TR is actively working with a number of organisations involved in the design, manufacture and development of Electric Vehicles (EVs), Battery Pack Modules (EBM) and Electric Vehicle Charging Units for both commercial and residential use.
Introduction

Global footprint, local support.

TR Fastenings Ltd (TR) is part of Trifast plc and is a global specialist in the design, engineering, manufacture and distribution of high quality industrial and Cat C fastenings principally to major global assembly industries.

The TR Group is a full service provider to the automotive industry. We are able to assist in reducing the total cost of ownership for companies by working with them from early engineering and design stage right through to specification, manufacturing, quality and logistics.

Our team of Engineers are on hand to become technology partners with niche vehicle and start up electric vehicle manufacturers, using our industry experience to develop a cost effective BoM (Bill of Materials), leveraging industry volumes, and reducing complexity.

We offer a wide range of high quality fasteners and C-class products. In addition, we have developed an application engineering support function and an advanced supply chain structure.
Manufacturing

Dedicated to producing high volume parts specifically to customer drawings.

Our strategic partnerships with other major manufacturers allow us to offer a wide range of special parts, including:

- Cold headed products
- Complex multi stage forging
- Special parts to customer drawing
- Turned and machined parts

Our manufacturing network spans two continents and represents approximately a third of the Group’s business.

We can ensure parts are made in the right part of the world to meet your quality, volumes, cost and delivery needs.

- 8 factories
- In-house heat treatment facilities
- Automated optical sorting facilities
- Specialised packing capability

Annual output approximately 8 billion parts

TR SFE (Taiwan) x 2
TR Formac (Singapore)
TR VIC (Italy)
TR PSEP (Malaysia) x 2
TR Formac (Malaysia)
TR Hank (UK)
What We Supply

ST & Plas-Tech Screws:
For IP (Instrument Panel), seats, IP & DP. ST screws for thin sheet metal, thread forming screws for plastic, panels.

Metric Screws & Bolts:
Metric screws & thread forming screws for interior & exterior applications, seats, IP & DP.

Spring Steel Clips:
Spring steel fasteners for A, B and C-pillar, panels, IP, DP; luggage compartment & roof.

Washers:
Washers for bolts & axles, interior applications, seats, headliners, IP & DP.

Rubber Bumpstop, Damper Grommets:
For interior applications, TC, glovebox & IP.

Bushings:
Bushings for steering applications, door gasket handles, IP & DP tính high torque applications in vehicle.

Spring Staples & Hog Rings:
Spring staples & hog rings for IP, TC A, seats.

Plastic Clips & Rivets:
Fasteners for mounting interior & exterior applications, ABC-pillar, panels, DP, IP & seats.

Plastic Parts:
Plastic fasteners for IP, seats, TC, cable management & edge protection.

Special Parts:
Special parts for special applications, rear seat, audio applications, seat, interior, gear box & more.

Where We Supply

Interior Trim
Auxiliary Electronics Devices i.e. Sat Nav
IP (Instrument Panel) inc HVAC
TC (Tunnel Console)
ICE (In Car Entertainment)

Sealing
Frame
Trim including armrests
Restraints (Seatbelts)

Braking & Steering Systems
Parking Brake
Service Brake
Steering Wheel
Steering Column

Lighting Clusters
Door Trim
Chassis including wheels
Body in White including luggage compartment & tailgate

Safety Systems
Airbag
Powertrain
Engine
EVBC - Electric Vehicle Battery Casing
Transmission

Chassis & Body in White (BIW)

Where We Supply
TR has invested in a number of manufacturing licences.

**TORX PLUS®**
Available in a standard or tamper proof version, the Torx Plus® design increases torque transfer, therefore extending tool life and increasing productivity during assembly.

**STRX®**
Strux® self clinching studs and nuts offer a stronger and more reliable assembly to traditional clinch fasteners. Resisting push out or rotation when installed, Strux® fasteners save significant time and cost compared to riveted or other staked fasteners during installations, specifically when combined with MAThread.

**MATHEAD®**
A patented system to prevent cross threading - the unique first threads align with the bolts accurately ensuring optimum assembly time. This feature has been incorporated in the design of the engine sump plug for a newly developed model. The clear advantage is that of both original assembly and subsequent servicing, thread damage is avoided. The principal usage is in the automotive industry.

**MOTORQ® SUPER**
A design that provides an enhanced drive capability and up to 25% material reduction to the head. This shallow head fastener has an attractive appearance and provides customers with the opportunity to reduce weight in vehicles. This drive is also available in a tamper resistant style.

**SPIRALFORM®**
A thread forming fastener design ensuring an optimum contact with metallic mating materials to provide consistently high strength capable joints.
TR Quality

TR operate in a quality focused environment to ensure customer requirements are fully integrated in our processes.

- **Quality Management Systems** - IATF 16949, ISO 9001 and ISO 14001 form the backbone of our management system and are supported by processes that ensure we exceed our customers’ expectations.

- **Product Quality** - TR use a fully integrated PPAP package that captures product requirements and enables realisation of product approval based on agreed timelines. Feasibility review is carried out by TR Engineers with both design and application knowledge. We adapt a team approach to product development – by providing input to our customers’ design verification programs, we ensure that product quality requirements are understood and appropriately managed to reduce unnecessary inspection costs.

- **Supply Chain Quality** - TR recognise the importance of every stage of the supply chain in delivering quality product to the customer. From the supplier of raw materials to in-house processes and outside service providers, the team works to ensure quality is fundamental in every process.

- **Quality Targets** - At TR everyone is focused on quality and by working with customers on their requirements we are able to drive home our “zero-defect” philosophy with quality ingrained in our processes.

- **Quality Deliverables** - Accuracy of information and customer response are key to achieving results and on-time delivery within our customer projects.

- **Quality Equipment** - Our feasibility teams ensure that the selected quality equipment provides the most efficient path to demonstrating product compliance. Where possible we use computerised inspection equipment to ensure focused reviews and analysis of trends which are fed into product development processes.

**Quality Control / Assurance**

- **Inspection Equipment**
  - Optical Indicator
  - Static Tensile Testing
  - 3D Microscope
  - Profile Projector

- **Testing Equipment**
  - Salt Spray Testing
  - First Scan Inspection Machine
  - Torque / Axial Tension Testing

- **Stereo Microscope**
- **Digital Microscope**
- **Profile Projector**
- **Plotting / Thickness Testing**
Electric Vehicle Charging Units

TR has extensive product ranges and technical expertise to support the design, manufacture and development of charging units for electric vehicles.

TR is actively working with a number of organisations involved in the design, manufacture and development of Electric Vehicles (EVs), Battery Pack Modules (EBV) and Electric Vehicle Charging Units for both commercial and residential use. As this sector continues to emerge and develop, TR is able to supply an extensive product range and has the necessary technical knowledge, expertise and experience to support this industry.

TR’s qualified engineers and sales staff are on hand to advise designers, production and purchasing teams on a number of matters. TR’s Design for Manufacture (DFM) to new fastener technology, sourcing insight and cost reduction.

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Industry Targets

The rapid growth of the EV sector is further accelerated by political-economic developments such as the UK Government’s initiative to ensure that by 2040, all new ultraleaves will either be electric or hybrid, zero-emission models.

EV charging stations typically include the following fastener groups, many of which include TR branded product ranges:

<table>
<thead>
<tr>
<th>Standard Fastenings</th>
<th>Fastenings for Plastic</th>
<th>Fastenings for Sheet Metal</th>
<th>Enclosure Hardware</th>
<th>Security Fastenings</th>
<th>Plastic Hardware</th>
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Fastenings for Steel Metal

Security Fasteners

Locks & Locking Systems

Threadforming Screws

Gaskets

Hinges

Clamps

Cable Management

Fastenings for Plastic

General Fasteners
Application Engineering

TR recognises that development of applications is a time consuming process, which is why our team of fastening specialists is on hand to support and guide you from developing new products to adapting existing ranges.

TR follow a simple process that can be adapted for your individual application.

- **Function:** Confirm the performance requirements of the fastener and application, does the product need to screw, clinch, rivet, weld, glue or clip together?
- **Application Environment:** Our team will support you to ascertain whether the product will require any specific design features for your application.
- **Assembly Method:** Fastener installation is a key part of the assembly process. Early involvement in the design or specification stage by our application engineers allows streamlining of your manufacturing planning process leading to systematic reductions in cost in assembly and production.
- **Manufacturing Process:** Upon confirming the product specifications, TR will assess the best method of manufacturing.
- **Evaluation:** Prototype parts allow you to test the application and assess if amendments to the specification are required.

TR adopts a full service provider ethos, supporting your designers and engineers to ensure your finished part is as required for your application. TR’s team of global specialists will work with you from design through to manufacturing and will be on hand to guide and advise where required.
Full Service Provider

As a full service provider we are able to assist in reducing the total cost of ownership for companies by working with them from early engineering and design stage, right through to specification, manufacturing, quality and logistics.

We adopt a three-tier approach that includes local, national and international teams. TR understands that a global solution creates some challenges; including communication, culture and security.

TR’s global delivery model has been designed from the ground up to address these challenges. Most importantly, TR’s global delivery operations provide our customers with both the quality and economic advantages that they require.

Locations in 18 countries
Supply into c.75 countries

A Typical TR DLF System

1. Production takes stock from site
2. On agreed day, TR DLF operator visits customer
3. TR DLF operator scans all bins that need replenishing
4. TR DLF operator downloads information to TR location
5. TR removes empty line off site and returns to TR location
6. TR DLF operator delivers stock and replenishment line

Initial setup
- Service level agreement (SLA)
- TR installs racks and bins directly into production area
- Initial stock is supplied

Ongoing