Production rate	32 RIVKLE® /min



RIVKLE® P2007

Maximum stroke	7.0 mm
Maximum setting force	21 kN (from M4 to M10 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	2,2 kg
Noise level	< 70 dB (A)
Production rate	32 RIVKLE® /min



RIVKLE® P3007

Maximum stroke	8.0 mm
Maximum setting force	40 kN (from M8 to M14 steel)
Operating air pressure	5.5 bar min. to 7 max.
Weight without tooling	3,4 kg
Noise level	< 70 dB (A)
Production rate	14 RIVKLE® /min



RIVKLE® B2007

Maximum stroke	8.0 mm
Maximum setting force	22 kN (from M3 to M10 steel)
Battery	Li-lon / 14.4 V / 2.6 Ah
Weight without tooling	2.1 kg + 0.3 kg (tool + battery)
Noise level	< 70 dB (A)
Production rate	24 RIVKLE® /min

We have issued a dedicated brochure for these products. Please contact BÖLLHOFF.



RIVKLE® B2007 – Flexible and versatile battery tool

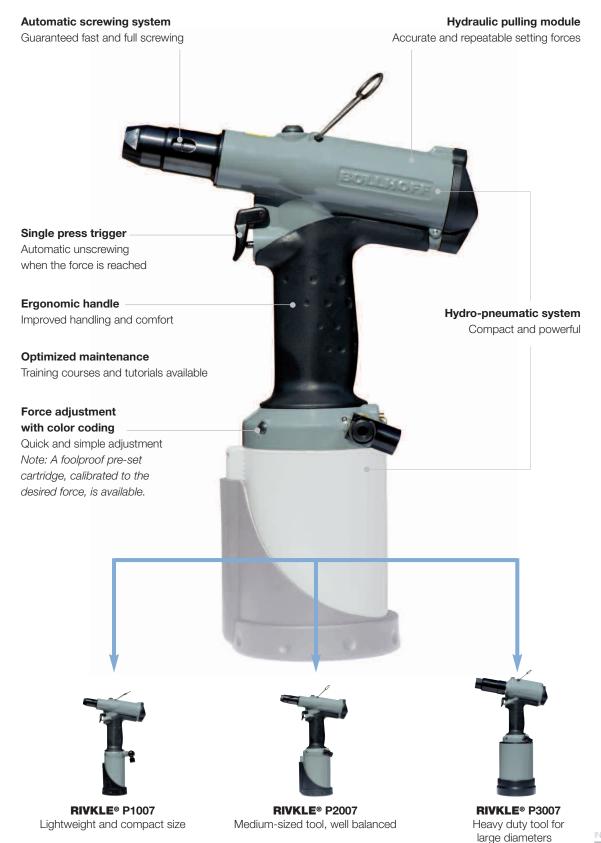


High-capacity lithium-ion battery

Maximum battery life



RIVKLE® PX007 – Flexible and versatile hydro-pneumatic tools





RIVKLE® EPK – Guaranteed perfect setting of fasteners for your manual assembly lines.

Fully controlled manual setting operation with communication with your production lines.

This hydro-pneumatic tool was specifically designed for the mass production of motor vehicles.

It is equipped with a remote control unit to manage the various communications with the environment and optimise the repeatability of the setting force (hydraulic booster).



1 The control unit is equipped with a built-in touch screen that allows the adjustment of the setting parameters, the counters and the alarms and the management of all the sensors.



RIVKLE® Powertool – Fully controlled setting

The unit features multiple connections for its power supply (air and electricity) and to communicate with its environment (PROFINET, PROFIBUS, ETHERNET, USB, etc.).

This modular range answers to all integration needs (communication and production cycle management). The setting stroke and the setting force are controlled in real time during the setting cycle.

Options such as a stack light, wheels, etc., are available.

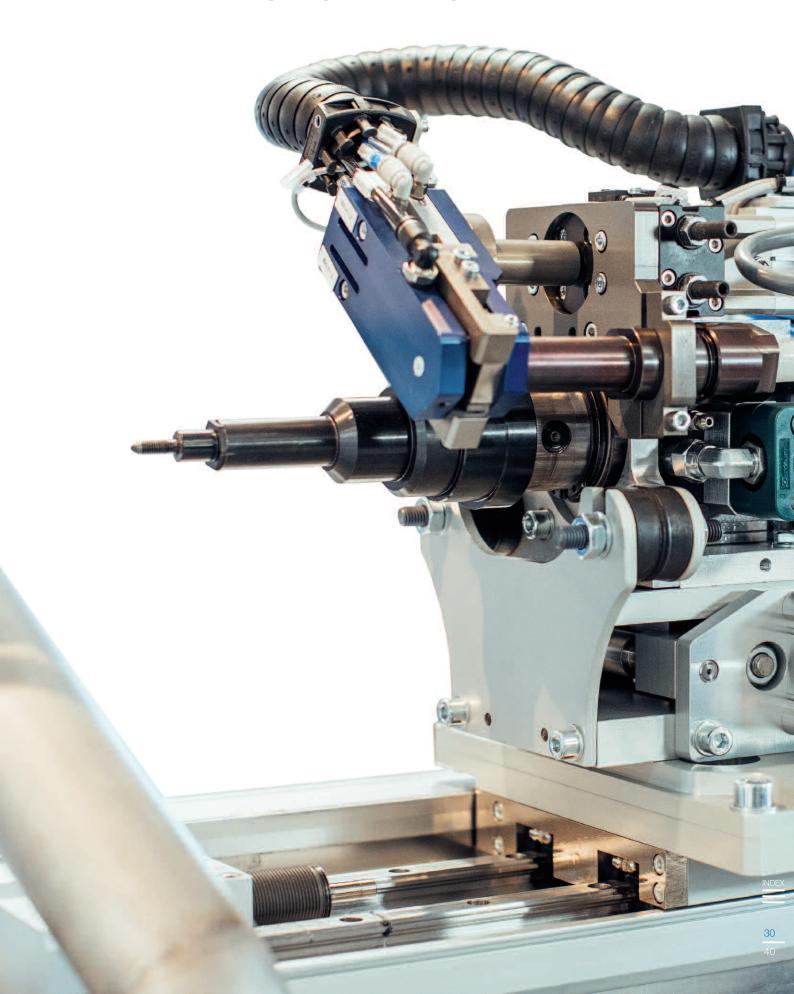
The wide range of setting heads provides a solution for all work station configurations (vertical, one hand, etc.).



	RIVKLE® EPK C	RIVKLE® EPK HP
Electrical power supply	230V - 50Hz / 110V - 60Hz	230V - 50Hz / 110V - 60Hz
Pneumatic supply	6 bar	6 bar
Setting capacity	6 to 21 kN (up to M10 steel)	20 to 55 kN (up to M12 steel)
Setting stroke	7 mm	9 mm
Noise level	82 dB (A)	85 dB (A)
Production rate	13 to 20 RIVKLE® /min	11 to 15 RIVKLE® /min

 $^{(\}sp{*})$ the production rate depends on the operator and the ergonomics of the work station

SETTING MACHINES RIVKLE® AUTOMATION



Automatic setting systems

Our range of automatic setting tools is optimized so that they can be integrated into production lines. The setting heads can be used with a BÖLLHOFF bowl feeder system.

The hexagonal RIVKLE® fasteners are oriented upstream, during the feeding process, in order to optimize the setting time.

Defective or incorrectly oriented RIVKLE® fasteners are recycled to avoid any shutdown of the production line.

The BÖLLHOFF vibratory bowl feeders can be integrated into two types of configurations: "pick and place" or "blow-feed".

Pick and place configuration

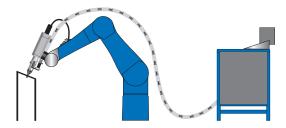
The setting head moves to the bowl feeder to pick up the RIVKLE® and moves to the workpiece to set the RIVKLE®.



The head can pick fasteners from different bowl feeders (different RIVKLE® fasteners).

Blow-feed configuration

The RIVKLE® fasteners are automatically blow-fed from the bowl feeder to the setting head.



Up to 4 setting heads fed with only 1 bowl feeder



INDEX

Stationary On a transfer system On a robot

RIVKLE® ESA 2.0 – Electric power to optimize your automated lines

Two powerful electric motors, combined with an accurate electronic control system, to ensure the fast and perfect setting of all your RIVKLE® fasteners.

RIVKLE® ESA 2.0 provides a fully automatic setting solution, without hydraulic components, which ensures optimum setting and limits the maintenance operations over time.

Electric power

Simplified maintenance and reduced environmental footprint

Electronic management of the setting parameters

High speed and accuracy, for full control and optimized repeatability

A powerful motor combined with a roller screw

Optimized energy consumption, friction, cycle time and robustness

4 servo-regulators

Control of all motor movements

Mechanical compliance

Insert / hole misalignment compensation



RIVKLE® ESA 2.0

Setting	Force
Weight	28.5 kg (variable according to configuration)
Power	Electric (400 Vac + N) + pneumatic (loading)
Setting capacity (kN	5 to 22 kN (up to M8 steel)
Setting stroke	8 mm
Process control	100% stroke and force
RIVKLE® feed system	Pick and Place or automatic blow feed
Maximum production rate (RIVKLE®/min)	13



Simple and user-friendly configuration and data access

Transfer

The standard ESA 2.0 head is installed on a transfer module in order to accurately manage the placement into the hole (collision management) and the recycling, if any, of the inserts.

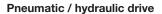
RIVKLE® HSA 2.0 – The reference for RIVKLE® fastener setting on automatic lines

Historical BÖLLHOFF offer dedicated to high volume, regulary upgraded still considered as the reference by many car producers all around the world.

The RIVKLE® HSA 2.0 tool is an automatic hydro-pneumatic setting system.

Used in the production of a large number of motor vehicles throughout the world, this machine has become a point of reference in terms of reliability and efficiency.

The latest version 2.0 further optimizes the performance and the maintenance operations.



Compact, powerful and reliable

Recycling

Uninstalled RIVKLE® fasteners are automatically eturned to the vibratory bowl feeder in masked time.

Full control over the setting process

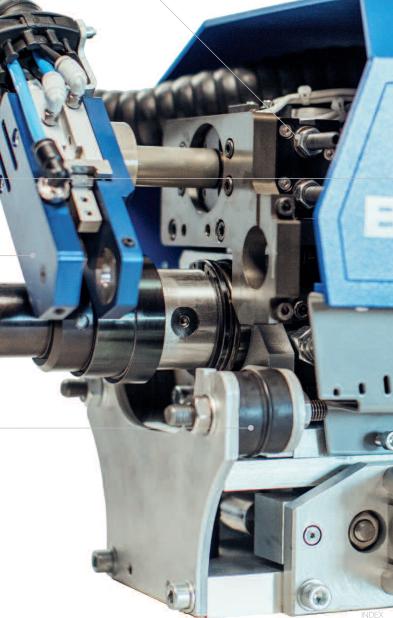
Orientation, screw in, insertion / screw in, setting

Pneumatic loader

Automatic feeding and orientation of the RIVKLE®

Mechanical compliance

Insert/hole misalignment compensation



	RIVKLE® HSA 2.0
Setting	Force
Weight	23 kg max.
Power	Pneumatic / Hydraulic
Setting capacity (kN)	5 to 32 kN (M4 to M12)
Setting stroke	28 mm - 8 mm
Process control	100% stroke and force
RIVKLE® feed system	Pick and Place or automatic blow feed
Maximum production rate (RIVKLE®/min)	10

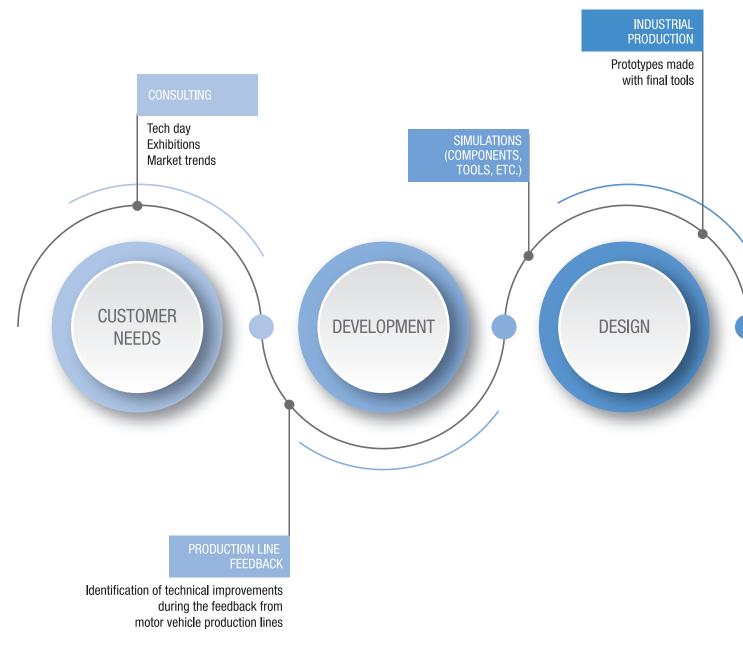




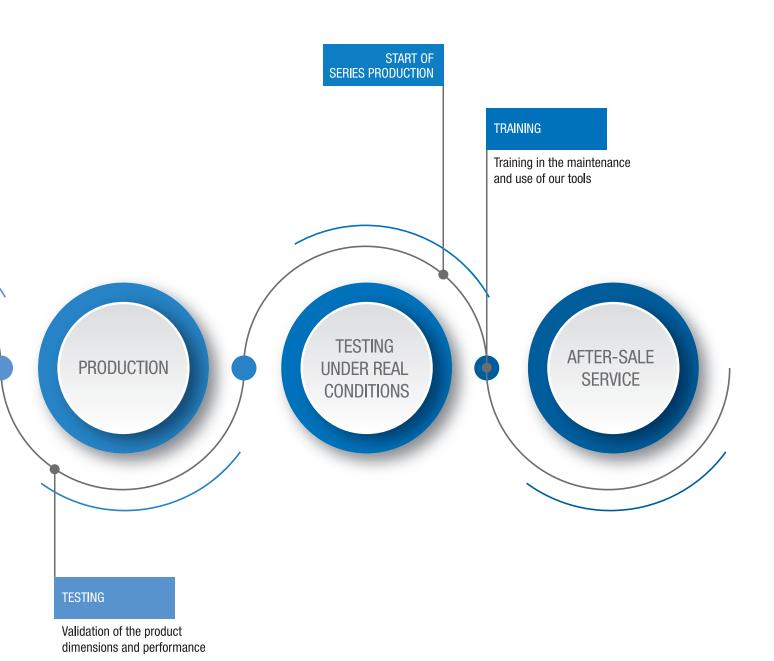
BÖLLHOFF is the only supplier for your assembly components and associated tools

BÖLLHOFF provides you with comprehensive assistance. Thanks to our fully in-house expertise, we will support and guide you, from the stages before your design to the industrial production stage and including to provide you with training in the setting methods.

We have the expertise for each step related to your project: consulting, development, design, prototyping.











BÖLLHOFF, an international partner: Proximity, Production, Quality

to you.



BOLLHOFF



BOLLHOFF

Worldwide for you a strong partner – at 39 locations in 24 countries.

Böllhoff Group

Please find your local contact on **www.boellhoff.com** or contact us under **fasteningtechnology@boellhoff.com**

