# Strong Connections
EJOT® Product Overview

EJOT®

**EJOT® The Quality Connection**



## EJOT® Advanced Fastening Systems

## Increased efficiency.
## Increased system performance.

EJOT turns customer requirements into individual product solutions. This know-how is our foundation and has helped us evolve into an innovative market leader. In addition to the EJOT product range, we offer system performance solutions that can 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**

Fastener costs amount to around 20% of the total joint cost, which means that the system costs make up the remaining 80%. EJOT products reduce the system costs for the joint through higher efficiency and greater productivity.

Our Application Engineers will work with you from the conceptual stages and throughout the development process.

## EJOT® The Quality Connection

EJOT®

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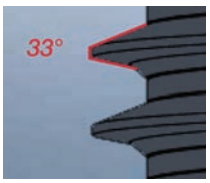
# Fasteners for Metals

## EJOT ALtracs® Plus
### The fastening solution for alloys

EJOT ALtracs® Plus is designed for direct assembly into cast holes whilst achieving strength values which are comparable to metric screw joints (strength value 10.9) but with cost-savings of up to 40% achievable.

The ALtracs® Plus thread is vibration-resistant at an installation depth of approx. 1.5 x d¹, without any additional safety elements such as washers, PA coating, micro encapsulating etc.




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

- **Direct fix into cast holes without secondary finishing**
- **Cost savings of up to 40% due to reduced processes**
- **Metric screws can be used in ALtracs® Plus threads**
- **Circular thread cross section - maximum engagement**
- **High clamp loads and long term stability**
- **Vibration resistant**
- **Multiple repeat assemblies possible**
- **Easy screw application (manual fastening)**
- **EJOT ALtracs® Plus brochure available**

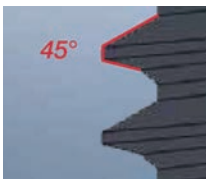
### Application Examples

- Electrical motor housing assembly

## EJOT SHEETtracs®
### Reliable thin sheet joints with pilot holes

The self-tapping EJOT SHEETtracs® fastener provides a safe solution for the process-reliant assembly of pre-punched sheet metal joints, of less than 1.5 mm thickness.

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 maximises the thread engagement area compared to non-circular thread geometries.

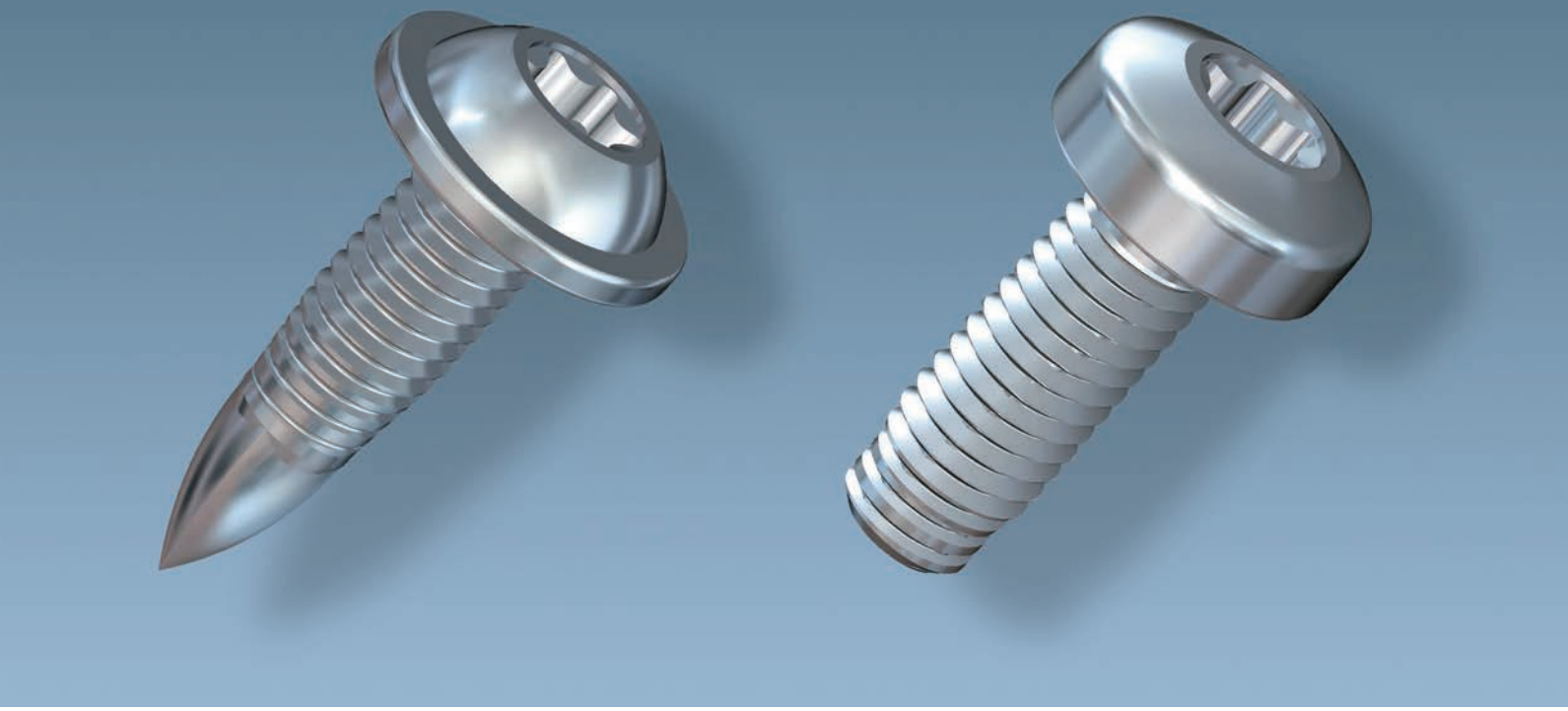



The asymmetric 45° flank angle causes smaller material displacement compared to common 60° threads and results in higher strength of the joint.

- **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**
- **EJOT SHEETtracs® brochure available**

### Application Examples

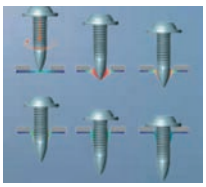
- Housing assembly of white goods
- Car roof assembly



## EJOT FDS®
### For high strength sheet metal joints

In addition to one-sided accessibility, the removability and recyclability of the fastener is very important. The FDS® Screw enables high-quality assembly of steel and aluminium thin sheets without the need for a pilot hole. Processes such as pre-drilling or pre-punching become no longer necessary.

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



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

- **Removable and high quality screw joint, without part preparations – eg, 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**
- **EJOT FDS® brochure available**

### Application Examples

- Car body assembly
- Coolant pipe assembly

## EJOT Spiralform®
### Thread forming for steel

EJOT Spiralform® Screws are special fastening elements for reliable and trouble-free metal screw joints according to DIN 7500. They enable thread-forming and tightening in just one process, 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 easy installation of the screw.

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

- **Suitable for assemblies according to DIN 7500**
- **Low thread forming torques due to the 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 brochure available**

### Application Examples

- Fastening of containers
- Fastening of car roof systems
- Multifunctional Fastening Elements25+

# Body-in-White assembly

## EJOT EJOWELD®

### High strength joining of light-weight materials

EJOWELD is a sophisticated friction-weld based assembly system designed to create an automated high strength join between light-weight materials and high-strength steel.

Five years in development, the EJOWELD process is arguably the most positive response to market demands for lighter vehicles. The system joins light-weight alloys, to thin sheet boron steel of up to 1800 megapascals. Such materials cannot be secured by traditional methods – the key is two specially developed EJOT components; a pin (CFP) for single sided fixing, and a component friction fastener (CFF) for double sided access.

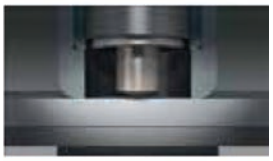
From the first axial load application, the EJOT component reacts to high revolutions by penetrating through the top material layer, then under-filling the two materials as one. This four, key-stage process is completed in typically less than 2 seconds - creating an incredibly strong join.

Design Engineers engaged in the Body-In-White development process can see first hand the science behind this process on a specially constructed demonstration rig.

Light-weight materials can be joined to the highest strength sheets using the EJOWELD Composite Friction Fastener (CFF). This versatile and reliable joining technology allows a large variance in material thickness combinations. This progressive development has made the concept of flexible material-body a commercial reality.

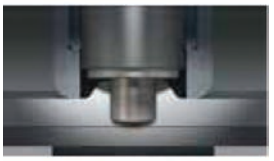
The development of a second component, the Composite Friction Pin (CFP) enables the EJOWELD system process to secure alloys to steel via a single sided process.

### Joining Process



**Step 1**

Penetration of the cover sheet (light-weight material)



**Step 2**

Cleaning and activation of the surfaces

**Step 3**

Plastification of friction element and base sheet

**Step 4**

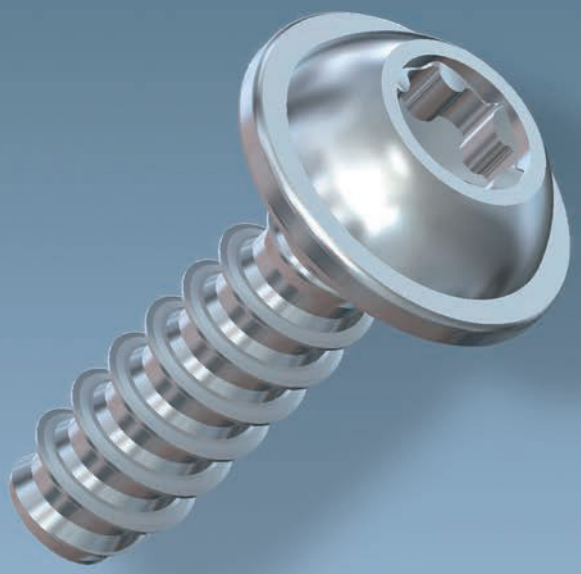
Compression / forming the welded joint

- No pilot hole
- No pre or post treatment of joint components
- No brittle intermetallic phases – no thermal adhesive bond between aluminium and steel required
- Control of linear expansion differences induced by temperature change
- A range of material thickness combinations can be achieved without modification to machinery

### Modular Design EJOTWELD® CFF System

- Feed
- Control cabinet
- Installation tool
- Support system (C bracket)
- Anvil adaptor
- Friction elements

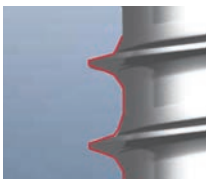
# Fasteners for Plastics



## EJOT DELTA PT®
### Direct assembly for thermoplastics

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

Developed specifically for thermoplastics, Delta PT's 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.



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

- **Direct assembly reduces processes - saves time and work**
- **Minimised radial stress allows thin-walled designs**
- **High tensile and torsion strength creates a safe, vibration-resistant joint**
- **A wide range of possible tightening torques**
- **Cost-effective solution for standardised parts**
- **Simple design engineering with the EJOT® DELTA CALC prognosis program**

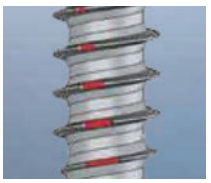
**Application Examples**

- Fastening of bumpers
- Assembly of intake manifolds

## EJOT DELTA PT® DS
### Safe direct assembly in thermosets

Some designs require the use of thermoset materials that impose special demands on direct assembly - due to their hardness and brittleness. The modified thread ends of the EJOT DELTA PT® DS (DuroSet) screw ensures reliability.

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.



Detailed view with forming grooves

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

**Application Examples**

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



## EJOT DELTA PT-P®

### Threadforming into unreinforced plastic

Derived from the market leading steel Delta PT fastener, this plastic version has been developed for applications where the material being threadformed into has considerably lower strength properties than the fastener itself. It therefore makes sense to match the screw material and the material to be fastened. Manufactured from EMS Grivory HTV 5H1 material, the EJOT Delta PT-P® makes it practical for unreinforced plastic to be viable for self-tapping assembly processes.

The screw joint is designed for low clamp loads under minimal relaxation, offering extreme weight savings.

- Maintains clamp load under thermal influence
- Weight reduction – up to 85% less than metal screw
- No corrosion
- Variable in length
- Recyclable
- High insulation resistance
- Coefficient of expansion similar to plastic

**Application Examples**

- Air silencer mounting
- Wheel arch lining
- Auto centre console hinge fixings
- Bluetooth mounts

## EJOT “BOSS” family®

### Safe direct assembly of thin-walled components

Where with thin-walled components do not allow for direct assembly due to minimal thread engagement, the EJOT “Boss” family is ideal for captive mounting and locking, providing reliability and cost-saving advantages.

Combining with the DELTA PT® screw, the range features optimal boss clips which are subsequent and captive assembled snap-fit elements. The latest boss generation provides adjustable wall thickness and various special or standardised solutions are available. Early consultation with our engineers is recommended at the design stage.

We offer goal oriented solutions for assembly designs. EJOT’s engineers can provide support from basic snap-on tools to complete assembly stations.

- High dynamic safety of the system in combination with the DELTA PT® Screw
- No Corrosion
- Easy and safe assembly
- Consistent tightening torques
- No catching of the parts
- Recyclable

**Application Examples**

- Spoiler and bumper assemblies
- Lighting assemblies
- Wheel housing assemblies

# Special Fastening Elements

## EJOT EPPsys®

### System for light-weight foam assembly

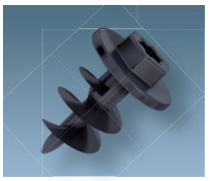
EJOT® EPPsys - or EPP System - has been developed to provide a variety of solutions to fasten assembly parts to foamed components, typically EPP (expanded polypropylene). Other materials from the field of non-metal light-weight construction can also be fastened with products from the range. Within this range sits EJOT EPPsys RSD and the EPPsys D screw:

## EJOT EPPsys® RSD

The EJOT® RSD is a friction welding boss that provides highly effective fastening for EPP foams and honeycomb elements. The friction welding process leaves the EPPsys RSD embedded in the EPP foam securely connecting to the molten material, enabling a direct assembly with the EJOT DELTA PT® Screw.

- Innovative fastening system for EPP foams
- Ideally suited for tolerance independent assembly, because no pilot hole is necessary
- High process reliability due to large margin between installation and stripping torque
- Weight savings due to used plastic material
- Manual, semi-automatic and fully automatic assembly possible
- High axial load capacity in the foam
- Recyclable

## EJOT EPPsys® D (Direct 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.

### Application Examples

- Car crashpad assembly
- Glove compartment assembly

# EJOT Microscrews®

## Secure fastening solutions for even the smallest components

**Market demands for miniaturisation means that EJOT continues to develop small dimensioned screws; the EJOT micro screws.**

They range from manual assembly to automated serial assembly and can be found in many applications, from telecommunications and electrical industries through to automotive manufacturing.

During the design and development stages, the utilisation of micro screws focuses on reliability of assembly. The thread geometries, which are matched to the component material, secure the long service life of the joint.

The micro screw variants of the EJOT DELTA PT® Screw for the direct assembly into plastics, and the ALtracs® Plus Screw for application into alloys, offer all of the advantages of the larger dimensions.

- High efficiency by thread forming direct assembly
- Compact design: for smallest installation space
- Saving of additional inserts or accessories
- Suitable for manual and automated installation
- Different thread geometries designed for direct assembly in plastic materials or metal

# Multifunctional & special fastening elements

## EJOFORM®

**Multi-stage forming technology**

EJOFORM® products are individual design engineering innovations, meeting a variety of requirements in one bespoke solution.

Unique products are manufactured in a multi-stage process where the wire section is cold-formed into a complex fastening element.

## EJOSYST®

**Complex components for individual solutions**

EJOSYST® products are manufactured through heading, rolling, machining, plastic injection moulding plus additional assembly work. Part of the EJOSYST® product range are individual component assemblies that compensate for manufacturing tolerance or thermal changes in length - to fasten / position, for sealing, or for the transfer or conversion of motion and moments.

## Headlamp adjusters

**Fine aim adjustment in limited space**

Sealed modular system that allows aiming and fine adjustment of headlamp and fog lamp assemblies. Low profile design creates fit into small spaces. Features include:

- Gear-preserving clutching at end of travel
- Quarter-turn assembly installation
- Interchangeable with motor mating geometry
- Collapses at high force front impact

## EJOT DELTAsert®

**Aluminium insert for direct assembly into plastic**

The aluminium EJOT DELTAsert® creates reliable thread-forming assembly into highly loaded thermoplastic components, previously only possible with pre or post moulded inserts. The ALtracs Plus 60 Screw can be directly installed into the DELTsert.

## EJOT® HardTip

**Metal direct assembly with inductive hardened thread forming**

These screws are mainly used when case-hardened fastening elements are not acceptable.

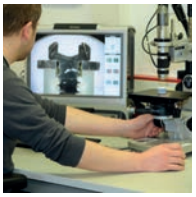
Material selection and production technology combine to create the thermal hardening and tempering process with an inductive short-term heat treatment. Toughness of the screw head and the load-bearing thread length are also increased.

As an alternative to hardening and tempering, the thermochemical treatment of case-hardening can be used.

## E-connectivity fastener

**Self piercing conductivity screw**

Developed to create an electrical bridge where metal sheets are bonded together. The fastener utilises pierce-point thread technology to provide instant self-piercing pick up. Its coating has been chosen to allow electrical conductivity to aid system electrical continuity.



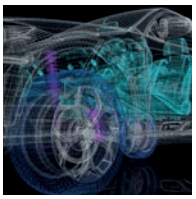
## EJOT® Project Management Services

EJOT® provides you with the highest level of support locally, nationally and globally.

Our knowledge is freely passed on to you as part of an ongoing ethos to create innovative and efficient assembly techniques for your application specification.

## Prognosis and Forecasting Software

Key to EJOT products delivering real-time solutions is the Group's worldwide commitment to 'application technology'; EJOT Applitec. We have a global knowledge pool of fastening expertise for every stage of the process – from concept to prototype to manufacture to assembly. Comprehensive application engineering services are supported by sophisticated forecasting and prognosis software that provides designers with accurate data on product performance that results in accurate implementation all the way through to production.



## Online Support

Once your registration has been approved, CAD data, PDF and DXF drawings for key products are available to download via our online engineering resource centre. Our Customer Service will advise you on how to access this facility.


## Specification APP

EJOT UK's fastener specification APP is available for iOS and Android, smart phone and tablet. Search for "EJOT industrial".

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SMMT MEMBER

Northwest Aerospace Alliance

member of the railalliance

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