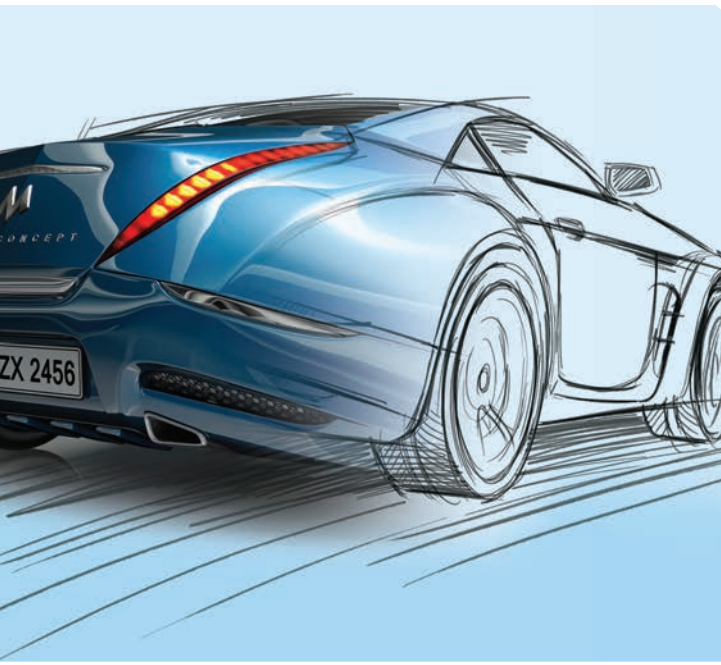
www.baier-michels.com



b&m-HIGHLOAD®

Direct screwing system for high-stress applications

Your Partner in All Facets of Cold Forming: **baier & michels**

The baier & michels Group (b&m) supports the manufacturing industry with fastener technology innovations. They are based on cold extruded parts such as high-performance screws and sealing systems from our own development and production. Our customers include OEMs and suppliers, especially from the automotive, electrical and medical technology as well as tool and plant construction.

b&m is not only a producer, but also a forward-thinking partner – with fastener tests in our laboratories, with application consulting and with technical training. What drives us are individual solutions to challenges, which cannot be met with standard technologies. The optimal solution is found when we can offer a real added value to our customers.

Our mission: to achieve a significantly improved interplay of quality, cost efficiency and eco-balance, whilst reducing risks and the use of resources in your components – with connections that last.

With social responsibility and photovoltaics on the roofs: the company headquarters is located in Ober-Ramstadt in the south of Hesse.

Highest precision and quality “Made in Germany”: b&m produces small cold extruded parts with a big impact.

Lab expertise: qualified application engineers set the screw-in parameters for our customers’ components.

From local screw dealer to a global supplier

Founded in 1932 as a small screw shop, baier & michels (b&m), headquartered in Ober-Ramstadt, has become one of the leading producers of high-quality fastening and sealing technology. With currently 500 employees, we operate at nine locations in Europe, Asia and North America. As a member of the Würth Group, b&m stands not only for the spirit of innovation, but also for stability and social responsibility in the sense of sustainable economic activity.

b&m-HIGHLOAD®

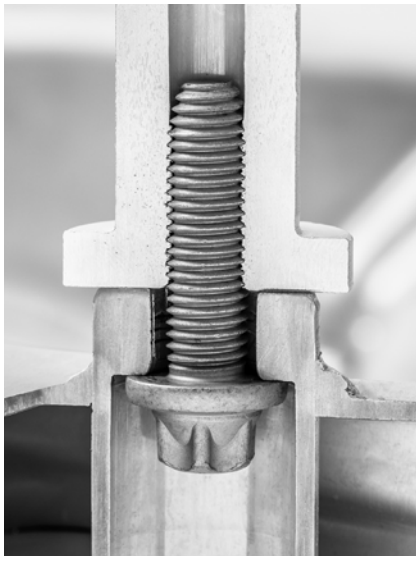
Thread-forming screws primarily use a trilobular shape of the thread body. In contrast to this conventional solution, the b&m-HIGHLOAD® uses a circular thread cross section that provides an additional load-bearing area.
The b&m-HIGHLOAD® is used primarily in composite structures. It is suitable for extremely high-stress component connections, whether in steel or aluminum. The special feature of this screw: Load tests have shown substantial preload forces and an extremely consistent screw setting behavior with moderate forming torque and high overtorque.

Connection problems in aluminum-steel hybrid assemblies

CHALLENGE:
Direct screwing failure when forming thread into tough-soft aluminum alloys

The use of thread-forming screws in aluminum-steel hybrid assemblies often leads to problems in the threaded connection. The reason for this is partly due to the different core hole parameters such as diameter, draft angles or surfaces (strain-hardened or machined). Another factor is that material strengths and screw-in depths, which differ greatly from high-strength steels to tough-soft aluminum, are crucial for the connection.

With low-strength materials, the large screw-in depth is often the cause of connection problems. Due to the high friction when forming the thread, conventional trilobular screws tend to seize in the component.



Solution: b&m-HIGHLOAD®
Universally usable in aluminum-steel hybrid assemblies

b&m-HIGHLOAD® is a direct screwing system that can be universally used and guarantees a secure connection from high-strength steels to tough-soft aluminum. Due to the special forming zone geometry, "seizing" of the screw is prevented and thus screw-in depths of up to 5 x D (D=thread diameter) can be realized with low-strength materials.

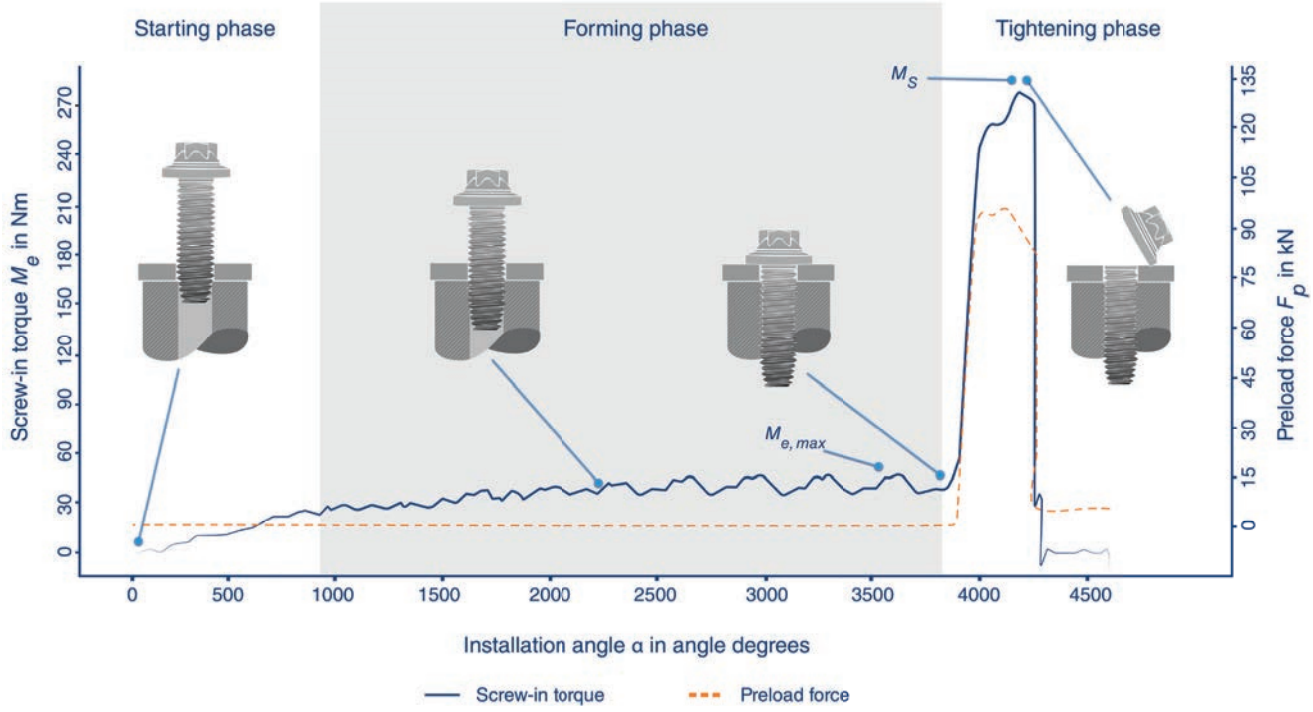
PRODUCT FEATURES:

- **Diameter:** M8 – M14
- **Length:** depending on diameter / 20 mm – 140 mm
- **Property class:** 10.9 according to DIN EN ISO 898-1 + induction-hardened forming zone
- **Head geometry:** Hexalobular external drive; customized solutions are possible
- **Coating:** according to specification (integrated or additionally applied lubricant according to application)

AREAS OF USE:

- Overcomes the challenges of multi-material structures
- Direct screwing in high-strength and tough-soft materials such as cast aluminum
- High-load applications with safety and crash relevance

High stress on crash- and safety-relevant components

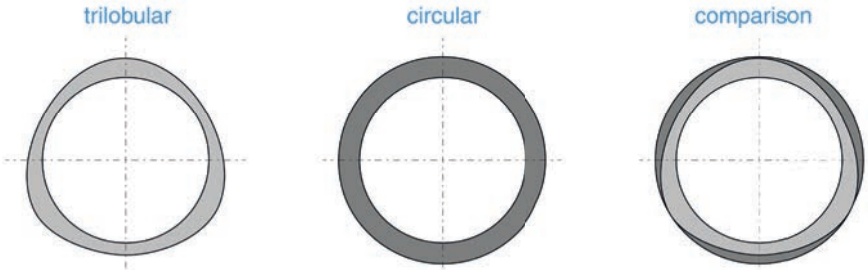


The diagram shows the three stages of a b&m-HIGHLOAD® M14x50 screw installation process until the overtorque is reached. (© b&m)

CHALLENGE:

Load capacity of the connections in crash- and safety-relevant assemblies is too low

Thread-forming screws mostly use a trilobular shape in the thread body. With these conventional concepts, the thread cross section has the profile of a strongly rounded triangle. This means that the thread sections do not overlap completely, resulting in comparatively low transmission of preload forces. The consequence: higher shear forces on the remaining overlap when under extreme stress, reducing its load-bearing capacity – whether in high-strength or tough-soft materials. This can cause critical situations, especially in safety and crash-relevant assemblies.



In comparison to a trilobular solution, the circular geometry of the b&m-HIGHLOAD® ensures an additional load-bearing thread section (© b&m)

Solution: b&m-HIGHLOAD® Direct screwing system for high-stress applications

Unlike other conventional direct screwing systems, the b&m-HIGHLOAD® uses a circular thread cross section, which provides additional load-bearing thread sections. In combination with the fully formed thread flanks, the screw, which can be used universally in composite structures, offers maximum overlap of thread section and because of this, high overtorques and preload forces. These benefits provide highly stressed connections, whether in steel or aluminum, with a noticeable plus in robustness: the b&m-HIGHLOAD® increases the load bearing capacity of safety and crash relevant assemblies.

Direct Screwing in Metals

WHY DIRECT SCREWING IN METALS?

The principle of non-cutting forming used here produces a thread with high load-bearing capacity due to the uninterrupted grain flow and strain-hardening of the material. Additional screw locking (e.g. to DIN 267-27/28) is therefore unnecessary.

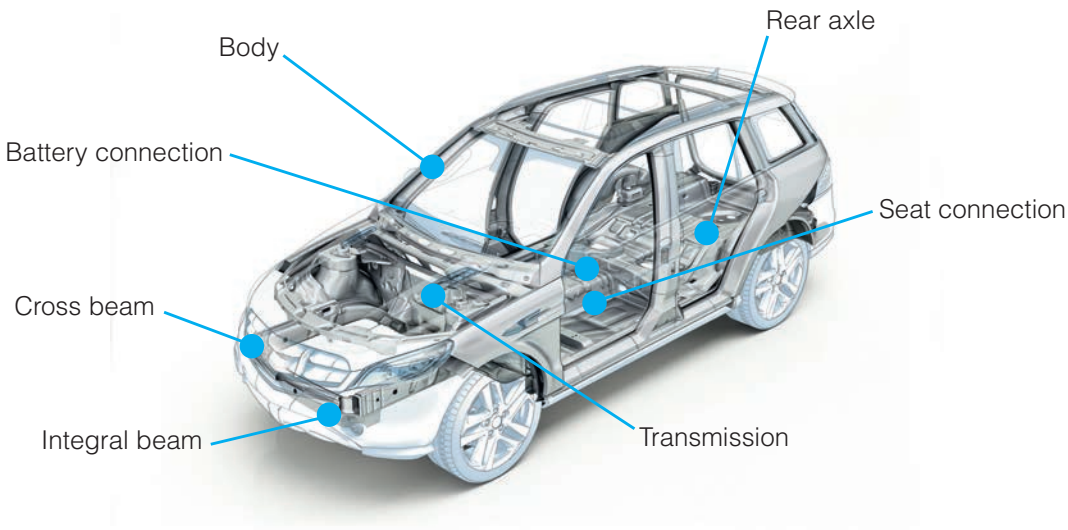
The generated thread is a metric ISO thread, which is compatible with standard parts. Furthermore, the threads formed in this way are free of play and are self-locking. Thread-forming screws can be used in all ductile, i.e. plastically deformable materials.

b&m-HIGHLOAD®

BENEFITS:

- Transmission of high preload forces even with a shortened load-bearing thread section
- Universal application for direct screwing in materials from high-strength steel to tough-soft aluminum
- Circular thread cross section and fully formed thread flanks offer maximum flank coverage and therefore high overtorques and preload forces
- The special forming zone geometry provides a self-righting effect and compensates for axial deviations when the screw is positioned.
- The special forming zone geometry prevents seizing of the screw, making screw-in depths of up to 5 x D (D = thread diameter) in low-strength materials possible.
- The immense preload forces of the threaded connection prevent radial transverse shifting between the components.

Application examples



baier & michels worldwide

Get connected with us!

We analyze your screw connection in our labs. In addition, we accompany your product development and production – with fastener technology consulting and training for personnel. On request, our experts present the potentials from the world of innovative connections at a b&m-TECH Day, either digitally or on-site at your premises.

Our services cover the areas of:

- Application engineering
- Process optimization
- Development of new connection systems

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