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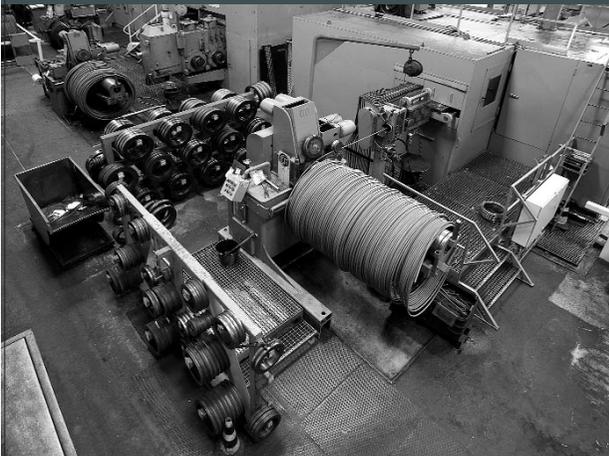
A subsidiary of the Indian
company Sundram Fasteners Ltd.

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Automotive

Fasteners for
Automotive Industry





Global Partner

PEINER Umformtechnik is a subsidiary of the Indian company Sundram Fasteners Limited (SFL). Sundram was founded in 1966 and has eight production facilities in India and subsidiaries in Germany, Great Britain, China and Malaysia. Sundram is part of the TVS Group, one of the largest India-based suppliers to the automobile industry. PEINER Umformtechnik is part of the global network of the internationally active TVS Group. The development work in Germany benefits from an effective cooperation with the Competence Center of Sundram Fasteners in Chennai, India. The incorporation within Sundram Fasteners has significantly extended both the number of manufacturing facilities and the production capacities for fasteners and forged components.

PEINER Umformtechnik

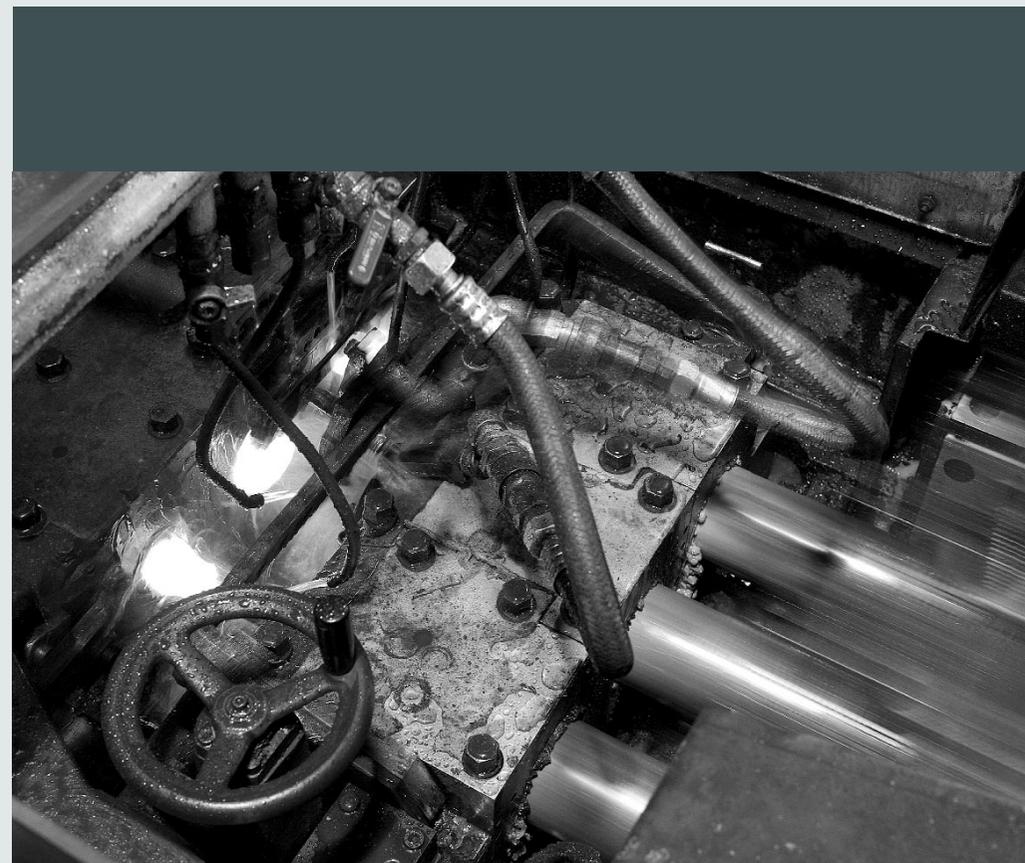
At its production facility in Peine, Germany, PEINER Umformtechnik has been producing bolts, nuts, other fastening systems and high-quality components for leading international automobile manufacturers for more than 80 years.

PEINER Umformtechnik uses innovative and modern production machinery and the latest organisational structures. The quality assurance system is certified to DIN ISO 9001 and ISO/TS 16949. The environmental management is certified to ISO 14001. To maintain the highest possible level of safety at work, PEINER Umformtechnik has implemented an occupational safety management system which is certified to OHSAS 18001.

For metal forming, PEINER Umformtechnik uses two different production methods. Cold forging takes place on modern multi-stage presses. Hot forging uses multi-stage presses for nuts and other components with a similar geometry and single-stage presses for screws, bolts and threaded sections on shafts. Technical and economical factors influence the choice of the appropriate production method. Threads and other profiled components are produced on modern rolling mills.

Computer-controlled machining centers are used for process steps which require cutting or grinding. Hardening of the products takes place in process-stable equipment which uses the

latest heat treatment technologies. Surface coating to protect against corrosion is carried out for PEINER Umformtechnik by approved and monitored service companies who are specialized in this field.



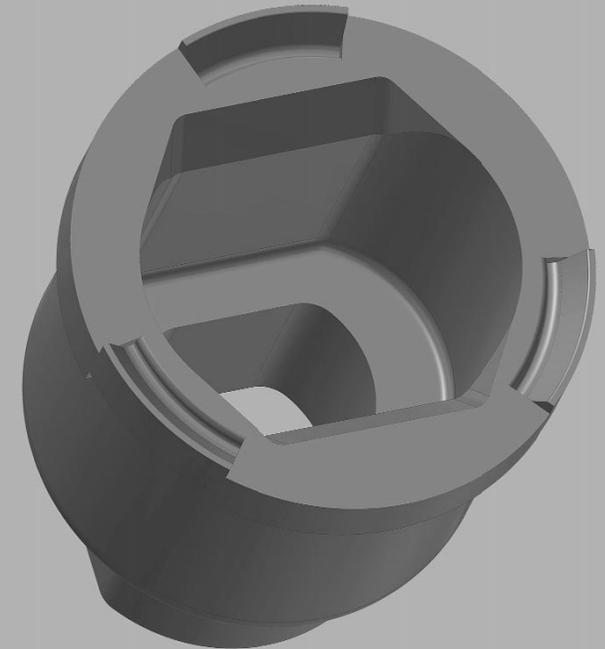
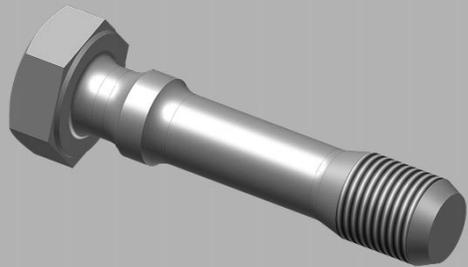
Qualified technical support

Our key-account management department advises our customers in all aspects of mechanical fasteners, for example the choice of the appropriate fastening system, design of the fastening system, dimensioning and assembly. We keep ahead of the latest technical developments as a result of our participation in research programs at higher education institutes and universities and the active, leading role we play in regulatory bodies and national (DIN) and international (CEN, ISO) standardization commissions. In addition, we carry out training seminars to inform our customers about recent changes to product standards, design and assembly regulations.

Qualified Engineering

A lot of experience is required to design high strength fasteners. Our development engineers plan and implement the best solutions from the functional, manufacturing and economical viewpoints in close cooperation with our customers' development and design departments.

Together with our own tool production specialists, our design department routinely takes on challenging tasks, including the modification and further development of existing mass produced components. The development work considers all aspects of the design and the manufacturing process with the aim of optimizing the overall costs of the joint.



Partner of the automobile industry
PEINER Umformtechnik is a partner of numerous automobile manufacturers and major system suppliers for the development and mass production of high strength fasteners and advanced forged components, including the subsequent machining and finishing operations. We supply fasteners and forged components for a wide range of applications in the automobile industry.

- For the chassis:
e.g. Wheel studs and wheel bolts, bushes, knurled shank bolts, eccentric bolts, double-ended studs, hollow and solid axle journals, weld bushes and hubs
- For brakes:
e.g. adjusting spindles, weld studs and eye bolts
- For engines:
e.g. connecting rod bolts, cylinder head bolts, bolts for the crankshaft bearing cap, valve housing for the camshaft adjuster

- For the steering:
e.g. ball pivots, self-locking screws with serrated bearing surfaces
- For gearboxes:
e.g. crankshaft end bolts, flywheel bolts, gearbox cover bolts, selector shafts, shaft guiding bushes, oil drainage plugs
- For the vehicle superstructure:
e.g. self-locking screws with serrated bearing surfaces, subframe mounts, towing eyes, weld nuts, weld bolts
- Bolts for mounting sub-assemblies

The following pages contain a few examples of the products we manufacture for the automobile industry. In this publication, we can only show a small selection from our extensive product range. We would be pleased to develop the best technical solution from both design and economic aspects for your specific application. Please get in touch for further information.

Wheel studs and wheel bolts can be manufactured in a wide range of designs. The corrosion protection systems which are used depend on the application and on customer requirements.

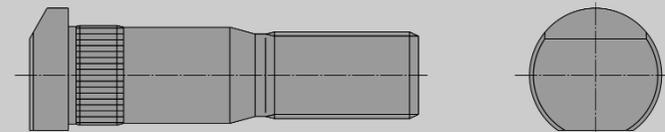


Wheel studs and wheel bolts

Head shapes	All head shapes are possible. The head design is chosen according to the application and required locking features.
Driving features	Driving features are normally only needed for wheel bolts. All driving features are possible.
Nominal diameter	M10 - M30 (1 1/4")
Thread	Metric. Special threads are also available.
Material	Hardened steel
Property class	Mainly 8.8 and 10.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Depending on the type of wheel stud or wheel bolt, functional features are provided to meet specific usage requirements. For example, splining is used to prevent wheel studs from turning during assembly/disassembly and other features are used to ensure the correct alignment of the wheel rim and the hub.



Features/advantages





Product example
Double-ended studs and centre collar bolts

Double-ended studs and centre collar bolts

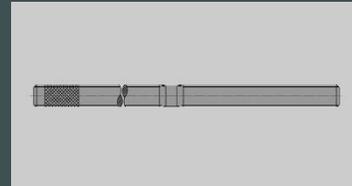
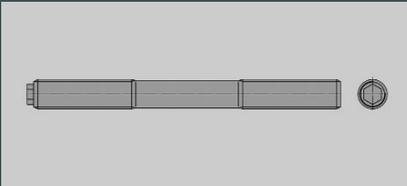
Double-ended studs and centre collar bolts are typically used to fix assemblies together and can provide an alignment function to aid assembly or act as a spacer.



Driving features	All driving features are possible. The stud ends can be provided with an internal or external driving feature, centre collar with external drive.
Nominal diameter	M5 - M46
Thread	Metric. Special threads are also available.
Material	Hardened steel
Property class	Mainly 8.8 and 10.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages	Double-ended studs have threads at both ends. The space-saving design also simplifies assembly.
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Product example
Connecting rod bolts

Connecting rod bolts

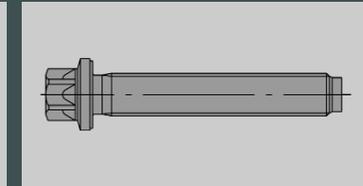
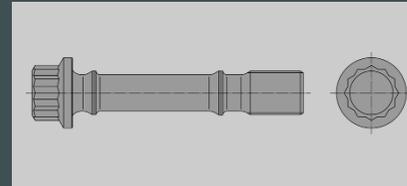
Connecting rod bolts are used to attach the big end bearing cap to the big end. With traditional designs, in addition to the tension provided by the bolt the correct alignment of the cap is aided by a fit shank. Fracture-split (cracked) connecting rods are becoming increasingly common. With this design, correct alignment between the bearing cap and the big end is ensured by the mating structure of the fracture.



Head shapes	All head shapes are possible.
Driving features	All driving features are possible.
Nominal diameter	M9 - M36
Thread	Metric. Special threads are also available.
Material	Hardened steel
Property class	Mainly 8.8 and 10.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages	The provision of a reduced shaft or waisted shaft leads to greater elasticity of the bolt, which increases fatigue resistance of the joint. Bolts with fit shafts ensure an exact alignment between the bearing cap and the big end.
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Features/advantages

P Product example
Hot forged parts

Hot forging

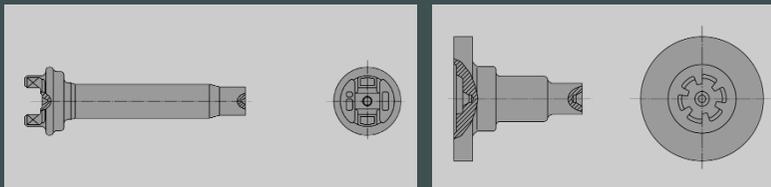
Hot forging (for special parts, bolts and nuts) is normally carried out when the forming forces are too large for cold forging or where cold forging is no longer economical or not possible due to the required geometrical shape. Hot forging is normally followed by machining.



Head shapes	All head shapes are possible.
Driving features	All driving features are possible.
Nominal thread diameter/Lengths	M10 - M40 (ca. 30 bis 600 mm) M40 - M64 (ca. 100 bis 560 mm) M64 - M72 (ca. 150 bis 500 mm)
Thread	Metric, Special threads are also available.
Material	Hardened steel, forging steel
Property class	From 4.6 to 12.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages	Hot forging is used where cold forging is not possible due to the geometrical shape of the component. Less tools are required compared to multi-stage cold forging, leading to reduced tooling costs. Hot forging is more economical for smaller production runs. Suitable high strength hot-forgable tooling steel types can be worked.
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P Product example
Ball pivots

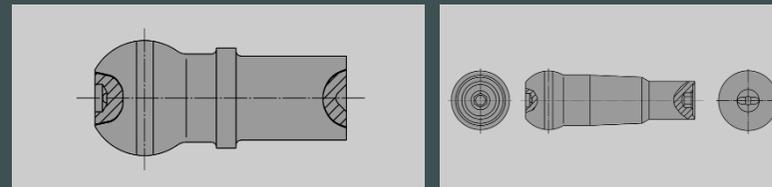
Ball pivots are used where two components or assemblies need to be joined together with a flexible connection. They are used e.g. for steering tie rod (track rod) ends, jointed rods and gas-filled springs.



Ball pivots

Driving features	All forgable driving features which are finished by machining can be provided in the ball end and the shaft end.
Nominal diameter	12 - 30 mm for cold forging from 30 mm for hot forging
Ball diameter	14 - 68 mm
Length	30 - 600 mm
Thread	Metric. Special threads are also available.
Material	Hardened steel, Cold forging steel
Property class	From 4.6 to 12.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages	If possible, the result of forging should be close to the final required geometry and size to avoid the need to remove too much material in a following machining step. Undercuts can be achieved by the use of tools which can move in a radial direction.
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Features/advantages

P Product example
Fit bolts

Fit bolts

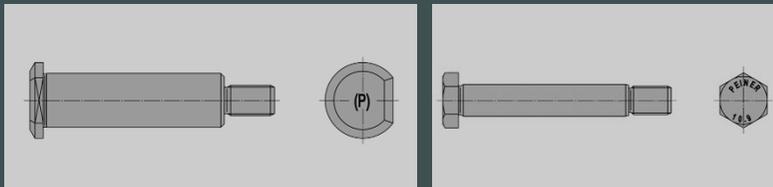
Fit bolts are used where two or more components need to be attached together and carefully aligned with each other at the same time. In some applications of fit bolts, the transverse forces are larger than the clamping forces. Fit bolts can also be used to prevent ball races from sliding within the bearing housing. With suitable surface treatment to ensure surface hardness, fit bolts can also be used directly as bearing pins.



Driving features	All driving features are possible.
Nominal diameter	M12 - M30 mm for cold forging from M36 mm for hot forging
Thread	Metric. Special threads are also available.
Material	Hardened steel, cold forging steel
Property class	From 4.6 to 12.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages	The fit shank of the bolt guarantees accurate alignment of the components and/or can be used as a bearing surface. The fit shank is manufactured by forging followed by machining (with cutting/or grinding) or without machining (calibrated).
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P Product example
Guide bolts

Guide bolts

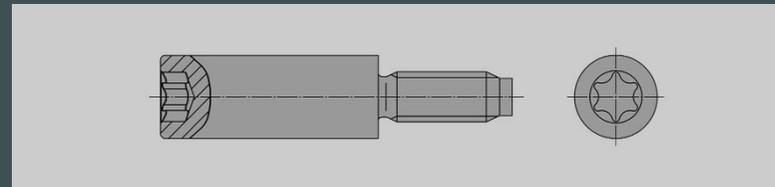
Guide bolts have a cylindrical fit shank which is manufactured to a close tolerance. The fit shank provides a guidance function for other components or assemblies.



Driving features	All forgable internal driving features can be provided in the end of the bolt.
Nominal diameter	12 - 30 mm for cold forging from 36 mm for hot forging
Thread	Metric. Special threads are also available.
Material	Hardened steel, Cold forging steel
Property class	From 4.6 to 12.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages	Guide bolts can be used e.g. instead of bolts and separate guide bushes. The cylindrical fit shank provides the guidance function (axial or rotating)
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P Product example
Extruded hollow components

Extruded hollow components

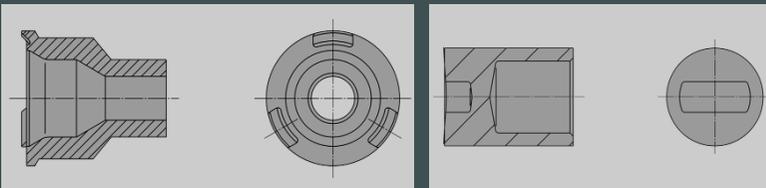
Hollow components can generally be produced much faster and with less material wastage using cold extrusion instead of machining with a lathe. In addition, changes to the grain structure due to the extrusion process lead to improved material characteristics, e.g. increased strength. It is usually no longer necessary to carry out heat treatment.



Driving features	All driving features are possible.
Nominal diameter	12 - 34 mm for cold forging (ring) >34 mm for cold forging (section) >34 mm for hot forging (according to requirements)
Thread	Metric. Special threads are also available.
Material	Hardened steel, cold forging steel, Aluminium alloys, steel which is suitable for hot forging
Property class	Typically press hardened or heat treated, range 4.6 to 12.9, special property classes are also available.
Surface treatment	All common surface treatment and corrosion protection systems.

Features/advantages

Features/advantages
Reduction of material wastage during manufacture (cost savings). Expensive machining operations can generally be avoided.



P PEINER
Umformtechnik

Competence and Variety

PEINER Umformtechnik has about 320 employees at its production facility in Peine, Germany and manufactures fasteners and forged components for a wide range of industries. In many cases, forging is followed by machining and finishing operations.

Steel construction and wind turbines

PEINER high strength bolt assemblies have an excellent reputation within these industries. Peiner also supplies a wide range of special fastening systems for wind turbine construction with sizes of up to M64.

Automobile industry

PEINER Umformtechnik cooperates with numerous automobile manufacturers and major system suppliers in the development and mass production of high strength fasteners and advanced forged components, including the subsequent machining and finishing operations.

Trade and industry

PEINER Umformtechnik is an experienced and reliable trading partner and supplies a wide range of industries with high value fastening systems. The active, leading role we play in regulatory bodies and standardization commissions allows us to give the best possible advice to customers concerning all applications of mechanical fasteners.

