

b&m-FORM[®] Family

Direct screwing in all ductile metal materials



Welcome to baier & michels



Group headquarters in an idyllic location
in Ober-Ramstadt near Frankfurt

Dear customer,
Dear business partner,

The globally oriented b&m group has built up a strong position as a partner for connection technology and C-parts management in the automotive industry. This is based on innovations in products, processes and systems, and confidence through competence, commitment and soundness.

New innovative products are being developed as problem solvers for customers in the field of technology. Our application engineers support customers with their requirements. A unique standardization tool with an online portal can substantially reduce the variety of parts the customer uses.

As a manufacturer, the b&m Group has the know-how to ensure very high and reliable product quality. With b&m Logistics, the b&m Group has a company that optimizes the customer supply chain worldwide through modern systems such as RFID.

Enjoy reading

Peter Federolf
Managing Director

baier & michels, founded in 1932, has developed a strong position as a supplier of fastener technology in the automotive industry and now employs more than 500 people worldwide. The Würth Group, to which b&m has belonged since 1973, provides additional financial stability with more than 79,139 employees and over 14,41 billion Euro in sales worldwide. baier & michels is now active in Europe, Asia and North America.



Direct Screwing in Metals

WHY DIRECT SCREWING IN METALS?

In direct screwing, fasteners generate a thread without cutting during the screw-in process.

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 self-locking. Thread-forming screws can be used in all ductile, i.e. plastically deformable materials.

BENEFITS:

- Cost advantages through the elimination of thread cutting and through direct use in cast, drilled or punched holes
- Produces an uninterrupted grain flow and a thread with high load-bearing capacity by strain-hardening of the material
- Through the forming process of the thread, no interfering chips are created
- The thread geometries of all our direct screwing systems have a large tolerance range preventing angular errors when the screw is applied
- No play between the screw and its self-formed nut threads
- No threadlocker is required due to the associated self-locking effect
- Repeat screwing is possible

b&m-FORM® Family

A customized solution for every application in the area of metals

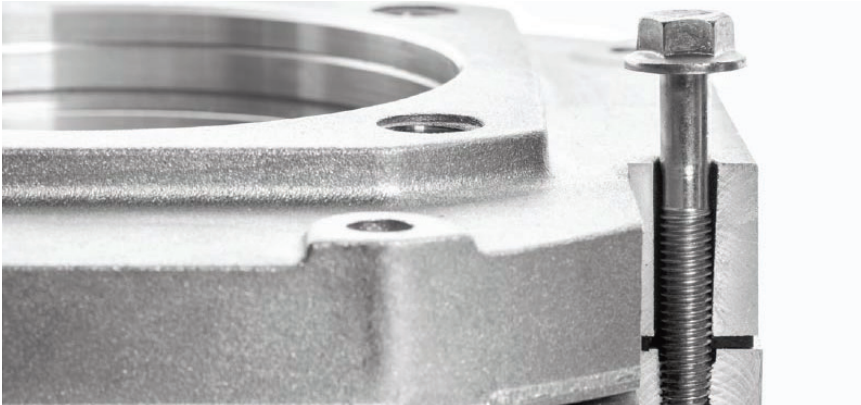


Product	Areas of use
b&m-FORM®	<ul style="list-style-type: none"> • Particularly suitable for aluminum direct screwing in cast core holes • Suitable for steel and sheet metal applications, zinc and zinc die casting
b&m-FORM S®	<ul style="list-style-type: none"> • Especially suitable for applications with limited installation space as well as assemblies which allow only minimal protrusion of the screw tip • Suitable for aluminum direct screwing in die-cast or drilled core holes • Suitable for steel- and sheet metal applications
b&m-SHEETFORM®	<ul style="list-style-type: none"> • Especially suitable for thin sheet metal applications in aluminum and steel

b&m-FORM®

Universally usable direct screwing system in all ductile metal materials

In contrast to „trilobular“ screws, the b&m-FORM® is designed with a circular cross-section affecting the entire threaded area. The forming zone is also provided with fully and sharply pointed thread flanks. The geometry of the thread guarantees a secure screw-in process even under unfavorable conditions.



Direct screwing connection in die-cast aluminum



b&m-FORM®

CHALLENGE:

Screwing connection in aluminum and steel

When producing internal threads in pre-drilled core holes made of aluminum and steel, special taps or thread formers are often used. Emulsions or oils are required for

mechanical production. Before the actual screw-in process, the threads must be cleaned. This procedure generates high additional overhead and manufacturing costs.

SOLUTION: b&m-FORM®

Universal solution for metals

- Easy hole locating due to the rounded screw tip
- Circular thread cross section and fully pronounced thread flanks offer maximum flank coverage and through this a high overtorque
- Large process window between forming torque and overtorque
- Easy installation with little need for axial force during the screw-in process
- A metric thread is generated, so that metric equivalents can be used for repairs

PRODUCT FEATURES:

- **Diameter:** M3 - M10
- **Length:** depending on diameter / 6mm - 70mm
- **Property class:** F10 according to b&m-factory standard WN04/14 or according to DIN/ISO specification
- **Flank angle:** 60°
- **Thread pitch:** metric according to DIN 13
- **Head geometry:** feasible solutions according to customer specification
- **Coating:** optional according to specification (integrated or additionally applied lubricant according to application)
- **Thread forming zone:** 3 - 4 threads

Project example

Product: b&m-FORM® M6x14

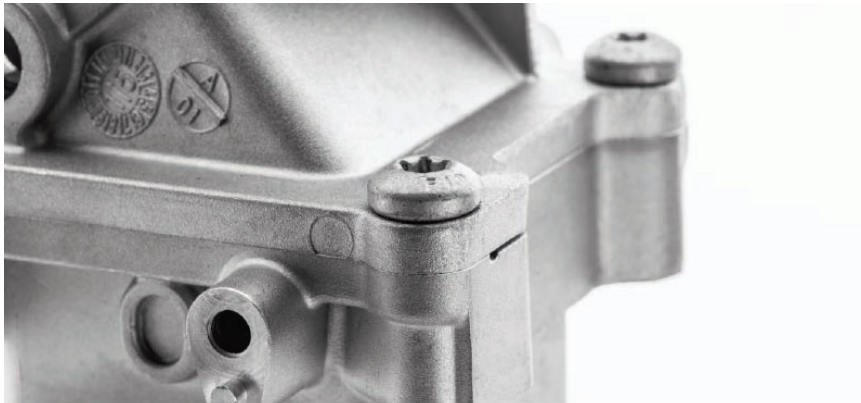
Project: Cover screw connection WAPU / Alu - Die-casting

Customer: Manufacturer of water and oil pumps



b&m-FORM S[®]

Direct screwing system with shortened forming zone suited for all ductile metal materials



Applications of screw connections with low screw-in depths

CHALLENGE:

Screw connection for limited installation space in aluminum and steel

The b&m-FORM S[®] is a conversion of b&m-FORM[®] with a shortened forming zone. It is particularly suited for screw connections in tight spaces and /or assemblies allowing only a limited protrusion of the screw tip. The fully-formed threads and tip geometry

guarantee a reliable screw-in process, even under unfavorable conditions.

PRODUCT FEATURES:

- **Diameter:** M3 - M6
- **Length:** depending on diameter / 6mm - 20 mm
- **Property class:** F10 according to b&m-factory standard WN04/14 or according to DIN/ISO specification
- **Flank angle:** 60°
- **Thread pitch:** metric according to DIN 13
- **Head geometry:** feasible solutions according to customer specification
- **Coating:** optional according to specification (integrated or additionally applied lubricant according to application)
- **Thread forming zone:** 1 - 2 threads



b&m-FORM S[®]

SOLUTION: b&m-FORM S[®]

Shortened forming zone

- Due to the short forming zone geometry on the screw thread, it is especially suitable for applications with limited installation space
- Circular thread cross section and fully pronounced thread flanks offer maximum flank coverage and through this a high overtorque
- Large process window between forming torque and overtorque
- Easy assembly with little need for axial force during the screw-in process
- A metric thread is generated, so that metric equivalents can be used for repairs
- Easy hole locating due to the rounded screw tip

Project example

Product: b&m-FORM S[®] M4x6
Project: Screwing connection of a pump cover
 Customer: Manufacturer of pumps in the automotive industry



b&m-SHEETFORM®

Specialized direct screwing system for thin sheet metal applications



Increased number of load-bearing threads by forming a hole-reinforcing collar

CHALLENGE:

Screw connection in thin sheet metal

The b&m-SHEETFORM® is provided with a forming zone specially designed for thin sheet metal applications ($t \leq 2\text{mm}$). This is particularly suited for screw connections in through-holes or passages. When the core hole is optimally designed, the

b&m-SHEETFORM® forms a hole-reinforcing collar from the sheet metal, which increases the number of threads in the clearance-hole and guarantees a connection with a high load capacity.

PRODUCT FEATURES:

- **Diameter:** M3 - M6
- **Length:** depending on diameter / 10mm - 30mm
- **Property class:** F10 according to b&m-factory standard WN 04/14 or according to DIN/ISO specification
- **Flank angle:** 60°
- **Thread pitch:** metric according to DIN 13
- **Head geometry:** feasible solutions according to customer specification
- **Coating:** optional according to specification (integrated or additionally applied lubricant according to application)
- **Thread forming zone:** 6 - 7 threads



b&m-SHEETFORM®

SOLUTION: b&m-SHEETFORM® Special forming zone

- Specially developed for thin sheet metal applications
- Cost benefits due to the elimination of punched, press-fit or welded nuts
- Easy hole locating due to the special forming zone geometry
- Increased number of threads through forming of a hole-reinforcing collar
- Circular thread cross section and fully pronounced thread flanks offer maximum flank coverage and through this a high overtorque
- Large process window between forming torque and overtorque
- Easy assembly with little need for axial force during the screw-in process
- A metric thread is generated, so that metric equivalents can be used for repairs

Project example

Product: b&m-SHEETFORM® M5x15,5

Project: sunroof screw connection

Customer: manufacturer of sunroofs



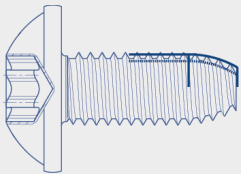
Comparison of the thread forming zones

of b&m-FORM[®], b&m-FORM S[®] and b&m-SHEETFORM[®]

b&m-FORM[®]

Universal solution for metals

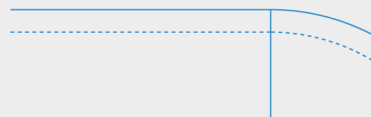
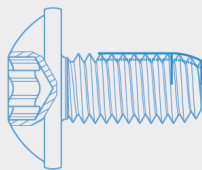
Thread forming zone: 3 - 4 threads



b&m-FORM S[®]

Shortened forming zone

Thread forming zone: 1 - 2 threads



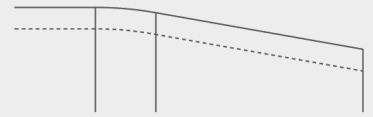
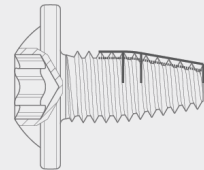
Comparison of the thread forming zones of b&m-FORM S[®] and b&m-FORM[®]



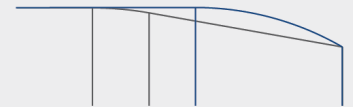
b&m-SHEETFORM[®]

Special forming zone

Thread forming zone: 6 - 7 threads



Comparison of the thread forming zones of b&m-SHEETFORM[®] and b&m-FORM[®]



baier & michels worldwide



Call us!

We analyze your screwing situation and offer you a non-binding technical consultation, upon request also on site. Our technical services include:

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

We also support you in the areas of procurement and logistics.

baier & michels GmbH & Co. KG

Carl-Schneider-Straße 1
64372 Ober-Ramstadt / **Germany**
Tel.: +49 (0) 61 54 69 60 - 0
Fax: +49 (0) 61 54 69 60 - 500
info@baier-michels.com
www.baier-michels.com

baier & michels S.r.l.

Via Eugenio Montale n. 6
35030 Selvazzano Dentro
(PD) / **Italy**
Tel.: +39 04 98 53 66 00
Fax: +39 04 98 53 66 96
italy@baier-michels.com
www.baier-michels.it

Würth baier & michels España S.A.

C/Picañol 2B
08208 Sabadell
(Barcelona) / **Spain**
Tel.: +34 (0) 653 194 108
Fax: +49 (0) 61 54 69 60 99 236
spain@baier-michels.com
www.baier-michels.com

baier & michels Kft.

Vásártér utca 4.
2351 Alsónémedi / **Hungary**
Tel.: +36 70 421 7205
hungary@baier-michels.com
www.baier-michels.com

Würth baier michels Otomotiv Limited Sirketi

Minarelicavus Mahallesi
Çelik Cad. No: 11/1
16140 Nilüfer-Bursa / **Turkey**
Tel.: +90 224 242 04 24
turkey@baier-michels.com
www.baier-michels.com

baier & michels USA Inc.

Greenville Office
65 Brookfield Oaks Drive
Greenville, SC 29607 / **USA**
Tel.: +1 864 968 1999
Fax: +1 864 968 1234
usa@baier-michels.com
www.baier-michels.com

baier & michels USA Inc.

Detroit Office
37450 Garfield Road, Suite 300
Clinton Township, MI 48036 / **USA**
Tel.: +1 248 877 9956
usa@baier-michels.com
www.baier-michels.com

Würth baier & michels Automotive Fastener Co., Ltd

No. 1969 Xizha Rd
Nanqiao / Fengxian District
Shanghai 201401 / **P.R. China**
Tel.: +86 21 6715 6028
Fax: +86 21 6715 6068
china@baier-michels.com
www.baier-michels.com

Wuerth baier & michels México S.A. de C.V.

Cerrada Bicentenario No. 3 Bodega 4
Parque Industrial El Marqués
El Marqués, Querétaro
C.P. 76246 / **Mexico**
Tel.: +52 1 (442) 446 9047
mexico@baier-michels.com
www.baier-michels.com