EJOT®

Strong Connections

EJOT® Product Overview

EJOT® The Quality Connection®

Content

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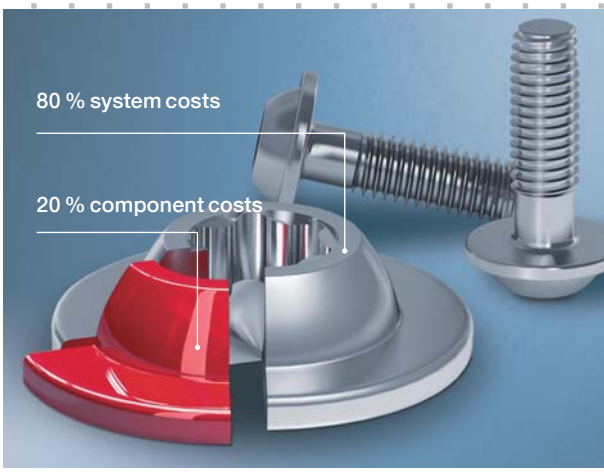
Fastening elements are small parts with an overall big effect. They are part of a system. We analyse this system for your benefit.



Increased Efficiency and Increased System Performance with the EJOT® Success Programme

EJOT translates customer requirements into individual product solutions. This know-how is the basis for our growth and has helped us evolve into a market leader within the fastener industry.
In addition to the EJOT product range, which can be found on the following pages, we offer system performance to help you achieve your objectives more effectively:

- **Design engineering support and on-site advice**
- **World-wide availability, just in time delivery**
- **Process reliable assembly and high degrees of purity**
- **0 ppm target and highest possible quality**

While the component costs only amount to 20 % of the total costs of the joint, the system costs amount to approx. 80 %. EJOT can help you reduce the system costs for the joint and operate the overall process with higher efficiency and productivity.

Further information is available on www.reducing-systemcosts.com

Contact our application engineers at an early stage of the development process.

EJOT DELTA PT® – Calculable performance improvement

The EJOT DELTA PT® has been especially developed for screw joints in thermoplastics. The thread geometry creates low surface pressure and provides a high clamp load of the joint.
Excellent long-term performance is obtained under thermal and dynamic loads.

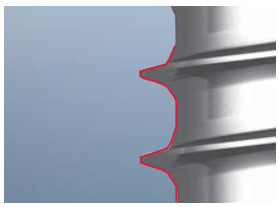
The innovative geometry of the EJOT DELTA PT® Screw results in a robust fastener which guarantees reliability even in complex designs and extreme applications.

- Direct assembly saves time and work steps
- Minimised radial stress allows thin-walled designs
- Safety due to high tensile and torsion strength as well as vibration resistance
- A wide range of possible tightening torques
- Cost-effective solution for standardised parts
- Simple design engineering with the EJOT® DELTA CALC prognosis programme

Detailed information available in the DELTA PT® product brochure.

DELTA PT®

direct assembly in thermoplastics in one work step.



High residual clamp load, due to large, load bearing thread flanks.

Application Examples

- Fastening of bumpers
- Assembly of intake manifolds

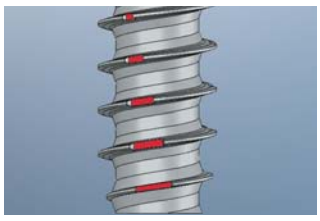
EJOT DELTA PT® DS – Safe direct assembly in thermosets

The EJOT DELTA PT® DS Screw ensures reliable direct assembly into plastic.

Some designs require the use of thermoset materials, which pose special demands on direct assembly due to their hardness and brittleness. Slightly modified thread ends are necessary to make a direct assembly with these very demanding materials possible.

With the thread form DS (DuroSet) EJOT responded to these challenging conditions. For the EJOT DELTA PT® DS Screw special grooves are applied to the established DELTA PT® thread geometry, which help to cut the female thread. These grooves are pronounced at the screw point and taper off towards the screw head. The thread forming zone permits low installation and high stripping torques.

- Smaller chip space allows for shorter hole depth, compared to screws with milled cutting edge
- Easy assembly due to easy application of the screw
- Larger flank coverage at the same insertion depth compared to milled cutting edge
- Extended production range for diameter and length
- Saving potential through standardisation: One type of screw for thermoplastic and thermoset
- Saving potential through omission of threaded inserts



Detailed view with forming grooves

Application Examples

- Assembly of cooling-water pump casings
- Assembly of contactor and switch casings

EJOT ALtracs® Plus – The fastening solution for light metal

EJOT ALtracs® Plus is designed for direct assembly into cast holes. Compared to metric screws cost savings of up to 40% can be achieved. An ALtracs® Plus screw achieves strength values which are comparable to the metric screw joint (strength value 10.9.).

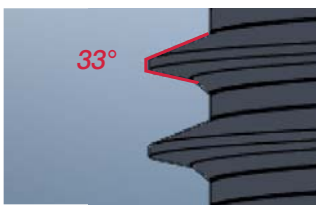
The ALtracs® Plus thread is vibration resistant at an installation depth of approx. 1,5 x d_1 (without any additional safety elements such as washers, PA coating, micro encapsulating etc.).

- Direct installation into cast holes - without secondary finishing
- Cost savings of up to 40 % due to reduced work steps
- Metric compatibility: Metric screws can be used in an ALtracs® Plus thread
- Maximum thread engagement due to the circular thread cross section
- High clamp loads and long term stability
- Vibration resistant
- Multiple repeat assemblies possible
- Easy screw application (manual fastening)

Further information for the dimensioning is available in the EJOT ALtracs® Plus brochure.

Cost advantage due to less work steps and less tooling costs

Three work steps can be saved with ALtracs Plus® Screws compared to metric screws.



The asymmetrical flank angle of 33° guarantees much higher strength values of the formed female thread root than a common 60° thread.

Application Examples

- Instrument panel assembly
- Electric motor housing assembly

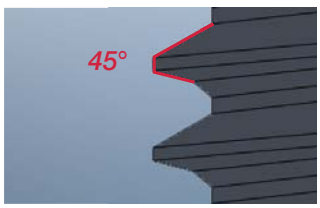
EJOT SHEETtracs® – Reliable joints in thin sheet metal with pilot holes.

There is a safe solution for the process reliable assembly of pre-punched sheet metal joints with less than 1,5 mm thickness - the self-tapping EJOT SHEETtracs®. The reduced flank angle of 45° creates a more stable female thread compared to common 60° threads.

The formed female thread with a larger thread root, results in higher stripping torques and pull-out forces. Additionally the circular cross section is designed to maximise the thread engagement area compared to non-circular thread geometries.

- High strength of the joint due to the formed draught
- Simple and safe assembly due to good alignment and low installation torque
- Circular thread cross section for maximised thread engagement
- Metric compatibility

You can find detailed information in the EJOT SHEETtracs® brochure.



The asymmetric 45° flank angle causes smaller material displacement compared to common 60° threads and results in higher strength of the joint.

Application Examples
- Housing assembly of „white goods“
- Car roof assembly

EJOT FDS® – The screw for high strength sheet metal joints

The automotive industry in particular has high demands on the joining technology. In addition to one-sided accessibility, the removability of the fastener is also very important, especially with regard to recyclability. The FDS® Screw enables high-quality assembly of thin sheet metals made of steel and aluminium without the need for a pilot hole. Work steps such as pre-drilling or pre-punching are no longer necessary.

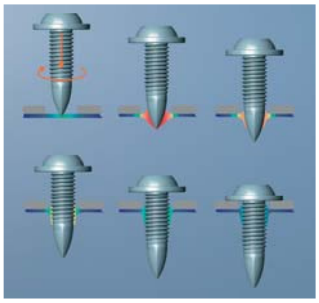
Due to the increased thread engagement in the formed draught a high-strength screw joint is created - without the undesired chipping. The screw joint is able to transfer high pull-out forces and high shearing strength.

- Removable and high quality screw joint, without part preparations, such as pre-drilling or punching
- One-sided assembly, no backing device necessary
- No hole overlap problems
- No material waste and no chipping
- High loosening torque and vibration resistance, no need for additional safety elements

All technical features are listed in the EJOT FDS® brochure.

Cost advantage due to less work steps

With the FDS® Screw sheet metal of up to 1,8 mm can be assembled without pilot hole.



The polygonal point and the conical thread forming zone ensure easy flow drilling through heating up of the material.

Application Examples

- Car body assembly
- Coolant pipe assembly

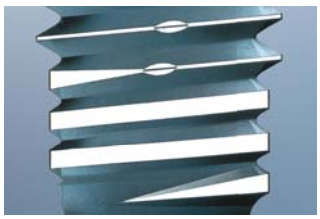
EJOT Spiralform® – The thread former for steel

EJOT Spiralform® Screws are special fastening elements for reliable and trouble-free metal screw joints according to DIN 7500.
This special screw enables thread-cutting and tightening in just one work step, always forming an accurate, tight fitting, high strength female thread. This guarantees optimal resistance against loosening under dynamic stress.

The special self-tapping Spiralform® Plus point ensures low thread forming torques and an easy application of the screw.

- Suitable for assemblies according to DIN 7500
- Low thread forming torques due to the Spiralform® thread geometry with self-tapping point
- The formed thread corresponds to the metric ISO standard thread DIN 13
- High strength values and maximum flank coverage due to circular thread cross section

EJOT Spiralform® Screws are available in different strength for a variety of applications. You can find detailed information in the Spiralform® product brochure.



Spiralform® Plus self-tapping point for especially low thread forming torques.

Application Examples
- Fastening of containers
- Fastening of car roof systems

EJOT® „boss“ Family – Safe direct assembly of thin-walled components

EJOT offers a variety of specific and standardised solutions for direct assembly of thin-walled components. The special fastening elements are suitable for applications which do not allow direct assembly due to insufficient thread engagement.

The „boss“ family provides the ideal plastic boss for direct assembly for subsequent, captive mounting and locking. Suitable for the individual application, this standard range realises secure and cost-effective fastening solutions.

The newest boss generation with adjustable wall thickness compensation offers additional cost saving potential.

- One fastening element for different component thicknesses
- No corrosion
- No mix-ups, since only one fastening element is used
- Economic efficiency through part reduction
- High dynamic safety
- Ergonomic and safe assembly
- Recyclable
- No catching of the parts
- Consistent tightening torques
- Automation through standardisation

All technical features are listed in the EJOT® „boss“ Family brochure.

EJOT EASYboss® V – the standard solution for varying snap-on thicknesses.

Application Examples
- Instrument panel assembly
- Centre console assembly

EJOFORM® – Flexibility through multi-stage forming technology

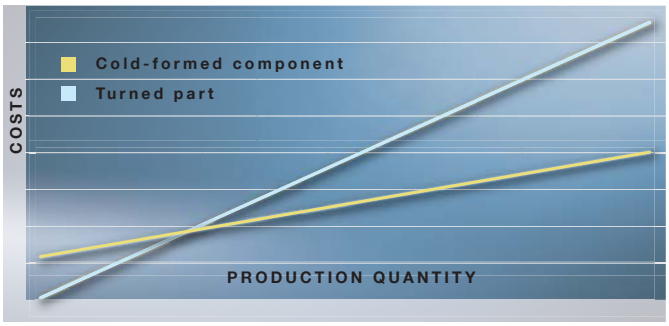
EJOFORM® products are individual and innovative fastening and design engineering solutions. These products meet various requirements, such as holder, stop bolt, distance sleeve or adjustment element.

These unique products are manufactured in a multiple step cold-forming process. With this technology a wire section is formed into a complex fastening element in up to six blows.

EJOFORM® products are engineered parts consequently designed for the individual case. According to experience it is possible to avoid 70 % of the failure costs during the design and development stage. Early involvement of the EJOT application engineers offers excellent opportunities to exploit the various cost-saving potentials. Expert monitoring from the first concept idea to the launch of production is an important part of EJOT's operating principle.

- 100% adjustment to the application
- Reduction of material and inventory costs
- Large savings potential through multi-functionality
- Simplification of the assembly
- Replacement of turned parts

For further information about cost saving potential with multifunctional fastening technology please refer to the EJOFORM® brochure.



EJOFORM®
Cost saving potential compared to turned parts

Application Examples
- Tread assembly
- Components for electronic braking mechanisms

EJOSYST® – Complex components for individual solutions

EJOSYST® products are based on the EJOT expertise in cold-massive forming and plastics processing - which means they incorporate the innovations and know-how of both fields. The components and assemblies of this product category are manufactured through heading, rolling, machining, plastic injection moulding as well as additional assembly work.

Part of the EJOSYST® product range are individual component assemblies for the compensation of manufacturing tolerance or thermal changes in length, to fasten or position, for sealing functions, or for the transfer or conversion of motion and moments.

Focus of the development is always the individual solution for customer-specific requirements.

- Components and assemblies optimised for production and design engineering
- Improved functioning and process features of the component
- Reduction of the logistical effort for component assemblies („one stop supplier“)
- Cost reduction compared to the single solution
- Network of external partners with numerous technical possibilities
- Optimum project monitoring for our customers through qualified application engineers - from the concept to the start of production

Your application engineer at EJOT would be glad to give you individual advice.

Application Examples

- Rear spoiler assembly
- Headlight exchange element for lorries

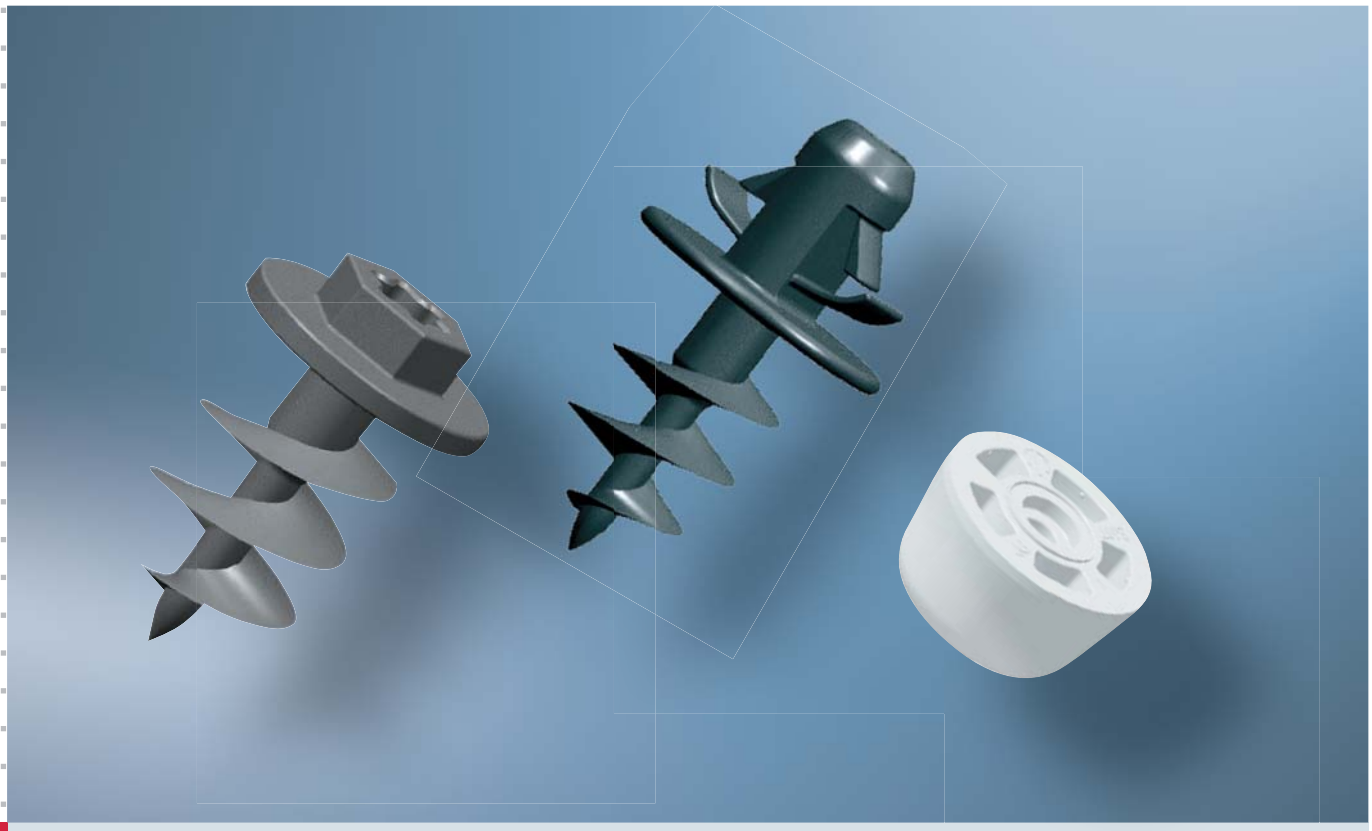
Compression Limiter TENSIOtec®
In order to utilise the many advantages of thermoplastic materials in vehicle motor engineering, the TENSIOtec® compression limiters are inserted into the components. They can take up the clamp load without stress damage to the plastic. „Compression limiters“ are a screw and sleeve system, which is mounted captive. Typical applications for TENSIOtec® are the fastening of cylinder covers, plastic oil pans or vacuum modules.

Adjustment Mechanism ADJUSTtec®
In modern vehicle construction it is necessary to design the fastening of mounted parts in an adjustable way. The requirements on fastening solutions have evolved from a simple attachment, over tolerance compensation up to multifunctional systems.
The design engineering flexibility of the ADJUSTtec® adjustment mechanism makes further functions possible, for example high-precision positioning, sealing or the implementation of lightweight design through the use of high-capacity plastic material.

Motion Converter TORQtec®
By using the product name TORQtec® EJOT describes motion converting systems that can be found in almost all application areas of the automotive and electric industry, the equipment and plant construction as well as the appliance industry. In combination with plastic nuts, spindle-nut systems with virtually play-free thread pairings are realised with the TORQtec® modules. Current requirements regarding dimensional precision and economic efficiency of the system are satisfied by the use of modern cold-forming technology, such as thread cutting without producing chips.

EJOT® Positioning Element
The assembly process of large-volume components in the vehicle industry require so-called positioning elements. With the help of these components the exact assembly of instrument panels or consoles is possible.
With the EJOT® Positioning Elements many functions can be realised. Through the individual geometric design they enable the quick and easy location of the installation point. The material mix of metal and plastics realises the lightweight design requirements and at the same time secures the necessary mechanical strength.

Application Examples
- Car tail lamp assembly
- Cylinder cover assembly in commercial vehicles



EJOT® EPPsys – Innovative Fasteners for the lightweight construction

The EJOT® EPPsys is a product group to fasten parts to foamed components, especially EPP (expanded polypropylene). Other materials from the field of non-metal lightweight construction can also be fastened with EJOT® EPPsys.

EJOT® EPPsys D (**D**irect Assembly)
Easy, quick and simple. This fastening element is directly screwed into the foam, without the need for a pilot hole. The EPPsys D screw is installed process reliable into EPP foams (with a large density) using defined torques.

EJOT® EPPsys DR (**D**irect Assembly **R**asthaken / snap-fit)
Additional engagement hooks enable easy and secure fastening of the EPPsys component on sheet metal or plastic parts with a wall thickness between 0,8 and 2,2 mm.

EJOT® EPPsys RSD (**R**eib**s**chweiß**d**om / friction-welding boss)
Through a friction welding process this product is directly installed into the EPP foam without pilot hole, and into PP honeycomb elements, enabling a direct assembly with the EJOT DELTA PT® Screw.

- No pilot hole necessary: Ideal for tolerance independent assembly in EPP faoms
- High process reliability due to a large margin between installation and stripping torque
- Weight savings due to used plastic construction
- Manual, semi-automatic and fully automatic assembly possible
- High axial load capacity in the foam

EJOT® EPPsys DR: engagement hooks allow for easy and secure fastening with tolerance compensation.

Application Examples
- Car crashpad assembly
- Glove compartment assembly

EJOT® Micro Screws - Secure fastening solutions for even the smallest components

Whether for the consumer electronics or automotive industry: The trend for miniaturisation continues. For this reason EJOT met those especially high demands on the use of fastening elements with the development of small dimensioned screws, the EJOT® micro screws.
They range from manual assembly to automated serial assembly, as already applied in many applications of the telecommunications and electrical industries, for example the assembly of cellular phones, circuit boards or medical small-scale units.

During the development of the micro screws, the precise customer demand is always the focus because the process reliable assembly of micro screws is essential.
The thread geometries, which are matched to the component material, secure the long service life of the joint.
In the field of micro screws the EJOT DELTA PT® Screw for the direct assembly into plastics and the ALtracs® Plus Screw for the application in light metal offer all advantages of the larger dimensions.

Your contact at EJOT will gladly advise you about individual solutions.

- High efficiency by thread forming direct assembly
- Compact design: for smallest installation space
- Saving of additional inserts or accessory
- Suitable for manual and automated installation
- Different thread geometries designed for direct assembly in plastic materials or metal; even metric threads are available

Perfection in detail: the EJOT Micro Screws offer all advantages of the larger dimensions.

Application Examples
- Cellular phone housing assembly
- Casing and circuit board assembly of medical small-scale units

EJOT DELTAsert® – Aluminium Insert for direct assembly into Plastic

The new aluminium EJOT DELTAsert® permits a reliable self-tapping assembly into highly loaded thermoplastic components, which was only possible with pre or post moulded inserts before. The current cost and weight reductions require new fastening solutions.

The ALtracs Plus 60 Screw can be fastened self-tapping into the EJOT DELTAsert® - or as the „classic“ version with internal thread and a metric M6 screw. An easy and process reliable assembly is guaranteed.

- Quick and easy fastening - no complex application process necessary
- Low weight through the use of aluminium instead of brass
- High pull-out force through high thread engagement
- High loosening torque through self-tapping DELTA PT® thread
- Multiple uses - in thermoplastic as well as thermoset materials

All technical details are available in the EJOT DELTAsert® product brochure.

Concluded installation of a DELTAsert® with metric M6 Screw in plastic.

Application Examples

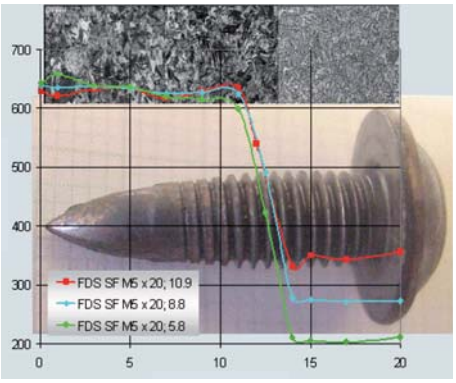
- intake manifold housing assembly

EJOT® HardTip – Metal direct assembly with inductive hardened thread forming

Due to the hardened thread forming zone the EJOT® HardTip screws are the ideal solution for direct assembly into steel. Through targeted material selection and a production technology combining the thermal hardening and tempering process with an inductive short-term heat treatment, a screw with a hard thread forming zone is produced. At the same time the toughness of the screw head and the load-bearing thread length are increased.
These screws are mainly used when case-hardened fastening elements are not acceptable.

As an alternative to hardening and tempering, the thermochemical treatment of case-hardening can be used. In connection with inductive hardening, screws with especially hard thread forming zones can be produced. These screws are suitable for use in high strength materials where conventional hardened fastening elements would fail.

- Controlled adjustment of the hardness in the forming zone through partial inductive heat treatment
- Hardness of the bearing thread according to 8.8/10.9 possible
- Usable for especially hard hole edges in the case-hardened version
- Thread forming zone hardness over 450 HV for the heat-treated version
- Hardness of the thread forming zone over 600 HV for the case-hardened version
- Possible costs saving through new production technology
- EJOT® HardTip is available for SHEETtracs®, FDS®, Spiralform® and ALtracs® Plus
- Further screws with HardTip available upon request



Hardness distribution of EJOT® HardTip Screws

EJOT®

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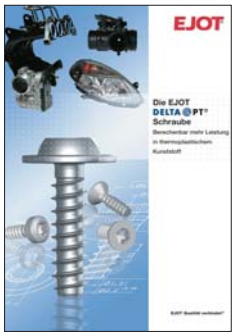

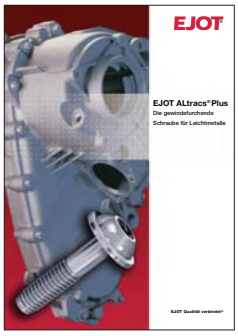

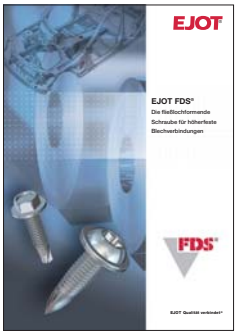

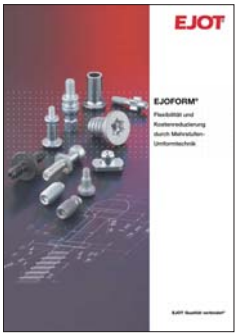

We will gladly provide you with individual brochures for all of the products.

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EJOT® The Quality Connection

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