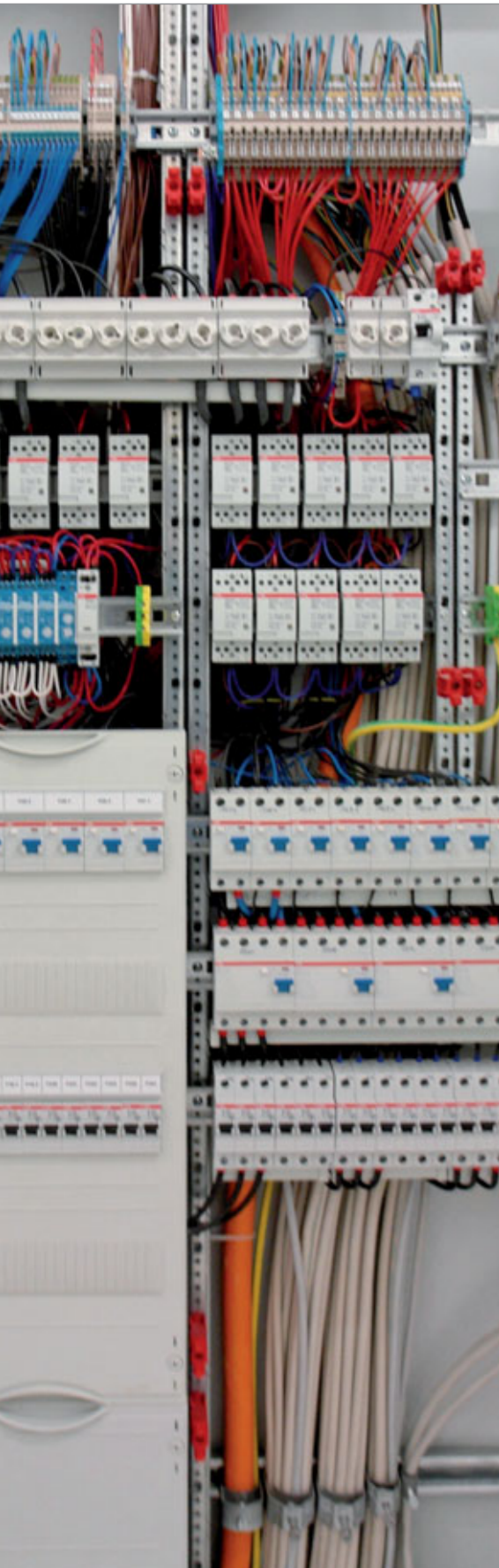




Partner of the energy technology industry –
expertise unites!

BÖLLHOFF

Böllhoff: **Your energy technology expert** for fastening technology



Editorial

The development and production of technologies to reliably generate and provide energy is a complex task and one of today's and tomorrow's main issues.

Renewable sources of energy or fossil fuels – electrical or thermal energy: A reliable energy supply is the basis of a functioning globalised economy as well as of society's prosperity today and in the future. An increase in efficiency over the entire energy supply chain as well as the use of renewable sources of energy and new materials make energy technology a dynamic economic industry with a high degree of innovation.

As a leading system supplier for fastening and assembly technology and as an international service provider, Böllhoff is a recognised partner for energy technology manufacturers and their suppliers. Whether it comes to screw-fastening, riveting, clinching or fastener supply systems – Böllhoff stands for innovative and reliable solutions.

Read the following pages and be inspired.

Energy

Dynamism

Innovation

Your value-added chain



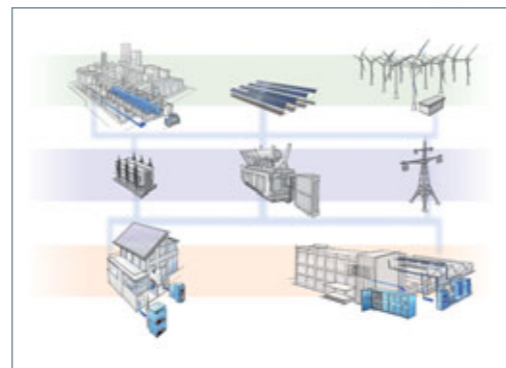
Innovative ability and technical potential are the basis for energy technology manufacturers' chances of success. From energy production to transmission to energy distribution for final consumption, many stages of energy conditioning are completed. The increase in efficiency of energy technology plants is one of the decisive factors for the competitiveness of energy technology manufacturers. Quality and process optimisation are of crucial importance – from manufacturing the smallest parts to large industrial plants.

Moreover, on the supplier side, there is an increasing focus on intercompany cooperation in forms of strategic partnerships aiming at an improved competence in the fields of development, production and logistics.



Research and development

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Diversity as routine

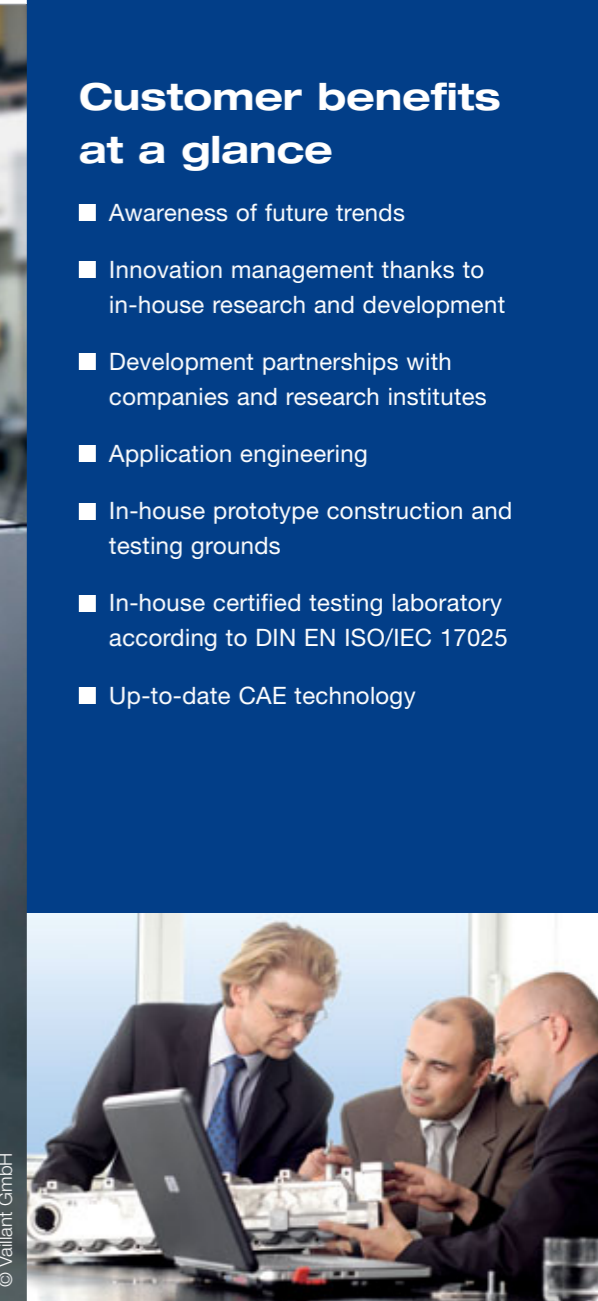
As a full-range and system supplier, Böllhoff offers products and services for every part of the energy technology supply chain. Customer orientation starts with research and development.

With its C-parts management, Böllhoff delivers products and fasteners to the heart of the production process. There, customised equipment and machines designed according to the Böllhoff portfolio ensure high efficiency. Optimised processes avoid downstream costs.

Our partnerships are based on an uncompromisingly high quality standard and a corporate culture imbued with the spirit of a family business.



Research and development



The limited availability of fossil fuels increases the importance of innovative energy technology aiming at the development of renewable sources of energy. There is also a trend toward decentralised energy supply. For that, an "intelligent" energy network and corresponding components must be developed to join the different forms of energy production and distribution.

Manufacturers of technology for production, distribution and use of energy all have a common focus: Production and in particular development costs are a decisive factor for the introduction of new energy technology products. Optimised fastening and assembly processes reduce those costs and are the key to realising modern products for energy technology.

The ECOTECH service (Economic Technical Engineering) allows manufacturers and suppliers of energy technology to benefit from technical advice from Böllhoff engineers. Their industrial know-how and advice covers all areas of fastening technology, corrosion protection and screw-locking. The simultaneous standardisation and optimisation of fasteners in the

development stage simplifies assembly and reduces tool costs. In view of an ever faster technological development and increased competitive pressure, this service is a crucial advantage in the energy technology industry.

RANGE OF SERVICES ECOTECH

- Standardisation of fasteners
- Optimisation of assortments
- Construction and design of fasteners
- Construction and supply of customer-specific special articles
- Application engineering tests in certified laboratory

THE SOLUTION ECOTECH

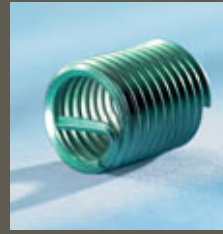
- Problem definition on site
- Concept for fastening solution
- Production of prototypes or use of existing fasteners
- Suitability check by evaluation of mechanical and physical values
- Testing under consideration of practical requirements

- Summary of results in a report
- Project-related realisation

Customer benefits at a glance

- Awareness of future trends
- Innovation management thanks to in-house research and development
- Development partnerships with companies and research institutes
- Application engineering
- In-house prototype construction and testing grounds
- In-house certified testing laboratory according to DIN EN ISO/IEC 17025
- Up-to-date CAE technology





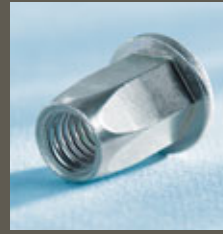
Thread strength?

- HELICOIL® thread inserts for thread reinforcement in lightweight materials
- High-strength wear-free threads
 - Corrosion- and temperature-resistant
 - High dynamic load capacity



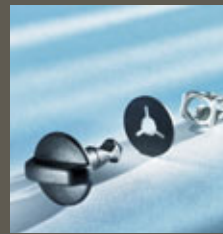
Thread reinforcement in metals?

- KOBSERT® threaded bushes for high-strength screw joints in low-strength metals
- Thread reinforcement, e.g. in motors and gear boxes
 - Repair of damaged threads
 - Mechanical anchoring



Thin-walled components?

- RIVKLE® solution for fastening a load-bearing nut or bolt thread to a thin-walled component
- Load-bearing threads
 - "Blind" assembly (one-sided accessibility)
 - Tightness, e.g. due to seal below the head



Easy opening and closing?

- QUICKLOC® quick releases for quick and repeatedly detachable joints
- Clamp, rotation and pressure locks
 - Maintenance-free, vibration-resistant and captive
 - Fast assembly



Self-piercing riveting instead of spot welding?

- RIVSET® high-strength, reliable fastening of steels, aluminium and plastics
- Particularly suitable for hybrid joining
 - High dynamic strength
 - Form- and force-closed



Fastening without fastener?

- RIVLINCH® form- and force-closed joining of sheets and profiles by cold forming
- Without additional fastener
 - No surface damage to coated workpieces
 - Repetitive

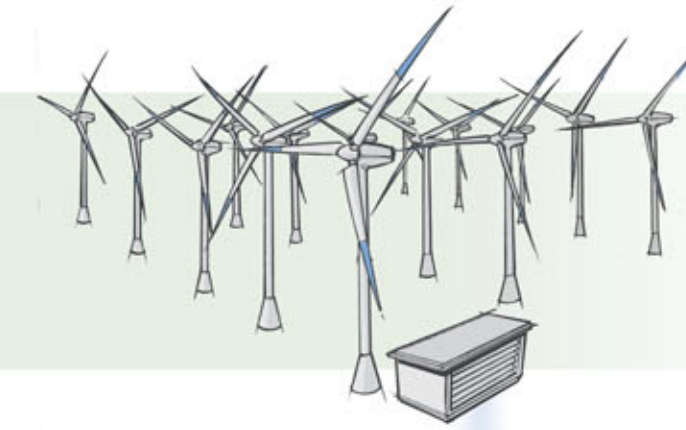
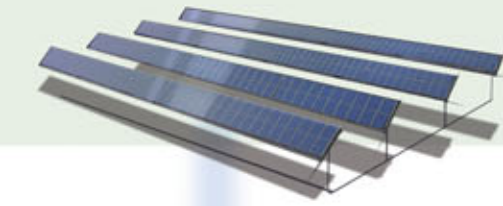
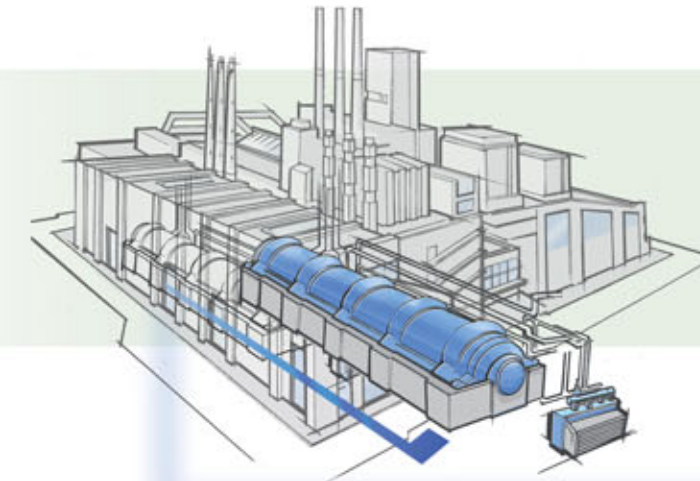


Screw-fastening: hand-held or stationary?

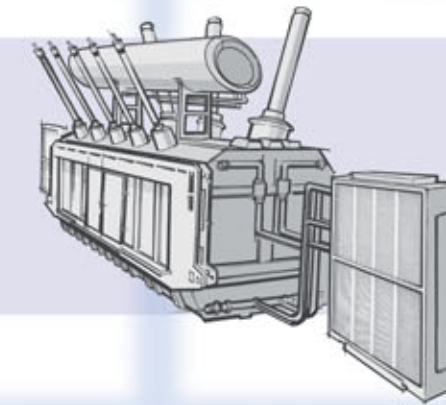
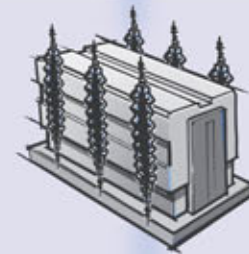
- UNIQUICK® screw driving systems and hand-held devices ensure maximum precision during assembly
- Feeding and screw-fastening without loss of performance
 - For deep screw points
 - Open interface to adapt pneumatic and electrical drives

Our products – for your energy technological challenges

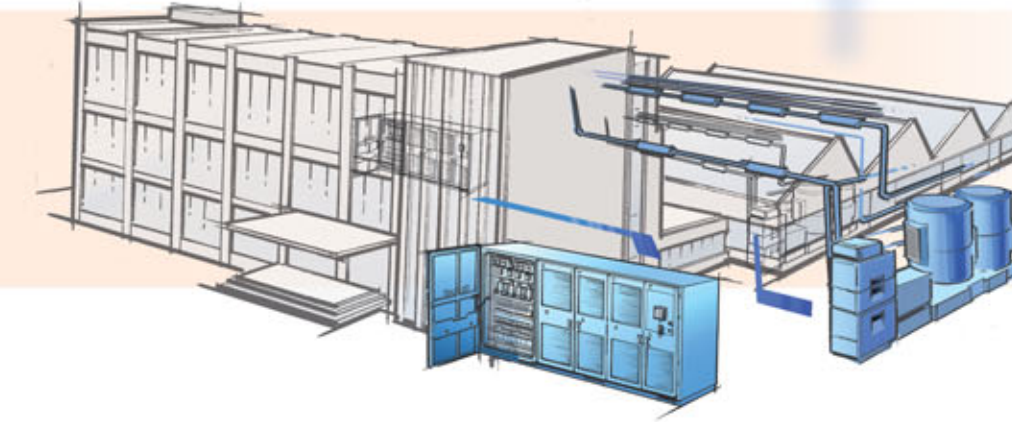
Energy production



Energy distribution



Energy use



Special screws for special applications?

- Screws specially tailored to the energy technology industry
- DIN and standard screws as well as special screws with most diverse drives and head shapes
 - Thread-forming direct screw-fittings



The perfect nut for every application?

- Versatile nuts for versatile fasteners
- Nuts with plastic rings or metal lock rings
 - Plate nuts, cap nuts, retaining nuts, etc.
 - Nut-and-washer assemblies



Technology and diversity, all about bolts?

- Customer-specific or standardised bolts
- Most diverse surfaces, materials and geometries
 - Individual shape, size and type
 - Head bolts, spacer bolts, threaded bolts, etc.



Washers and discs for every application?

- Height compensation and underlay with standardised and innovative components
- Contact, spring and insulating washers
 - RIPP LOCK® lock washers
 - Customised washers and discs



Large and small screws for demanding challenges?

- Screws with various coatings and materials
- Competence in heat-formed parts
 - Transport guard on thread on request
 - Screws with certificate documentation as per 3.1 and 3.2 EN 10204



Permanent and secure fastening?

- All types of fasteners with a wide range of clamps
- Hose and pipe clamps
 - Fastening clamps
 - All variants and materials



More than just fasteners?

- One-stop-shop for all C-parts to reduce number of suppliers and bundle competence
- Fixtures, clamps, saddles, clips, etc.
 - Balls, sealing rings, bushings, springs, etc.



Purchasing and logistics



Customer benefits at a glance

- Optimised internal processes
- Reduced number of suppliers
- Re-assignment of planning, scheduling and procurement
- Reduced administrative effort
- Reduced stock, storage area and capital commitment
- 100 % readiness to deliver
- Standardised and optimised C-parts

Quality and security of supply – these are the main challenges in energy technology. Whether it is about the further development of existing or the development of entirely new technologies and procedures: Energy technology manufacturers are under a great continuous pressure to achieve constant innovation while the demand for energy technology products is increasing worldwide. This requires an optimisation of material and of information flow. Fastener supply systems simplify processes, minimise stocks, avoid supply shortages and reduce costs.

In that process, the smooth supply of assembly lines is an important prerequisite. Even one missing or faulty fastener can result in a production standstill.

Under the name of ECOSIT® (Economic Supply in Time) Böllhoff has established a supply and stocking system – for added efficiency and cost effectiveness. Böllhoff manages the entire supply chain for its customers: material planning, procurement, quality assurance, storage and the internal distribution of goods, right through to the production and maintenance

area. ECOSIT® supports sustainable reliable and simplified processes in the energy technology industry – by reducing the number of suppliers and ensuring 100 % supply capability.



ECOSIT® MultiBin System

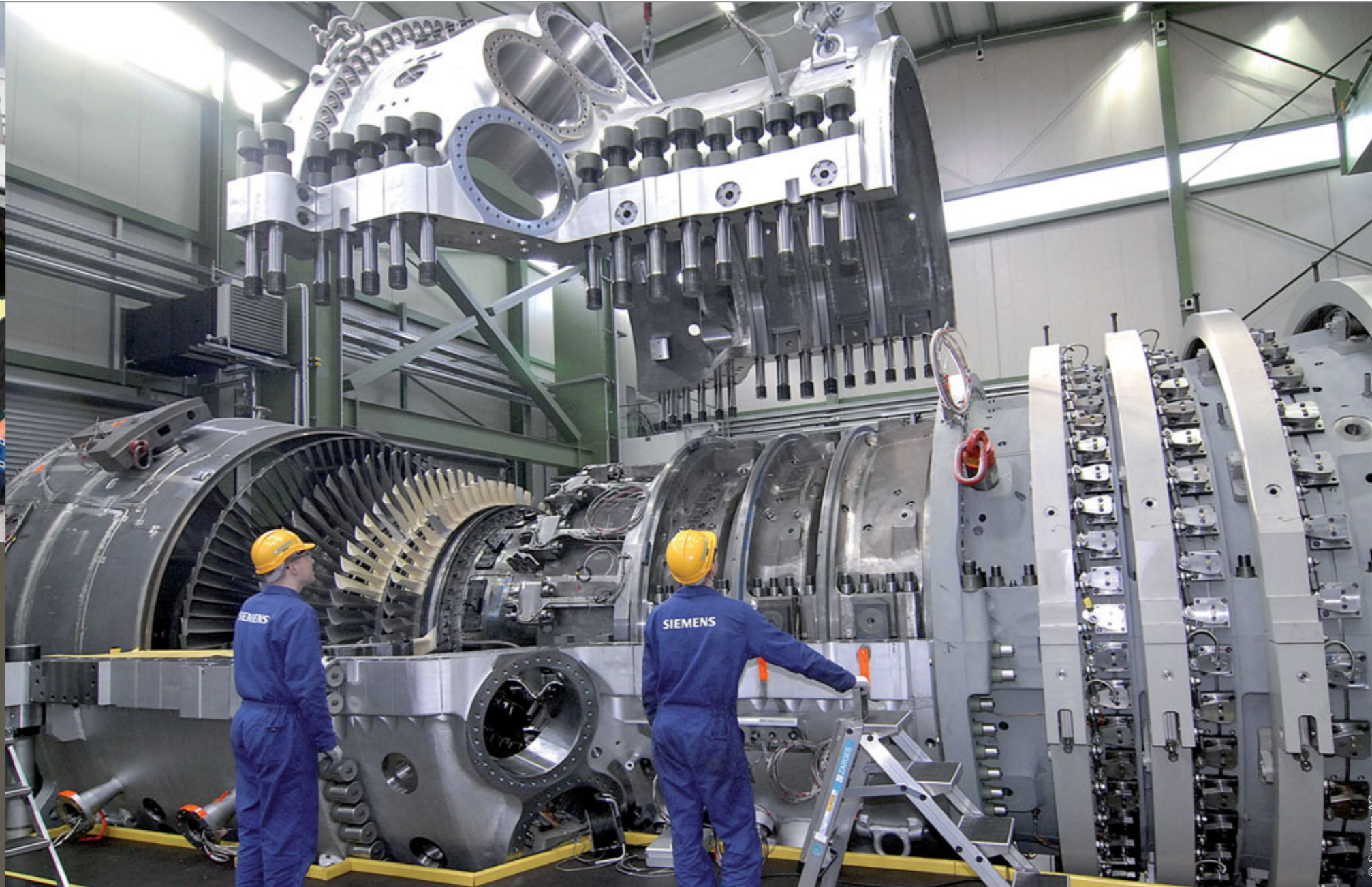
With the ECOSIT® procurement system, Böllhoff regularly supplies the numerous unloading points in the customer's production with most different DIN parts, parts as per drawing, fastening technologies of our own production as well as with other C-parts. In practice, the customer's process costs are considerably reduced.

ECOSIT® SmartBin® System

One of the Böllhoff supply systems is provided with "SmartBin® technology". The items to be stored and managed are filled into containers and boxes at the customer's premises. Each of these boxes is placed on electronic scales which serve as a weight detector. Every day, Böllhoff checks their weight online and thus ascertains the current on-site stock. As soon as the calculated stock

in a box drops below the defined replacement limit, the items are automatically ordered and supplied. With SmartBin®, customers have reduced storage area, storage costs as well as procurement costs and moreover benefit from the multiple evaluation options.

Production and assembly



Customer benefits at a glance

- Reduced production and assembly times
- Profound knowledge of the energy technology industry
- Recognised production planning know-how
- High level of development expertise
- Wide product range
- Customer-specific solutions

Suppliers make a great contribution to the added value of energy technology products. Since energy technology is quite complex and versatile, cross-company cooperation is required. New business models and convergences in the fields of energy production and supply are going to have a considerable impact on cooperation in the energy technology sector. For the coordination of tasks based on the division of labour, modern electronic media are becoming increasingly important for communication and security of supply.

Böllhoff's flexibility and innovative strength are reflected in its wide range of fastening and assembly products for the production of the energy technology industry: screws, nuts, thread inserts, quick-release fasteners, rivets, standard and custom-made parts in all required sizes and materials. All fasteners and their processing systems are carefully coordinated.

Production and modernisation processes can also be optimised with Böllhoff's innovative screw and joining systems.



RIPP LOCK® locking screws

RIPP LOCK® is a reliable screw lock – even under extreme vibration or dynamic stress. The lock washer has radial ribs on both sides which form-closelyly emboss in the counter-surface and in the underside of the screw head when the screw or nut is installed so as to avoid self-unscrewing.

HELICOIL® tangfree

The new HELICOIL® tangfree thread insert is installed without tang so that tang break-off or removal are not required. This even allows installation on both sides of the thread insert without a specific orientation. HELICOIL® tangfree is characterised by high wear resistance as well as corrosion and heat resistance.

UNIQUICK®

Screw fastening, feeding and separation of fasteners. Screw driving systems and hand-held devices of the UNIQUICK® series ensure maximum precision and process reliability for the installation. From the handy telescopic screwdriver to the special multi-screw driving unit – we adapt our products and services to your supply chain and precisely implement your individual assembly requirements.

Quality and internationalism



Customer benefits at a glance

- Certified quality management according to ISO/TS 16949:2002
- Certified environmental management according to DIN EN ISO 14001
- In-house certified testing laboratory according to DIN EN ISO/IEC 17025
- Successful cooperation with leading manufacturers of energy technology
- Cross-national presence

The Böllhoff quality management is certified according to ISO/TS 16949:2002. This means a strict orientation toward the zero-defect philosophy: Continuous improvement is a constant process.

Apart from that, for more than 130 years, the Böllhoff Group has proven to be a flexible and fast-working independent family business. This independence will also in the future be the pacemaker for the further development of the company. Experience creates trust. Values create connections – Joining together!

Böllhoff is one of the leading international service providers of fastening and assembly technology. The headquarters of this family business, with four generations of history, is located in Bielefeld, Germany. Böllhoff is a worldwide operating company with over 2000 employees and a network of companies and representatives on every continent.



Wilhelm A. Böllhoff

Michael W. Böllhoff

Quality assurance for the energy technology industry

At Böllhoff, quality starts with the fasteners which fulfil the high requirements of energy technology for safety and functionality through comprehensive quality processes. Our customers' requirements are our motivation to continuously improve all processes day by day.

The central pillars of the Böllhoff quality management

- Comprehensive certifications
- Multi-level evaluation processes for new suppliers
- Comprehensive supplier and purchase management
- Long-term partnerships with suppliers
- Safe production due to preventive QM planning for products and processes

Energy technology international

To manufacturers of energy technology as well as to their suppliers, to be a successful global actor means to efficiently use all available resources. With Böllhoff as a partner, numerous international production facilities of energy technology manufacturers are optimally supplied with a comprehensive range of products and services – worldwide! The maxim for all processes is: Think global, act local!

Böllhoff International with companies in:



Argentina
Austria
Brazil
Canada
China
Czech Republic
France
Germany
Hungary
India
Italy
Japan
Mexico
Poland
Romania
Russia
Slovakia
Spain
Turkey
United Kingdom
USA

Apart from these 21 countries, Böllhoff supports its international customers in other important industrial markets in close partnership with agents and dealers.

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Böllhoff Group
Archimedesstraße 1–4 · 33649 Bielefeld · Germany
Phone +49 (0) 5 21/44 82-01 · Fax +49 (0) 5 21/44 93 64
www.boellhoff.com · info@boellhoff.com

