PennEngineering provides this select group of products and focused engineering services to specifically target the unique assembly challenges of the automotive, transportation and heavy industrial equipment markets. This model brings together the combined resources of PennEngineering’s products, global facilities and years of expertise to offer a unique combination of standard and “make-to-print” components and fasteners along with customized installation solutions for any application.

**Global Services & Capabilities**

**Global Product**
- Availability and Supply

**Complete Design**
- Engineering Services
  - Solid model design
  - Interference analysis
  - Structural joint and fastener analysis
  - FEA deformation analysis

**Quality Assurance**
- Full PPAP, level 3 certification
- Statistical process control
- Complete process to part lot traceability
- Comprehensive internal auditing
- In house calibration of all measuring equipment
- Laser and vision inspection systems
- In house machine tool design and production
- Heat treatment
- Plating

**Installation Systems**
- Manual
- Automatic feed
- Robotic installation
- In-die systems

**Quality Certifications**
- ISO 9001
- ISO 14001
- ISO/TS 16949
- BS OHSAS 18001

**A2LA Accredited Lab**

Licensed technologies including MA_Thread®, TAPTITE®, REMINC®, REMFORM®, MORTORQ® SUPER and TORX®/TORX PLUS®
Critical Systems Fastening

Security / Engine / Electrical / Brake / Steering / Safety / Body / Frame / Transmission

Fasteners & Precision
Automotive Components

Micro Fasteners Secure
Critical Electronic Systems

- Active safety
- Infotainment
- Wireless conductivity
- Communication
- Performance
- Navigation
PROFIL® Fasteners and Installation Systems

PROFIL develops nuts and studs which are fastened to metal parts or panels by means of a riveting, piercing or pressing process. In addition, PROFIL designs and manufactures automated feeding equipment for in die press shop applications and assembly line solutions to meet the individual production requirements of its customers.

Products
- Rivet nuts / studs
- Pierce nuts / studs
- Press in nuts / studs
- Manual, automatic feed and robotic installation systems

Typical Mounting Applications
- Body panels
- Body seating
- Instrument panels
- Controls
- Safety systems
- Closures

Types

<table>
<thead>
<tr>
<th>Self-piercing and riveting</th>
<th>Riveting</th>
<th>Clinching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PROFIL Advantages
- Installation in one step
- Minimum space requirements within the tool
- Minimum tolerances
- Simple installation in every work direction (no evacuation of slugs)
- Joining of high strength steel up to a tensile strength of Rm = 1500 MPa
- Suitable for a wide range of sheet metal thicknesses with only one nut type (t = 0.5 mm - 5 mm)
- Easy and simple tool maintenance
- All kinds of surface coatings of the sheet metal panels are feasible (no deformation by piercing or riveting)
- Wide range of sheet metal solutions available
- Solutions for a single or multistage installation available
- Applications in carbon fiber reinforced materials feasible
PennAuto™ Products

PennAuto fastener products offer a unique manufacturing and distribution methodology based on manufacturing of high strength components and fasteners in PennEngineering’s wholly owned manufacturing subsidiaries in Kunshan China. Supported by sales, product inventory, distribution services and customer technical assistance, product is strategically located in close proximity to its global customers. PennEngineering is one of the first companies in the world to develop the ability to manufacture high strength complex components / fasteners in China that meet today’s demanding global automotive quality standards.

Using a specialized approach, PennEngineering can produce PennAuto hardware with complex geometry using cost-effective and advanced processes unlike typically employed conventional machining methods. PennEngineering utilizes highly controlled, multi process, high volume production techniques, which involve forming/forging of the basic fastener shape followed by precision secondary turning/machining operations to complete the job.

This capability uniquely positions PennEngineering to deliver product at lower cost while achieving the same or improved levels of quality, as compared with Western competitors who are locked into high manufacturing and distribution cost structures. Local service centers provide our customers with personalized service and the assurance of continuity in product supply from operations in China.

Externally Threaded Components

- Banjo bolts
- Double ended studs
- Hex bolts
- Hex flange bolts
- Screws
- Shoulder bolts
- Square head bolts

Internally Threaded Components

- Floating nuts
- Hex flange nuts
- Hex nuts
- Insert nuts
- Inserts for plastics
- Lock nuts
- Pierce-nuts on wire
- Tube nuts
- Weld nuts

Other Hardware

- Brake components
- Fluid handling components
- Hollow dowel pins
- Locator/guide pins
- Ball studs
- Bushings
- Compression limiters
- Double ended rivets
- Dowel pins
- Grooved shafts
- Hinge pins
- Rivets
- Shoulder rivets
- Sleeves
**PEM® Self-Clinching Fasteners**

Self-clinching fasteners have provided thin sheet attachment solutions to the automotive industry for over 75 years. The reduction of loose hardware allows for less costly assembly and stronger, lighter designs.

**Types**
- Heavy duty, high torque and high tensile externally threaded studs
  - Assorted head and clinch styles
  - Grade 5 through 8 and class 9.8 to 10.9
  - Thread size up to ½” / M14
- Internally threaded clinch and weld nuts
- Internally threaded spacers and standoffs
- Captive screws
- Micro fasteners

**Typical Mounting Applications**
- Airbag housing
- Battery covers
- Brackets
- Door trim
- Grill assembly
- Mirror housing
- Sunroofs
- Automotive electronics

---

**ATLAS® Blind Threaded Inserts**

Blind threaded inserts (rivet nuts) are designed to provide strong threads in thin materials. They are called “blind” because they can be installed from one side of the panel. Access to both sides is not required. These fasteners are ideally suited for tubing, extrusions and other similar types of applications.

**Types**
- Standard duty
- Heavy duty
- High torque

**Typical Mounting Applications**
- Bumper and frame systems
- Electrical systems
- EV battery trays
- Exhaust system
- Fuse boxes
- Mounting to hydroformed tubing
- Radiators
- Sunroofs
- Tool Box
About PennEngineering

For more than 75 years, PennEngineering has established and advanced an industry-leading reputation around the world for precision fastening and assembly solutions. In addition to automotive fastener products engineered for OEM automakers, tier-one suppliers, and aftermarket manufacturers, the Company’s extensive portfolio of technologies also include products designed to enable secure attachment of critical components for the electronics, computer, data/telecom, medical, marine, and aerospace/aircraft industries.

The Company is well positioned to serve customers on a global scale from manufacturing and technical facilities in the United States, Ireland, Germany and China, and worldwide support from a network of exclusive distributors and engineering representatives. All combine to deliver the quality products, local sourcing, and technical expertise for which PennEngineering has long been known, regardless of application challenge.
CONTACT

PROFIL

General Inquiries
Tel: 313-299-8500
Fax: 313-299-7966
autoinfo@pemnet.com

North America
Rob Edwards
redwards@pemnet.com
Tel: 248-536-2130

Europe
Arndt Pohl
info@profil.eu
Tel: +49 6175 799 0

Asia
Young Yang
young.yang@pemnet.com
Tel: 86-139-1760-4705
Season Wu
season.wu@pemnet.com
Tel: 86-186-4262-8247

PennAuto

North America
Mike Mosher
mmosher@pemnet.com

Europe
Mark Chadwick
mchadwick@pemnet.com
Vincent Chapelot (France)
vchapelot@pemnet.com

Asia
Gavin Gong
gavin.gong@pemnet.com

DANBORO, PA - USA
FRIEDRICHSDORF, GERMANY
GALWAY, IRELAND
KUNSHAN, CHINA
SHELBY TOWNSHIP, MI - USA
WATERFORD, MI - USA

PennEngineering®

autoinfo@pemnet.com • www.pemnet.com

© 2018 PennEngineering
(1/2018)