



FLEXIBLE ELEMENTS FOR THE INDUSTRY

Witzenmann GmbH

Östliche Karl-Friedrich-Str. 134
75175 Pforzheim, Germany
Phone +49 7231 581-0
Fax +49 7231 581-820
wi@witzenmann.com
www.witzenmann.de



THE GROUP

With 22 Companies in 17 countries
Witzenmann is the worldwide Number 1 in our industry.

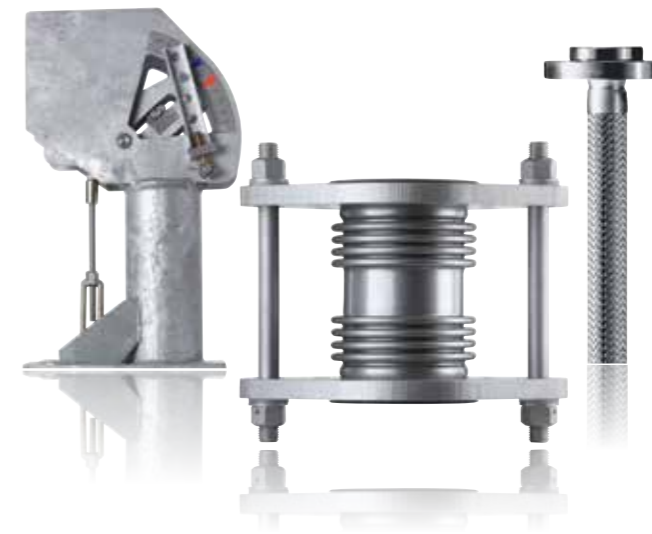


World leader

Witzenmann is a global group specialising in the design and manufacture of flexible metal elements. Guided by our vision of "managing flexibility", our company has become renowned as a reliable manufacturer and as the innovative development partner of choice within the industry. Today Witzenmann offers the widest range of products available, enabling us provide optimised solutions time and time again.

Assuming responsibility

As a signatory to the Declaration of Accession, the Witzenmann Group is committed to the 10 principles of the United Nations Global Compact. This initiative by former UN Secretary General Kofi Annan is based on internationally agreed conventions and treaties on human rights, labour standards, environmental protection and anti-corruption. The Global Compact aims to make the 10 principles an integral part of business strategy and operation.



OUR FLEXIBLE NETWORK

The group's renowned international technology network across Europe, Asia and the Americas generates advantage in terms of operational excellence and innovative strength.

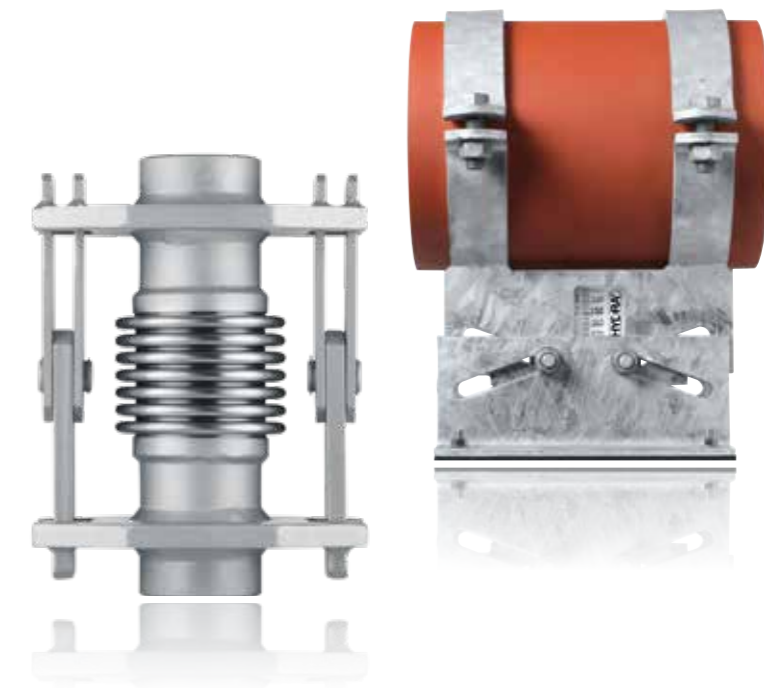
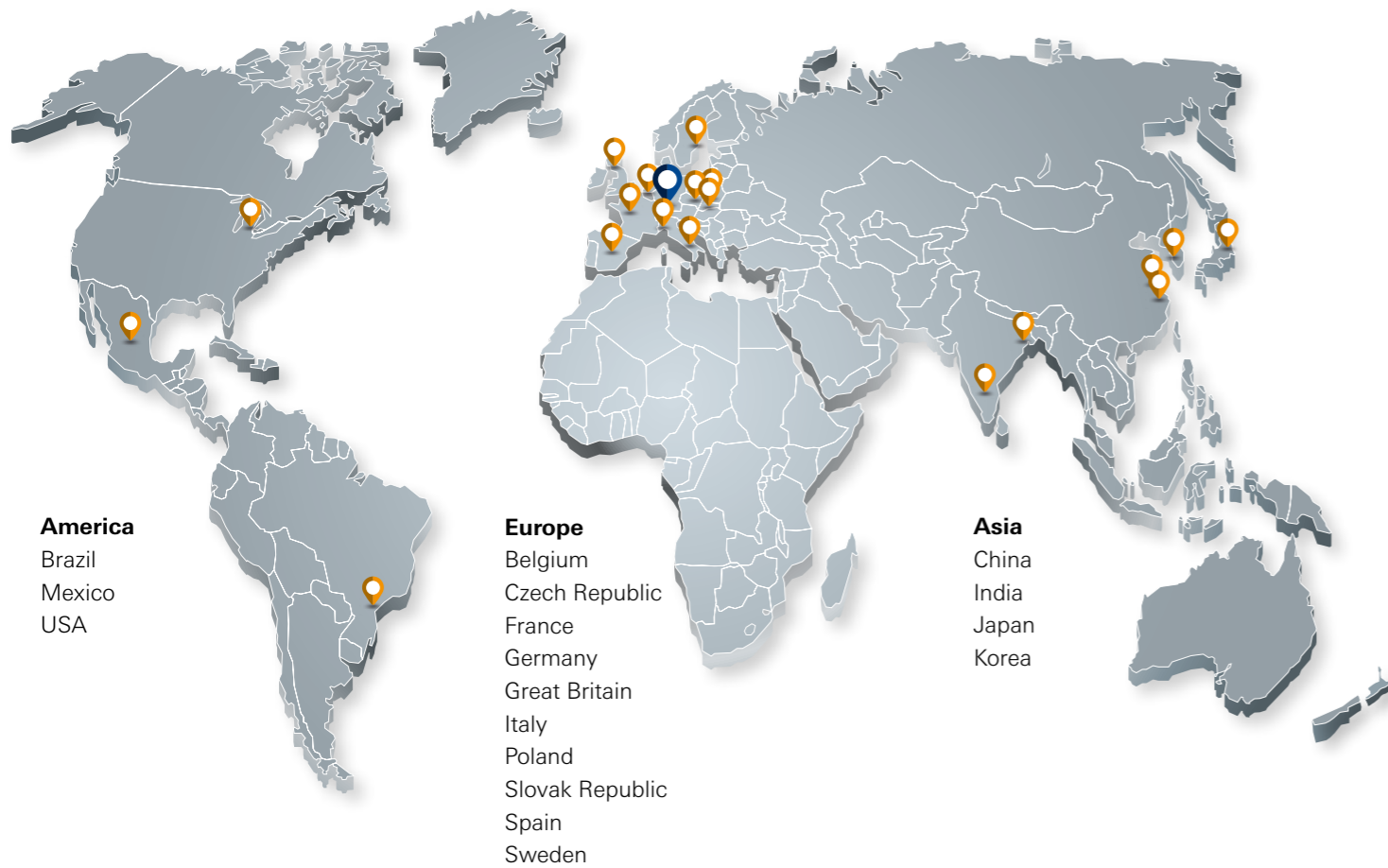
Always close to the customer

One of our corporate principles is to manufacture our products close to our markets. In practice, this entails establishing extensive local knowledge both in production and in engineering. To ensure this, our Competence Centre in Pforzheim provides the respective subsidiaries with the appropriate Witzenmann technology. This strong technology network within the group enables us to address global trends and to develop corresponding optimised solutions. This has made us the innovation leader in our industry.

Fast service, efficient production

To be "always close to the customer" is to provide fast, local, efficient service. Through our network of worldwide subsidiaries we are able to provide:

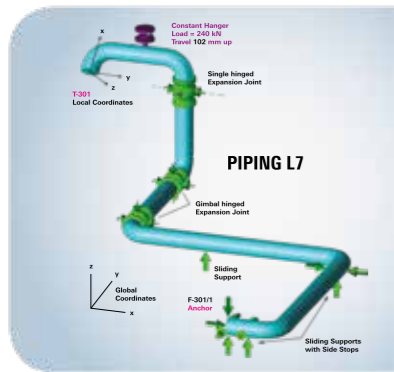
- Sales support and customer relationship management
- Engineering expertise including design calculations, whether for new components or complete piping systems
- Production and assembly services to meet required delivery times for replacement parts or new variants



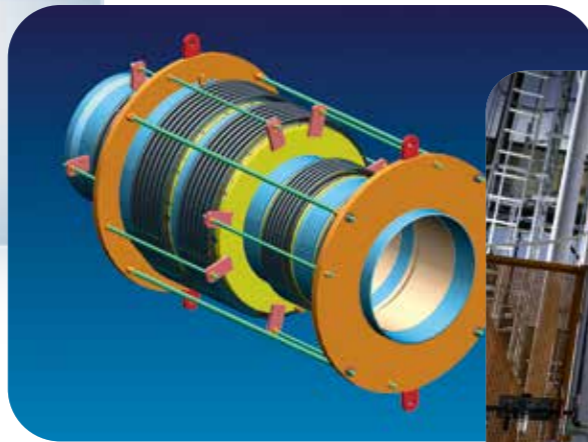
EXCELLENT IN EVERY STEP

Our engineering expertise from the initial customer contact to the installation of the optimally specified component is one of our core strengths. This is what has made us the market leader of our industry.

Design and calculation



Engineering



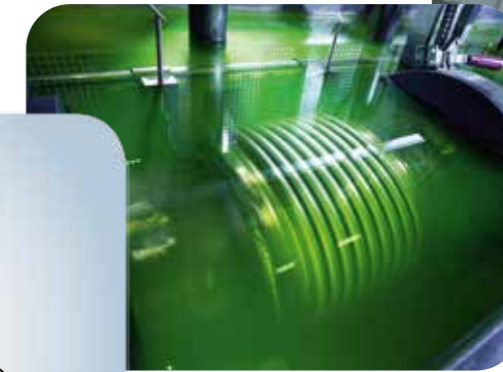
Production



Quality



Certified and approved



Installation and start-up



Design and calculation

Pressure pipe and design is based on the results of pipe stress analysis. Witzemann provides all necessary data for the expansion joints as well for the pipe supports which are data base for the reliable calculation of the pipe layout. The data are either integrated in the design software or could be downloaded from our website. Hanger assemblies can easily be designed with our sizing software FLEXPORTE with the integrated data transfer to Sigma ROHR2, Intergraph CAESAR II & Smart 3D and AVEVA PDMS & E3D.

Engineering

Our products are calculated and designed in accordance with international standards such as DIN, EN, EJMA, or ASME (U-Stamp Holder) and others.

Production

Witzemann has probably the most extensive production plants in the industry. HYDRA Expansion joints of up to 12,000 mm in diameter can be produced here and presses that apply 1200 tons of pressure ensure, for example, clean and perfect forming processes for high-strength materials.

Quality

"Near-service" product validation tests even under extreme operating conditions guarantee the required service life and operational reliability. For this purpose we have a testing centre that sets global standards and provides us with extensive testing measures, such as x-ray or ultrasound weld seam tests, electron beam microanalysis (EBMA), pulsating pressure tests or cryogenic flexibility tests.

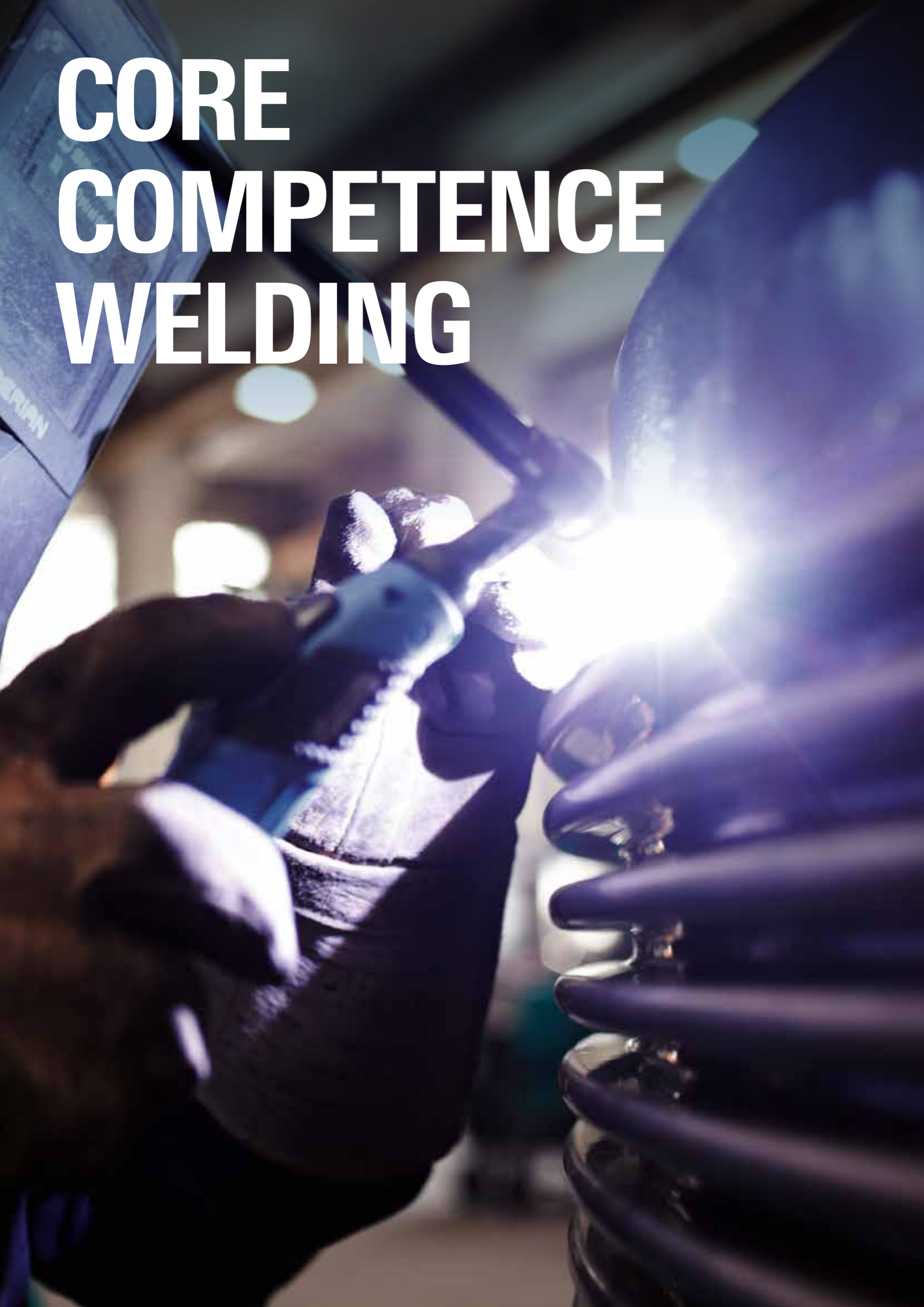
Certified and approved

We have all important approvals and certifications for a wide range of markets. From nuclear to solar power, from chemicals to district heating or plant engineering and construction, from large engines to ships. The entire process is on an international level of course, since our components and systems are installed in facilities and units worldwide and guarantee highest reliability there.

Installation and commissioning

24 tons, 12 meters long, DN 5600, special bellows with leakage control. For complex components, where very high safety requirements apply or difficult installation conditions exist, we are also there onsite. With engineering expertise, from the installation to starting up the system. That brings the assurance which stands for the success of the whole project.

CORE COMPETENCE WELDING



Cryogenic applications, products for the nuclear or aerospace and aviation industry. These are fields of application that demand the highest level of precision and reliability. Loading systems of liquefied gas on drilling platforms, high pressure pipelines in plant engineering or compensating elements that are impinged at far more than 1000 °C during steel production - this requires the most diverse range of materials depending on the area of application. Ranging from high-strength, particularly tough materials up to other "exotic" materials required for the specific application involved. And each of these materials require highly specific

welding skills. For this reason, welding is one of our core competencies and an essential feature that distinguishes us as a leader in technology.

With regular certification, annual inspections and ongoing further training we are ensuring that we will continue to belong to the best in our industry and that our connections of stainless steel to copper, aluminium or grey cast iron or quite simply high-alloy steel connections also fulfil what our welders promise.

QUALITY BY WITZENMANN

This not only reflects the expertise of each individual employee – but also the quality of our processes.



Product durability, absolute reliability and outstanding levels of service are essential for a company that strives for overall quality leadership. "HYDRA – Quality by Witzenmann" is supported not only by our DIN ISO 9001/ IATF 16949 accreditation, but also by a wide variety of national and international approvals and certifications such as EJMA, ASME or U-Stamp. Our customer base includes all of the world's major manufacturers. This is reason enough for us to consistently enhance the qualitative development of our product solutions.

Technology transfer from other markets

Witzenmann is involved in many highly specialised markets including aerospace, nuclear power and even medical technology. These are all fields in which maximum functional reliability is required under the most demanding operating conditions. The resulting need for continuous development, with uncompromised quality, is what makes Witzenmann the chosen development partner across the world.





THE WIDEST PRODUCT RANGE

From precision bellows from the clean room up to 12-meter expansion joints for plant engineering and construction. From miniature hose for laser systems up to 25-meter long metal hose for oxygen lances. We have the most diversified portfolio in the industry.



As the inventor of the metal hose and founder of the metal hose and expansion joint industry, Witzenmann offers the world's largest product range of flexible metallic elements. With our HYDRA expansion joints, HYDRA metal hoses and HYDRA bellows as well as an extensive range of pipe supports we always offer you the optimum solution when it comes to the decoupling of vibrations and compensation for movements. This product expertise from one source has the advantage that the overall system (pipeline, its compensation, the suspension and mounting) can be economically and efficiently coordinated.

FLEXPORTE supports online the selection of metal hoses, expansion joints and bellows. The software selects according to the operating parameters and designs suitable HYDRA standard products from the Witzenmann product range. With interfaces to 3D CAD systems the user can include the pipe supports in the 3D planning of the whole construction.

FUTURE IS TODAY



Lightweight construction, weight reduction, multifunctional elements or new materials are issues that concern our engineers and innovation management on a daily basis.

In the approx. 2 km long DESY accelerator tunnel (Deutsches Elektronen Synchrotron) Witzenmann is one of the project partners when it comes to supply lines from DN 125 to DN 300 for various fluids. Our scope of services here includes, in particular, low-friction bearings or the calculation and design of the flexible elements required. Punctual delivery also, of course, so that DESY can be put into operation by 2014 as planned.

ITER (International Thermonuclear Experimental Reactor) is an international research project that is currently building the largest and most advanced experimental fusion reactor. ITER seeks to show that it is physically and technically pos-

sible to generate energy by means of nuclear fusion. Witzenmann is one of the development partners in the field of "flexible tubing". How can forces, expansions and movements be absorbed – how is the best and lowest-resistance support achieved.

The future has already arrived as well in our materials and forming laboratories, of course. In conjunction with leading universities, we work here on research projects in which we test out new material combinations, gain experience in alternative forming processes or simply encourage an exchange of experience with specialists of other fields.



HYDRA® METAL HOSES

Manufacturing and packaging of special up to series

Stripwound hoses



HYDRA Stripwound hoses

Stripwound hoses from Witzemann are wound from strips of material in various profiles depending on the respective application and specifications. The industry's broadest product programme ranges from the highly flexible metal hose with engaged profile through to the sturdy interlocked protective hose. The flexible metal elements are used as heat and ageing-resistant components in exhaust gas technology, for example, as protective conduits and conveying hoses.

Applications

- Protective hoses for electric cables and fibreglass strands in medical technology
- Extraction and conveying hoses for dust, chippings and pellets
- For ventilation and exhaust gas routing

Corrugated hoses



HYDRA Corrugated hoses

Corrugated hoses are mechanically formed from seamless or longitudinally welded tubes and are available in a variety of wall thicknesses, material types and packaging. These are used to convey pressurised fluids and fluids in a vacuum in an absolutely leak-tight manner. The hoses compensate for movement, expansion and vibration within the piping systems.

Applications

- Pressurised or vacuum-sealed gas, water, hydraulic or refrigerant lines in technical building equipment
- As pressurised hoses in the chemical industry and vacuum technology or as a noise and vibration-damping equalising piece
- As a conveying hose in heat exchangers and stratified storage systems
- Oil, fuel and exhaust gas lines in the automotive industry



HYDRA® EXPANSION JOINTS

DN 125 to DN 12,000

Axial expansion joints



Reliable, safe and at the forefront of technology

The expansion joints and metal bellows support axial, angular and lateral movements within piping systems. Equipped with single or multi-layer bellows, HYDRA expansion joints exhibit an enormous compressive strength while simultaneously maintaining a high degree of flexibility. Witzemann's broad product range incorporates standard expansion joints in nominal diameters from DN 125 - 3,000.

Characteristics

- High level of safety due to multi-walled bellows
- Temperature and corrosion resistant
- Low fixed bearing load by means of anchoring
- Compensation of movements and thermal expansions

Special designs



Special designs

Special designs include expansion joints that differ from the usual product range. Such as in their geometry (oval or rectangular expansion joints). In their properties and materials (extreme light weight (aluminium), aggressive media (titanium), electrical conductivity (copper), magnetic permeability) or in their areas of use (DN 12,000 brick-lined for temperatures up to 800 °C, for high pressures or vacuum).

Characteristics

- Supplied with connecting pieces
- Individual, client-specific designs
- Durable and extremely robust



HYDRA® METAL BELLOWS

DN 1.5 to DN 125

Clean room production



HYDRA Corrugated bellows

Witzenmann corrugated bellows are made by the hydraulic forming of thin-walled tubes. Depending on the requirement profile, they can be designed either with one or multiple walls. Single-ply bellows have small spring rates and are employed particularly in vacuum technology. Multi-walled bellows are very pressure resistant and at the same time very flexible. They are used, for instance, as valve shaft seals for operating pressures of up to 400 bar.

Precision bellows



HYDRA Precision bellows

Our precision bellows meet the highest demands for dimensional stability, cleanliness, functionality and service life. These bellows are manufactured under clean room conditions with continuous production monitoring and quality control. The smallest HYDRA precision bellows measure only 3.0 mm and are therefore also suitable for use in mechatronic systems.

Application



HYDRA Diaphragm bellows

Diaphragm bellows consist of diaphragm rings welded together in pairs. They have a high specific expansion compensation (up to 80% of the overall length) and a very small spring rate. Diaphragm bellows are especially suited for low pressure or vacuum applications.

Diaphragm bellows are used in vacuum technology, special valve construction, slip-ring seals and as expansion elements in oil-cooled high-voltage switchgears.



HYDRA® PIPE SUPPORTS

The harmonised complete range

Constant hangers



HYDRA Spring hangers and constant hangers with accessories

Spring hangers and constant hangers with accessories are used wherever pipelines have to be hung flexibly. They absorb the weight (with or without medium) of the pipelines and ensure defined flexibility of the pipelines. Our product portfolio includes spring hangers, spring supports, hinged spring supports, constant hangers, constant supports, accessories and pipe clamps. Thus, depending on the choice of hanger, a balanced load chain can be formed, which can encompass the pipeline.

Bearings



HYDRA Bearings

The product range includes floating, guide, fixed and roller bearings. In some cases, these have lifting devices or additional insulation saddles as well as supporting shells for supporting the pipeline. The complete range of bearings is perfectly matched and characterised by a sturdy design and maintenance-free operation. The patented clamps ensure ease of assembly and long operational reliability. The patented infinitely adjustable height adjustment ensures easy and optimum adjustment of the bearings to the conditions on the site.

