



KLINGER NEWS

Group Magazine



EDITORIAL



In 1886, Richard Klinger started a small engineering workshop in Vienna. The young and talented engineer, a passionate inventor, set the foundation for the KLINGER Group. After only seven years, his business was thriving. He acquired an old paper mill in Gumpoldskirchen and transformed into a state of the art production site – in those times this meant gas lights, allowing for night shifts! It is a location with a long tradition of engineering excellence and even today, some 130 years later, it is where the KLINGER Group is headquartered.

Looking back at our history, our Group has experienced several challenges: Two world wars, international expansion, good and bad acquisitions, economic crises, we even changed our corporate slogan several times! However, overcoming such periods helped us to evolve, learn and grow even more. Sometimes it was difficult to cope with change. But change is a positive force, an enabler, so to speak, to remain a market leader for generations. "trusted. worldwide." is never an easy task, but it is what we set out to do a long time ago.

Despite all that has changed, one decisive factor has firmly remained over 130 years: Our company philosophy. We are a fair, respectful and a long-term partner for our customers. We put our customers first, we listen, ask and solve their challenges and needs. Our commitment to quality is another fundamental element. We deliver products and services used in critical applications. In a team effort to ensure plant safety, it is our responsibility to exceed industry standards and to support operators with foresight and expertise.

In this KLINGER News, we will present examples of how we serve different industries. From mining in Zambia to wind energy in Germany. To us, it is a snapshot of our exciting day-to-day business. For you, it is hopefully an enjoyable read.

Dr. Christoph Klinger-Lohr

IMPRINT

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INDUSTRY EXPERTISE

Our special application know-how

Over its 130 years of existence, the KLINGER brand has firmly established itself in the industry as a world-class manufacturer and supplier of gaskets, valves and level gauges. And while it is a fact that many industries around the globe rely on our products from these product segments, the company has a lot more to offer. Can KLINGER help in other fields as well? Yes, we can.

The KLINGER Group's activities, which comprise 16 manufacturing companies around the globe and a worldwide network of 44 distributors, are based on three pillars: Sealing, fluid control and instrumentation. Working with these building blocks, which have made the KLINGER Group "trusted. worldwide.", we have come up with a wide range of innovations that take our business beyond the duties of a manufacturer and supplier of valves and gaskets.

Same principle, different application

In its traditional role, most of the Group's work focuses on keeping a medium sealed off from the environment and thus helping to avoid the negative impact of leaks for an operator. But

are there also scenarios where you might not want to keep the medium in, but rather out of a pipe or cylinder? Looking at the challenges faced by wind turbines, KLINGER Germany has recently identified a market for precisely such an application. And what about focusing on a specific medium and offering tailored solutions? Taking this approach, KLINGER Portugal has literally redefined its role and now concentrates on providing its fluid control expertise for drinking water and wastewater. To give you a last example: Sealing materials such as they are used for gaskets offer a wide range of properties. What other industries can benefit from them? KLINGER Switzerland, our resident manufacturer of Polystrat, a rubber-coated steel, is a well-known and valued supplier of the automotive industry.

What does this prove? Simple. Industry expertise is not so much about what you do, but what you can potentially do with it. Thinking outside the box. And in this context, KLINGER does a lot more than just manufacture and distribute gaskets and valves. So yes, we can. And the articles of this edition of the KLINGER News will show you how.

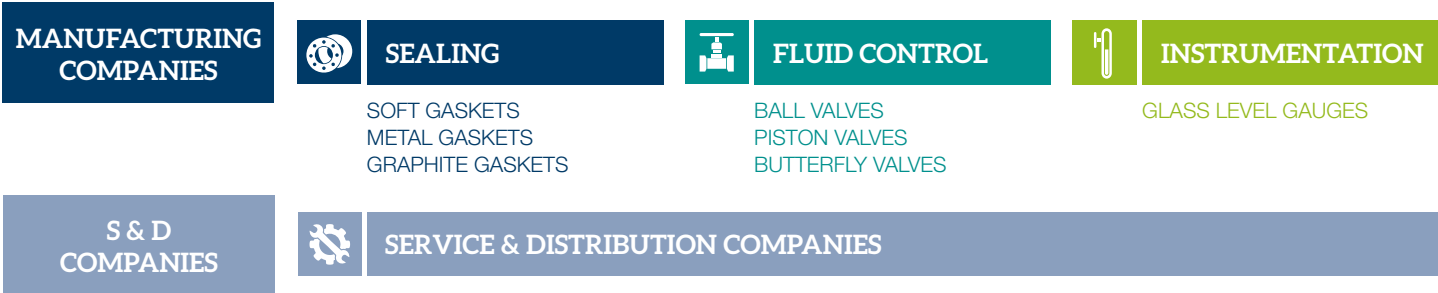


Our business model is unique as we manufacture and trade products. This close contact with our customers helps us to better understand their needs."

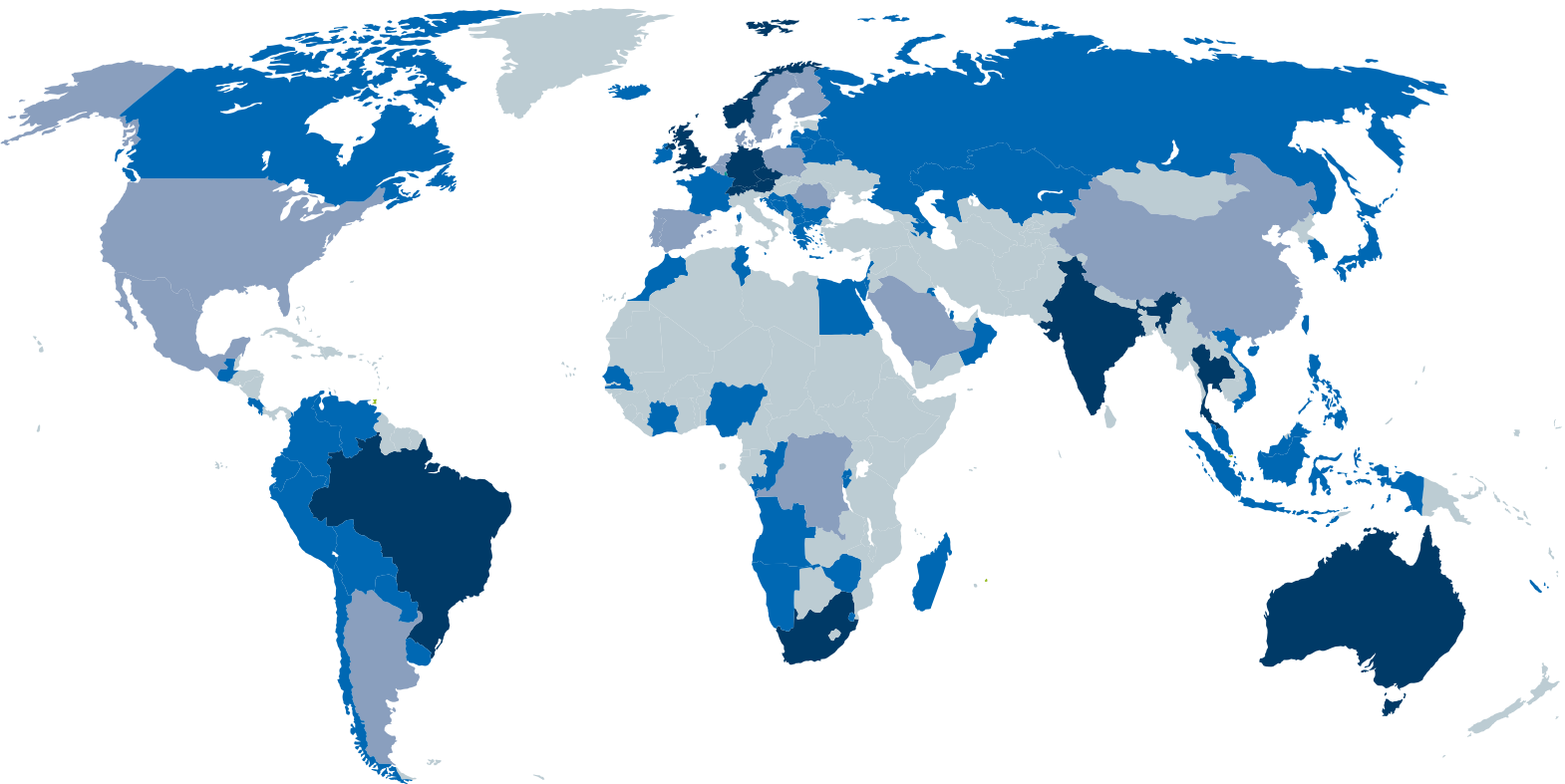
Heinz Scharl
CEO
KLINGER Group

OUR BUSINESS MODEL

Our mission is to offer safe and reliable products and services for high-end sealing, fluid control and fluid monitoring systems.

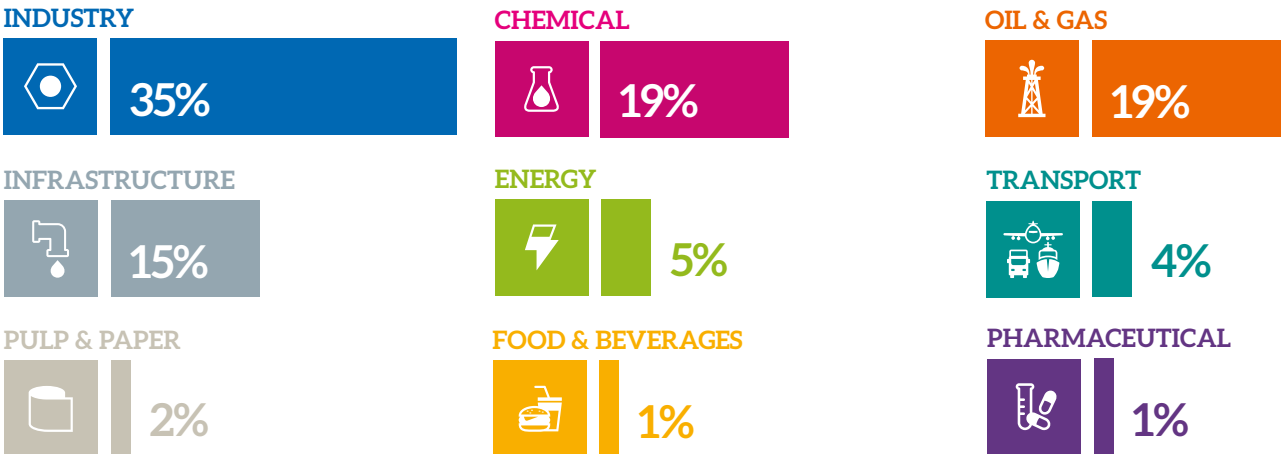


OUR GLOBAL NETWORK



MANUFACTURING COMPANIES SERVICE & DISTRIBUTION COMPANIES INTERNATIONAL PARTNERS

TURNOVER PER MARKET



130 YEARS

Pioneering Spirit



The Gumpoldskirchen business location which is still the headquarters of the KLINGER Group today

1860

It all started with the birth of Richard Klinger on the December 31, 1860, in Bohemian Aicha (at this time part of the Austro-Hungarian empire, nowadays Czech Republic). He followed his

father's wish and started studying civil engineering at the Technical University of Vienna. During his studies, he found his real passion and switched to mechanical engineering.



Richard Klinger – Founder of the KLINGER Group



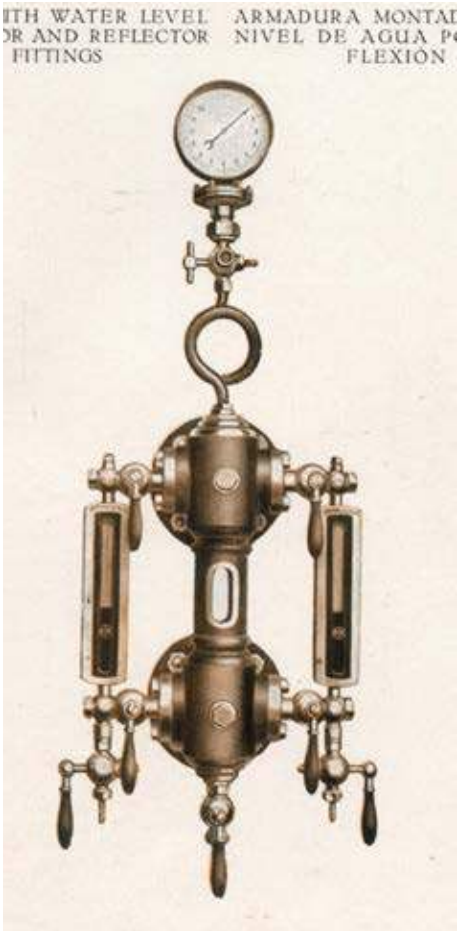
The house in Aicha (Czech Republic) where he was born

1886

The young engineer opened a small engineering workshop in the 4th district of Vienna. The first projects included the design and manufacturing of pleating fabrics and cutting crystals.

1890

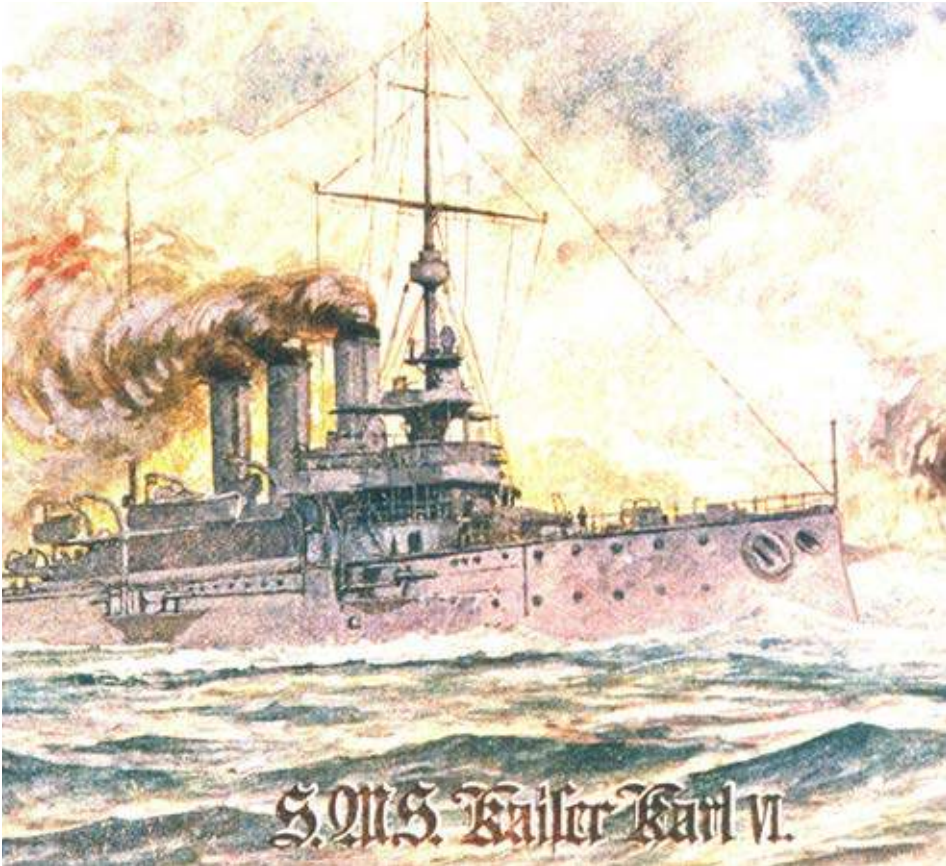
Richard Klinger invents the modern reflex level gauge which is patented in 1890. The sale of the patent rights to the United States helps him to collect the necessary capital to establish his own manufacturing company.



Water level gauge – an innovative product from this time



Richard Klinger and his team



KLINGER products on the naval vessels of the Imperial Austro-Hungarian Army

1891

Richard Klinger acquires a small factory in Gumpoldskirchen (south of Vienna) and transfers the business to the new site. This is still the company's headquarters today.



Klingerit: The well known gasket material from the past

1894

The company continues to improve the design and manufacturing of the water-level gauges. Nevertheless, a problem still exists: Leakage due to unsatisfactory seals. Richard Klinger's answer is the invention of the compressed fibre gasket, the famous "Klingerit" gasket sheet.

1898

The success story of "Klingerit" takes off: The gasket material is so safe and reliable that the Imperial Army Ministry decides to equip naval vessels of the Imperial Austro-Hungarian navy with "Klingerit" and KLINGER water-level gauges. This is a breakthrough for the small company and the foundation for the further business expansion of KLINGER.

RETROSPECTIVE

KLINGER through the decades



KLINGER headquarters, 1970s

From the revolutionary development of the compressed fibre gasket to the advanced sealing material technology of today, product innovation and problem-solving abilities have always been the cornerstones of our company. Pioneering spirit and setting the standard for each decade are part of our company's DNA. Here is a retrospective of our past.



Klingerit400 Universal, 1967



Reflex level gauge, 1980s



KLINGER indicator cock, 1966



Broad sealing portfolio, 1968



R&D in the 1960s



KLINGER stainless steel level gauge, 1962



KLINGER Ballostar®, 1972



Piston valve, French advertisement, 1930s



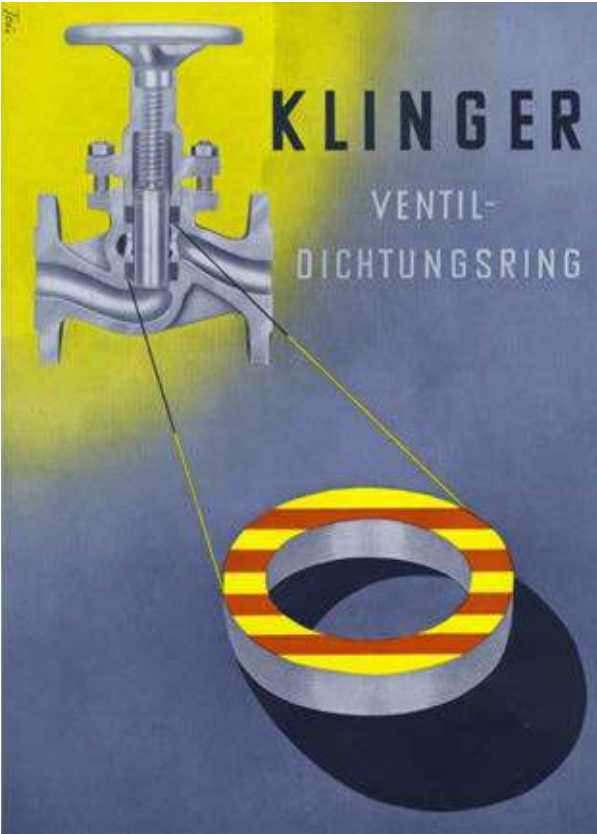
KLINGERIT advertisement, 1920s



Sealing compound, 1975



KLINGER Ball Valve KHM, predecessor of KHE



Valves and gaskets for fluid control applications, 1964



Klingerflon PTFE sealing material for a broad field of applications, 1968

PARTNER-SHIP

Westad enters into maritime joint venture with Chinese partner



Hudong valve factory in Shanghai, China.

Westad, a manufacturer of high-performance butterfly valves, has been a part of KLINGER since October 2013. Wishing to increase its industry expertise for the maritime business, our Norwegian colleagues are now teaming up with a Chinese company. Wishing to know more, the KLINGER News team caught up with Kim Arild Tandberg, Westad's Area Manager for China. Here's what he had to say.

KN: Good afternoon Mr. Tandberg and thank you for making time for this interview.

KT: Gladly, it is always a pleasure to talk about how we can serve our customers even better.

KN: According to our information, you are in the final stages of forming a joint venture with a Chinese partner. What can you tell us about this?

KT: Let me start by telling you about our joint venture partner: The Shanghai Hudong Marine Valve Manuf. Co., Ltd., as the name suggests, is a marine valve manufacturer based in Shanghai. It is run by the state-owned Hudong Zhonghua Shipbuilding Group and has a staff of around 200 employees.

KN: Have you had previous dealings with this company?

KT: Yes. Hudong has been one of our strongest partners here in China and

focuses on providing all kinds of valves for the marine industry. We actually approached Hudong back in 2010 regarding a possible joint venture, but our negotiations were put on hold as a result of the 2011 financial crisis. We picked up where we had left off again in 2013, and in 2014 signed a licensing and royalty agreement, authorizing Hudong to act as an OEM manufacturer for Westad. We are planning to officially launch our joint venture in the fourth quarter of 2016.

KN: What are the reasons for entering into a joint venture in China?

KT: One thing you have to know is that China is well on its way to becoming the world's largest shipbuilding nation. And as most of the shipbuilding will therefore happen here, having a local presence is very important for us.

KN: Customer proximity has always been one of the strengths of the KLINGER Group, so I can understand the desire to establish a local presence. But why does this require a local partner?

KT: Westad is an industry expert in the field of butterfly valves for LNG, LPG as well as chemicals and cargo applications. In the past we have been approached by Chinese shipyards to not only provide butterfly cargo valves, but also the full package of required valves. Teaming up with Hudong Marine enables us to meet this demand.

KN: Regular readers of our KLINGER News know that you have recently modernized your production site in Norway. What will you be producing there and what will be made in China?

Our business location in Geithus, Norway, will continue to focus on high-end butterfly valves for the LNG, the LPG, the chemicals as well as the Oil & Gas business. This will also include valves made from complex materials, such as titanium and high-grade steel.

Together with Hudong, on the other hand, our focus will be on butterfly valves for ballast and water systems. We will also manufacture other valves for the marine industry in China.

KN: You yourself are based in Shanghai. A topic I am sure also interests our readers: What is working in a city such as Shanghai like?

KT: Very different to what I have experienced in the past (laughs). Shanghai has a population of around 26 million people and spans an area of more than 6,300 square kilometers. As a consequence, travelling, either by bus, train or car takes a lot of time and it is not unusual to be on the road for a day to reach your destination. Meeting up with a business contact, a partner or even a colleague based somewhere else can therefore be a time-consuming task. The language barrier is also a challenge and good translators are key persons in Shanghai. Luckily for us, we have quite a few contacts in Hoi Tung (Westad's agent in China) and at the Hudong factory with good English language skills.

KN: By way of closing, do you have any last comments on your upcoming joint venture?

KT: Let me add three things: First, entering into a joint venture here in China is vital for Westad, as it underlines our reputation as an industry expert for the marine business. Second, Hudong is the ideal partner: They are good at what they do and together we can supply the maritime industry here in China with all the necessary valves for various applications. Last but not least, our joint venture will not only focus on manufacturing valves. We will also be putting quite an effort into research and development – in other words, expect to hear from us here in China regarding new products and solutions.

KN: Thank you for the interview.

SCANDINAVIAN CORPS

KLINGER Marine exhibits at the SMM



The KLINGER booth at the Shipbuilding, Machinery and Marine Technology Fair (SMM) in Hamburg

Attracting more than 2,200 exhibitors from all over the world and around 50,000 industry visitors, the SMM in Hamburg is Europe's most important trade fair for the maritime industry. Held for the 27th time, this year's SMM also addressed cutting-edge topics such as Industry 4.0. Representing the Group, two familiar faces were present: Westad, which attended with its joint venture partner Hudong, and KLINGER Denmark. Wishing to find out more about the SMM, we tracked down Per Gunnar Rønningen, Westad's Sales Director.

Per Gunnar Rønningen is not an easy man to reach. Constantly on the move to his next customer, Per Gunnar is currently on a business trip in Asia when we finally catch up with him. Somehow we manage to find a slot in his tight schedule and discuss Westad's presence at the SMM. "Being in Hamburg for the SMM has in the meantime turned into something of a tradition for us," confirms Per Gunnar, adding: "Although this year does mark the start of a new beginning, as this has been the first time we were present as Westad, the marine expert of the KLINGER Group." Asked about the attendees to the fair, he says that he has noted a change: "Since shipbuilding is now mostly in the hands of Chinese

companies, the people you meet at the fair are mostly ship owners, and not so much the people who actually build them."

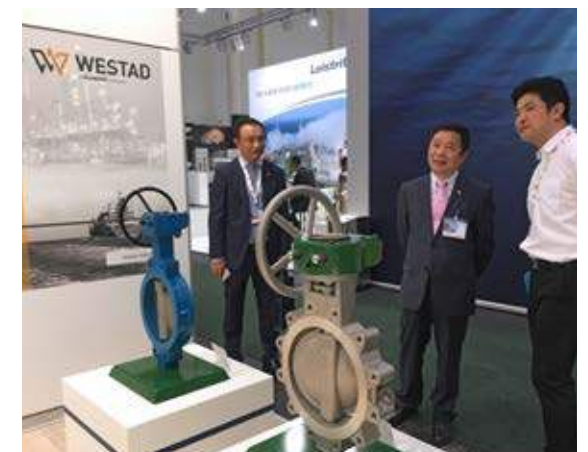
Major marine hot spot

Covering an area of 93,000 square meters – and thus larger than the famous island of Alcatraz in the Bay of San Francisco, the SMM showcased everything the maritime industry has to offer along four distinctive theme routes: The Digital Route represented companies offering the digitalization of processes, the Green Route focused on more efficient solutions, and the Security Route highlighted civilian and military applications, including the topics crew protection, piracy, cyber-attacks and port protection. Last but not least, the Job Route offered career-seekers a path into the marine business. Westad, which was present for the second time together with its Chinese joint venture partner, displayed its tried and proven butterfly valves for the LNG, LPG and the chemicals business. "It's difficult to reinvent the wheel," comments Per Gunnar, referring to the exhibited high-precision butterfly valves, and adds: "You might not think so, but the

marine industry is very conservative. The guiding principle can be summed up under the motto 'if it works, don't fix it'. Which obviously works for Westad. During the course of the trade fair, which was held from September 6 to 9, Per Gunnar was able to generate a satisfying number of leads. "Amongst others, we met up with a ship owner from China to discuss the technical details of an upcoming tender. And we had a visit to our booth by a Chinese delegation," states Per Gunnar. And Klaus Knutzen, Managing Director KLINGER Denmark, is also satisfied with this year's result: "Overall, we are happy with our participation at the SMM. The Scandinavian companies that are a part of KLINGER Marine have successfully showcased their strength with their marine portfolio: From special gasket products to dedicated level gauges, and right up to valves for cargo and engine room applications."

Moving on

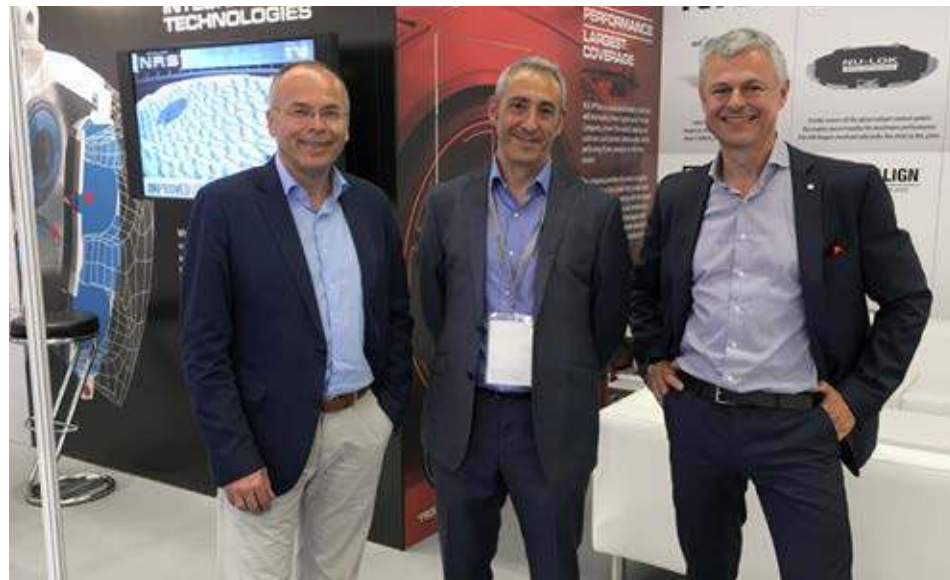
Per Gunnar Rønningen, meanwhile, has already set sail for his next destination. "At the moment we are following up and concluding another order in China," says Westad's Sales Director, who seems to be always on the move: "After that, we have a client visiting our company next week for a meet and greet." Which, knowing a little about Per Gunnar, will probably result in more destinations to travel to, and more business for his company.



Hudong, the Chinese partner of Westad, also attended the SMM

AUTO-PILOT

KLINGER Switzerland: Our expert for the automotive industry



Eckhard Steeger, KLINGER Switzerland, Jose Luis Ciordia (NUCAP) and Michael Sautter, KLINGER Holding, at the Automechanika 2016 in Frankfurt

KLINGER has been an important player in the automotive supplier industry for almost a century. In the early days of the automobile, the family-run enterprise was already producing automotive engine seals and components for braking technology. In the mid-nineties KLINGER merged many of its automotive activities with Elring to form Elring-Klinger, today's world market leader for automotive sealing technology. Some significant automotive activities, however, still remain in the KLINGER Group, for example noise and anti-vibration applications in the brake industry. In this field, KLINGER Switzerland plays an important role in the art of making brakes silent. Eckhard Steeger, Managing Director of KLINGER Switzerland, tells us more.

KN: Good morning Mr. Steeger and thank you for joining us to talk about KLINGER's activities in the automotive sector. Let us start with some information about yourself. You joined the KLINGER family last year and took over the role of the Managing Director at Egliswil. Can you tell us a bit about your professional background?

ES: Gladly. I have been working in the automotive sector for around 30 years now, of which I spent 20 years in commercial roles. My recent ventures involved founding and running a company manufacturing friction materials for brake pads in Germany, which I subsequently sold to a major US enterprise. My latest activity before joining KLINGER was a consulting business supporting, among others, large Chinese brake manufacturers in building up state of the art brake businesses. And now, as you know, I am part of the KLINGER family here in Switzerland.

KN: Judging from your resumé, I'd say you are a person willing to accept a challenge. What challenge have you taken on for KLINGER in Switzerland?

ES: To answer that question, let me tell you a bit about the status quo before I joined the company. KLINGER Switzerland was a proven quality supplier to EU customers. The traditional product range was already excellent, but we did see a need and an opportunity to broaden the portfolio with innovative materials. Secondly, as a consequence of globalization, we identified a need to enlarge our

customer base and to expand our business into North America and Asia.

KN: What kind of products does KLINGER Switzerland manufacture and how are you changing the game?

ES: Our business here focuses on the production of Polystrat, a rubber-coated steel that is used for the production of shims for automotive disk brakes. Our niche in the value chain is the rubber coated steel material and in this role we are an important development partner for companies who make shims and brake systems. We run two manufacturing lines in a proprietary process, which was designed and built in-house. The high degree of flexibility in our process is what makes us unique in our industry and an important partner for our customers.

KN: Who are your customers for the Polystrat coils?

KN: Polystrat is delivered to automobile and brake manufacturing companies. As brake disks are subject to wear and tear, they have to be replaced every 25,000 to 30,000 kilometers. Independent aftermarket suppliers therefore also play a very important role as part of our customer base.

KN: In terms of regions, where are your target markets located?

ES: As already mentioned, our traditional business is mainly focused on EU customers. But we see substantial growth opportunities in China and North America. You might not be aware of this, but with 20 million cars produced annually, China has become the world's largest car market with substantial further growth ahead. The US, which produces an average of 16-17 million every year, is another important target market for us.

KN: You mentioned recent changes among the market players?

ES: Yes. Let me explain: We have recently seen significant dynamics and

a consolidation process in our market. Our main competitor Wolverine acquired another competitor, MSC. Only a year later, Wolverine was acquired by ITT.

KN: How does this change the game for you?

ES: We do not think that our game has changed very much, but of course we are a stable factor in a market that has seen quite a few surprises lately. We expect that our customer focus, our flexible manufacturing technology and our undivided attention on our niche in the value chain will generate further growth for us particularly in this market environment.

KN: KLINGER Switzerland also has a certain duality: On the one hand, you provide products to your customers and partner companies, on the other hand you also have ambitious ongoing R&D projects.

ES: That is correct. A main focus in our R&D work is on surface structures, coatings and rubber mixtures. All our projects are about fine-tuning the properties of our Polystrat materials. Our different materials may look more or less the same to someone not familiar with braking technology, but they actually have different properties which can provide critical customer value. These are actually high-tech materials. In our R&D efforts it is key for us that we have a well-equipped lab and we manufacture on equipment developed in-house. That said, our most important



A long history of industry expertise: Advertising from the 1940s.

success factor in R&D is our experienced and passionate team. We are not a large company, but we have everything we need for successful innovation in our field.

KN: Can you give us examples of your cooperation with different customers?

ES: NUCAP, for example, is a key strategic partner. They punch a staggering 2000 different types of shims and millions of pieces a year from our material. Our long-standing cooperation has really developed into a strategic partnership. Or take Brembo in Italy, which creates special brake pads for sports cars, such as Ferrari. Together with them, we are now launching Polystrat in different colors to increase recognition: For example in iconic red or silver for certain premium brands. So Polystrat is "nice to see" but also good for your ears and a smooth driving experience.



The laboratory for R&D and in-house testing

Automechanika 2016, the world's largest automotive after-market show, was a perfect platform to reinforce the strong and solid partnership that KLINGER and NUCAP already started four years ago. In the course of the show we saw that the technologies we had developed together – for example the silver-colored and branded NULOK shim or the texturized branded shim, were met with extremely positive feedback from our customers. This is a clear example of the power of KLINGER and NUCAP teamwork, which brings innovative solutions to the market. This has allowed both companies to become the benchmark among the independent aftermarket shim manufacturers in Europe."

Jose Luis Ciordia
NUCAP – Vice President
European Operations



Brake shim made of Polystrat TX produced by KLINGER Switzerland

KEEPING FOOD SAFE

KLINGER BV supports F&B



The Food & Beverage industry must comply with very strict legal and safety standards

 **At the start of this year, headlines across the world put the Dutch subsidiary of an international confectionary items manufacturer in the spotlight. The bad news: Pieces of plastic had been found in one of its products, triggering a wave of negative publicity, health concerns and a recall of the affected chocolate bar, spanning no less than 55 countries. As a result of this incident, regulators across the world stepped down hard on F&B manufacturers in an attempt to curb further incidents. In the Netherlands, KLINGER BV was there to assist its F&B customers.**

"In the F&B industry our customers have different concerns from those, for example, in the Oil & Gas industry," confirms Mark Garvelink of KLINGER BV, adding: "While safety is always a paramount issue, it also covers packaging and production installations to not endanger human health in any possible way." While this seems obvious, it means that F&B manufacturers have to pay extra attention during every single production step in order to avoid a situation such as the one described above.

Legislative compliance

In the Netherlands, two major regulations govern the relevant measures regarding food safety. The NEN-EN 1935 and the directives of the FDA. As product related regulations, they cover the materials permissible for use in F&B installations. Following the chocolate bar recall incident, production methods as well as the traceability of a product's origin now also interest the various regulators a lot more than in the past. "As a responsible company, we acknowledge these trends in the F&B industry," states Mark Garvelink, and adds: "KLINGER BV,

however, is not only there to support its customers – we have gone the extra mile and erected a clean production area."

Coming clean

KLINGER BV's new clean production area meets all the requirements of the regulators regarding the utilization of gaskets in F&B production processes. This includes compliance with the aforementioned NEN-EN 1935 and, as the gaskets are also produced in accordance with the Commission Regulation EC 2023 – which governs good manufacturing practice for



Challenge for F&B products

- » Compliance with legal standards: FDA, EU, ISO
- » Exposure to high-temperature steam
- » In contact with different system media (e.g. milk > milk fat, cola > phosphoric acid)
- » Subject to aggressive cleaning regimes (CIP – cleaning in process, SIP – sterilization in place)

materials and articles intended to come into contact with food – KLINGER BV's customers can also have their flange management certified on the basis of ISO 22000, the international food safety management standard. "In times of major uncertainty regarding production safety, the ISO 22000 certificate helps our customers to send a strong signal," believes Mark Garvelink, "it clearly conveys that the certified company takes food safety seriously and is undertaking every possible measure to ensure that its products are not only tasty, but also produced in accordance with the highest quality standards."

"Clean" gaskets

"KLINGER offers a wide range of gaskets which meet both customer and regulator demands," comments Mark, "in essence, these are our KLINGER

Quantum, top-chem and soft-chem offerings." Manufactured under clean production area conditions, these gaskets stand out due to their characteristics, which are specifically tailored to meet the requirements of the industry.

- » KLINGER Quantum is a material featuring excellent sealing traits on food lines. Able to perform significantly better at higher temperatures than any comparable fiber gasket material, it offers excellent temperature and chemical resistance.
- » The KLINGER top-chem range, comprising the variants 2003, 2005 and 2006, stands out due to its excellent chemical resistance to alkaline and/or acidic media as well as due to its mechanical properties displayed in low to medium temperature conditions.

» KLINGER soft-chem is easy to cut and install. Requiring only a low compressive load to seal on all flange materials, it is ideal for a wide range of applications. These include lid seals, general chemical processing, and sensitive flanges as well as corrosive and aggressive media.

F&B Expertise

And KLINGER BV's rapid response to the changing conditions in the national F&B industry has already paid off: A major Dutch beer producer has just completed a full gasket standardization project which featured the full scope of KLINGER Quantum and KLINGER top-chem 2003 gaskets. A large national candy manufacturer, on the other hand, has recently implemented a large-scale optimization project, which includes flange management and the standardization of F&B-approved gaskets in the form of KLINGER Quantum. Furthermore, employee training has also been initiated to ensure that not only are the correct gaskets employed, but that they are also installed correctly. Mark Garvelink: "As an industry expert for the F&B sector, it is important for us to stay abreast of the latest developments. By listening to the requirements of the regulatory bodies as well as those of our customers, it is our job to come up with solutions that help to meet the requirements of both sides. And this is precisely what our clean production area and our products do."



KLINGER BV's clean production area meets all food & beverages compliance guidelines

SENTRY DUTY

KLINGER UK revolutionizes leakage testing



 **Leakages and ill-assembled flanged connections are a daily concern for both offshore and refining industries. Possible implications include additional reinstatement, production loss, monetary losses, damage to assets, harm to employees and environmental consequences. Operators and engineering houses have been left with limited options for ensuring the integrity and safety of bolted flange connections – until now.**

Traditional leak testing of pipelines, valves, vessels and associated equipment involves flooding a section of pipe with a medium, typically nitrogen, and inspecting each bolted flange connection for leaks. This time-consuming and costly service requires multiple processes including blanking-off sections of pipe, flooding the line with large volumes of costly test media, pressurizing and inspecting each individual connection.

Know your customers

"As an industry expert, we understand the importance of adapting to current market conditions and at the same time continuing to develop safe, innovative and commercially beneficial sealing

solutions. Among our customers there is an increasing demand for a fast and cost-effective alternative to the process of nitrogen testing," confirms Mathew Craggs of KLINGER UK. With their latest solution, known as the KLINGER Sentry Gasket, Mathew and his colleagues in Bradford have not only listened to their customers, but have also delivered a unique service offering.

The KLINGER Sentry Gasket adheres to the principle of reverse integrity leak testing. This technology enables leak testing to be carried out on individual jointed connection is achieved prior to full system pressure testing. Having the ability to ensure a safe and leak-free flange connection prior to a mandatory full system pressure test in a timely, safe and commercially beneficial way is the reason for the KLINGER Sentry Gasket and reverse integrity solutions. So how does the solution actually work?

Install, connect, test

Simplicity and safety are the design building blocks for the Sentry. A trusted concept with the addition of technology-led and customer-focused improvements. Based on industry feedback, we have taken an original

concept and made customer-focused changes to the design, eliminating design concerns and improving installation ability.

Designed around proven sealing technology, installation of the Sentry is no different to that of current Raised Face or Ring Type Joint gaskets utilizing best practice assembly procedures. The Sentry incorporates an annular from which the test medium (nitrogen or hydraulic oil) is pumped through the integral test port. The simplicity of the design enables the fitter to connect a KLINGER test plug to the gasket and attach a hose fitted to the test pump or nitrogen bottle. Once installed and the test plug connected, the operator can simply pressurize the unit and monitor the seal's integrity on the pressure gauge connected to the test pump or nitrogen bottle.

World of benefits

What does this effectively mean for the operator? First, it speeds up leakage testing and therefore reduces plant downtime. Just a comparison: Nitrogen-testing can take up to several days during which a shutdown-state has to be maintained. Next to speeding up leakage testing and thus reducing plant



The Sentry Gasket: Saving time, costs and material in leakage testing

downtime, utilizing the Sentry Gasket also significantly minimizes the required volume of testing media, thus again saving the operator money. During installation, the Sentry validates the individual joint integrity, reducing the need to revisit the joint. Last but not least, in the event of leakage, only one visit to the flange is required to adjust and test it.

The KLINGER Sentry Gasket is available in two designs: The KLINGER Sentry RTJ, as the name suggests, can be used in ring joint flanges. It features a heavy-duty build and is able to withstand high pressures. Primarily used in offshore and high-pressure applications KLINGER can manufacture the Sentry RTJ in materials to suit any application from their Bradford operation.

The KLINGER Sentry DS, on the other hand, is a composite gasket, which has a serrated metal core with a soft facing material. Based on Maxiprofile, it is designed for use in raised face flanges.

Introducing the KGIT

As the increasing amount of corporate "zero harm" initiatives show, companies are taking their measures to reduce

work-related injuries to a minimum very seriously. No wonder, apart from keeping employees from doing their job – sometimes over weeks or months, they also reflect badly on the image of the employer. In some areas, avoiding work-related injuries is easier than in others. In subsea operations, for example, injuries to a diver's hands can happen fairly often and, due to the dimensions of the objects that have to be shifted and inserted, taking extra care is never a simple task. Aware of this dilemma, KLINGER UK has developed the KLINGER Gasket Insertion Tool. It allows for the safe and precise insertion of a KLINGER Sentry RTJ Gasket between two flanges. This is made possible by multiple features: On the one hand, the profile has been specifically designed to ensure that the gasket sits correctly in the groove. On the other hand, well-positioned holes simplify standard subsea tooling, making the KGIT a valuable aid for subsea transportation and fitting. In practical application, this leads to improved make up times, and thanks to the insertion via the handle, increased safety. Following installation, the handle can be broken off without effort, thus providing access to the Sentry test duct and the tag can be retained for records. The insertion tool around the

gasket, which has the sole purpose of ensuring correct and safe installation, subsequently corrodes away by means of a cathodic reaction as a result of immersion in salt water.

“With the KLINGER Sentry Gasket and the KLINGER Gasket Insertion Tool we continue our tradition of quality and innovation. Understanding our customers is vital for our business. Knowledge of their businesses, processes and requirements provides us with a sound starting point for engineered sealing solutions and services. These are perfect factors for KLINGER to demonstrate the benefit of customer focus and business excellence.”

Mathew Craggs
Technical Sales Manager
KLINGER UK

HOT TOPIC

KLINGER Fluid Control realizes solutions for district heating



A look at the new combined heat and power plant "Niehl 3" in Cologne

Customers around the world value the **KLINGER Group's global distribution network**. Thanks to this setup, the family-run enterprise is able to offer products, services and solutions wherever required. Furthermore, clients are able to benefit from the know-how that each of the **KLINGER companies contributes to the Group as a whole**. **KLINGER Fluid Control**, for example, is the specialist for the manufacturing of industrial valves. With its flexible processes and production technologies, it supports customers in the fields of district heating, steel, chemicals and the paper industry as well as refineries. And it is now helping to realize two impressive projects in the energy sector – in Cologne and Berlin.

As a city-hopping destination, the North Rhine-Westphalian city of Cologne is well-known for its sights. These include, for example, the Cologne Cathedral, the Hohenzollern bridge and the Ludwig museum of modern art with its large collection of works by Pablo Picasso. Less known to the tourist is the fact that Cologne is also Germany's fourth-largest city with regard to its size. Needless to say, a city of this magnitude faces numerous challenges when it comes to providing its citizens with energy. In order to remain competitive and as energy-efficient as possible, German utilities are continuously improving their quality and

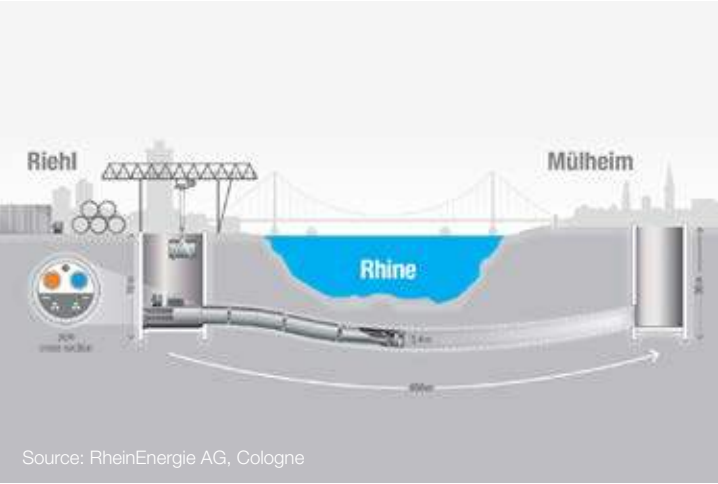


Illustration of the new pipeline under the Rhine to ensure the supply of electricity and district heating for Cologne.

security of energy provision by investing into new projects, such as for example the erection of the combined heat and power plant (CHP) "Niehl 3".

Going under

Cologne's new CHP, constructed by the energy supplier RheinEnergie AG, is named after its location, Niehl harbor. Next to supplying up to one million households with electricity, it will also provide 30,000 additional households with district heat. And the work surrounding "Niehl 3" is well on its way to becoming a tourist attraction itself – thanks to the impressive engineering and construction activities required to add it to the distribution network. As a

city, Cologne is divided by the Rhine. In order to provide the districts on the far side of the river with heating, a district heating tunnel was built more than 30 years ago. With "Niehl 3", a second such tunnel is now being completed to create a district heating ring, consisting of the nodes downtown Cologne, the district of Deutz as well as the west and north of Cologne, located on the other side of the river.

Meet "Marion"

Drilling a tunnel under one of Germany's major rivers is not a trivial matter. In order to complete the excavation as quickly as possible and to ensure precision work, RheinEnergie AG employed the

tunnel drilling robot "Marion" for the 650 meter tunnel, which is located approximately ten meters below the bed of the Rhine. In total, it took "Marion" 960 hours of non-stop work to reach the other side. In order to stabilize the tunnel walls, massive reinforced concrete pipe segments were pressed into the excavated space. Each segment has a width of 3.4 meters, is 4 meters long and 30 centimeters thick. In addition to two DN 700 district heating pipelines for flow and return, a gas pipeline as well as conduits for 110-kV high voltage and fiber optic cables will be pulled in.

Expertise acknowledged

In the course of the construction of the new district heating tunnel, KLINGER Fluid Control's German sales team was able to win RheinEnergie AG's Europe-wide tender for district heating shut-off valves and was subsequently awarded the order at the beginning of this year. The scope of supply consists of KLINGER Ballostar® KHSVI VVS DN 400 to DN 700, PN 25 shut-off valves. The DN 700 variants will be used as the main shut-off valves on both sides of the river Rhine, the smaller dimensioned ball valves, i.e. DN 400 to 500, will be installed in the district of Mülheim. Upon its completion, "Niehl 3" will provide an electric output of 450 MW and up to 265 MW of thermal heating. Connecting the new CHP to Cologne's distribution grid will furthermore significantly increase the city's security of supply. Last but not least, the new CHP is also important with regard to Germany's ongoing energy transition – it will provide backup whenever the renewable forms of energy are no longer able to cover the city's energy demand.



Transportation of a 12 t district heating pipe including a KLINGER Ballostar® KHSVI

Vattenfall Europe Wärme AG and KLINGER Fluid Control: Big in Berlin

Our second energy sector project takes us northeast of Cologne, literally to the other side of the country, to Berlin. Historically, East Berlin has been supplied with district heat from the cogeneration plants Lichtenberg and Klingenberg since the 1970s. In 2010, following decades of reliable service, the energy utility Vattenfall Europe Wärme AG took the power generation plant in Lichtenberg off the grid. Since then, the utility has only operated heat generation there.

Clean cogeneration for the capital

In order to continue to supply the east of Berlin with electricity and district heat, Vattenfall is erecting a new combined heat and power plant (CHP) in Marzahn-Hellersdorf, one of the capital's boroughs. In December 2015 it was announced that Siemens would act as prime contractor for the construction of the new CHP. Upon its completion, the plant will be fuelled by natural gas, which burns without residuals and barely sets sulfite dioxides and particulates free. Furthermore, thanks to its coupled generation process, this natural gas-fuelled CHP achieves a high level of overall efficiency. At the same time, the waste heat of the power plant serves to supply district heating, resulting in a fuel

energy utilization ratio of up to 90 %. Overall, this approach leads to lower CO₂ emissions and a significantly more efficient handling of fossil resources.

Long-term partnership

KLINGER Fluid Control's activities at the Marzahn-Hellersdorf construction site go back to the year 2012. In August of that year, our industrial valves expert provided the first KLINGER DN 1000 valves ever utilized for district heating in Germany. Continuing their partnership, the company supplied two KLINGER Ballostar® KHSVI ball valves DN 1000, PN 25, for the district heating extraction of the gas and steam turbine plant in July of this year.

Perfect fit

The project, for which it is still "early days", is scheduled for completion in 2018. At this stage, however, Vattenfall Europe Wärme AG has already undertaken significant measures to guarantee that the new CHP will be a success: Choosing Marzahn-Hellersdorf as the site for the plant, for example, ensures that existing infrastructure, such as the natural gas and electricity connections as well as the district heating route can be utilized. This should also contribute to reducing the required construction time of the plant. At the same time, no longer required parts of the old facility have already been removed, including a 160 meter tall chimney, which was highly visible even from a great distance. The cleared space is now being used for the new construction.

Needless to say, a modern plant should also fit into its surroundings: For this purpose, a Europe-wide architecture competition was launched. It will now be up to the winners, the architecture offices h4a Gessert + Randecker mit Glück Landschaftsarchitektur to ensure that "Marzahn-Hellersdorf" is not only good for the environment, but also for Berlin's skyline.

OF PANDAS AND BEACHES

BASF in China relies on KLINGER Schöneberg



Delivery of KLINGER Schöneberg ball valves for BASF Shanghai

BASF, the largest chemical producer of the world, has its headquarters in Ludwigshafen, Germany. Active with subsidiary companies and joint ventures in more than 80 countries, the group operates almost 400 production sites in Europe, Asia, Australia, the Americas and Africa. The customer base of BASF is similarly global, and spans 200 countries. In China, BASF has teamed up with KLINGER Schöneberg to

complete two major undertakings: The projects "Giant Panda" and "BEACH II".

Apart from its size, BASF is noteworthy in many different regards. Founded more than 150 years ago in 1865, the company, for example, discontinued its production of consumer products in the 1990s and has since then focused exclusively on industry customers. A less known fact, and something BASF has thankfully not dis-

continued, is its wine selling activities at Ludwigshafen which cover more than 800 fine wines from all over the world and which date back to 1901. While not quite that lengthy, KLINGER Schöneberg's cooperation with BASF has already spanned 50 years. And it was further enhanced this year after the Ludwigshafen-based company named our colleagues one of their Main Valve Vendors (MVV). Following the announcement of two major projects in Shanghai – "Giant Panda" and "BEACH II", KLINGER Schöneberg will now also be supporting the company's subsidiary in China.

Power of the Panda

The "Giant Panda" project was announced in December 2015 after the Asia-Pacific region had been identified by BASF executives as the company's fastest growing region for base metals and custom catalysts. Within the various production processes, these catalysts are mainly used for olefin production as well as for the removal of impurities, fatty alcohols, sulfuric acid and butanediol.



"BASF has been a long-term partner of KLINGER Schöneberg in Germany and with the MVV agreement, we also support BASF directly in Asia with our products and expertise. Asia was and still is an important market. Each project in this region enriches our expertise for this market as well as for other customers."

Manfred Gossmann
Managing Director
KLINGER Schöneberg

The corresponding catalyst production plant, which is being erected at the Caojing Chemical Industrial Park in Shanghai, is scheduled for completion in the fourth quarter of 2017 and will create 75 new jobs. After commissioning, the "Giant Panda" will produce basic metal and customized catalysts as well as adsorbents to meet the rapidly growing demand in China and Asia. Featuring energy-efficient systems as well as a high degree of automation, the plant will not only allow BASF to further expand its activities in terms of factory space, but will also be able to flexibly adapt to future customer requirements.

In order to ensure an optimal operational flow, KLINGER Schöneberg has been awarded an order to supply various ball valves from the INTEC K-series, including 2-piece flanged ball valves, multiple-way ball valves, tank bottom ball valves as well as piston bottom and PFA-lined ball valves. Delivered in the sizes NPS 1" up to NPS 8", the ball valves will be utilized in the pressure classes 150 to 300 and within a temperature range of -29 °C to 400 °C. A total of 633 valves will be delivered for soft and metal-seated sealing systems.

On the beach

"BEACH II" is a project initiated by BASF Shanghai Coatings, which was established as a joint venture between BASF Coatings and the Shanghai Huayi Fine Chemical Co., Ltd. in 1995. A total sum of 145 million euros is being invested to erect a new major plant on the premises of the company at the Shanghai Chemical Industry Park in Caojing / Shanghai. Following its completion, which is scheduled for the fourth quarter of 2017, the new plant should increase the automotive coatings capacity of the joint venture by an additional 79,500 tons per year. According to BASF, these further investments at their Shanghai production site will meet the increasing demands of their Chinese OEM customers regarding innovative and environmentally efficient coating solutions. Furthermore, BASF stated that this step was in accordance with the company's overall strategy to expand in parallel to the growth of the automobile industry, while at the same time strengthening their presence at the business locations of its customers. In addition to the new plant, BASF is already operating a site for resins and cathodic e-coating at this business

location, which will allow for future synergies between these two plants.

Awarded a contract for the delivery of a total of 838 valves, KLINGER Schöneberg has been called upon to support the successful completion of the "BEACH II" project. The ordered valves all belong to the INTEC series, specifically the models K200, K210, K410 and K500. The delivered sizes will range from NPS 1" up to NPS 6" and are intended for the pressure classes 150 to 300. The temperature range within which the valves will have to provide excellence "trusted. worldwide." has been specified as between -29 °C and +220 °C. Following delivery, the valves will ensure optimal leakage protection in soft-seated sealing systems.



The INTEC K-series

REUNION

The KLINGER Sealing Conference in Baden



An international group of participants attended this year's Sealing Conference in Austria

From May 23 to May 25, KLINGER Dichtungstechnik invited its business partners to the annual international Sealing Conference in Baden, Austria. Focusing on bringing everybody up-to-date within the Group, the three-day conference offered a wide range of workshops and presentations held by members of the family from all over the world.

What do KLINGER Switzerland, Thermoseal (USA), Kempchen (Germany), KLINGER The Netherlands, KLINGER Germany, Ruml (Czech Republic), KLINGER United Kingdom and Bartsch (Germany) have in common? Two things: They are all part of the KLINGER Companies spanning the globe. And they were all

present at this year's KLINGER Sealing Conference in Baden, Austria.

Created as a distributor conference, the event has a wide range of functions: On the one hand, it serves to keep the various members of the KLINGER family up-to-date regarding the latest developments. This includes the introduction of new companies, such as for example this year's Thermoseal company presentation, provided by its Managing Director, Scott Peters. On the other hand, it also introduces the attendees to new products and solutions, such as for example version 6.0 of the KLINGER®expert gasket calculation software, which was subsequently available for hands-on and extensive training in the course of a

workshop. Last but not least, the Sealing Conference also serves as a platform for sharing knowledge, networking, exchanging ideas and voicing requests.

Common ground

The result of one of such request was presented at this year's conference: In order to better reach its audience, i.e. the customers who rely on KLINGER's products and solutions, the product data sheets of

KLINGER Dichtungstechnik have been reworked. Featuring the distinctive new KLINGER corporate design, they offer a clear and concise overview of the various product characteristics as well as information on the specified areas of application. Making use of this new standardized format, clients can quickly find the exact product tailored to their needs.

Another fact that became evident in the course of the Sealing Conference is that KLINGER is and remains the undisputed market leader with regard to static seals. This was underlined by a number of presentations, which highlighted the industrial expertise of the companies Bartsch, KLINGER Switzerland and UK as well as



Baden in Lower Austria is located near Austria's capital, Vienna, and KLINGER's headquarters in Gumpoldskirchen

Kempchen with regard to a wide range of sealing materials, including soft sheet, graphite and metal seals. One aspect which was apparent throughout the entire Sealing Conference was the openness, with which the various topics were discussed. While success stories were without doubt celebrated, talking about lowlights or areas in which the Group still needs to improve was also achieved in a frank and cooperative manner.

Something for everybody

Next to an interesting and diverse agenda, which also covered topics such as

material test certificates, manhole and rubber steel gaskets as well as further company presentations, the around 50 attendees were also treated to an accompanying program: Due to venue's proximity to the KLINGER headquarters, they also had the opportunity to visit the factory in Gumpoldskirchen and gain valuable insights into the production processes here in Austria. Speaking of Austria, a trip to the heart of Europe could never be complete without visiting a "Heurigen". Offering locally produced food and fine wine, these special restaurants are a unique part of Austria's national gastronomy. And, according to the feedback received by the participants, rightfully so. Looking back at the conference, Christoph Klinger-Lohr, Managing Director of KLINGER Dichtungstechnik, stated: "The three days of the Sealing Conference were without doubt packed to the brim with different

topics and therefore quite challenging for our participants. I also believe it is safe to say that everybody profited from being here and I would like to use this as an opportunity to thank all our speakers and participants for their valuable and interesting contributions – be it in the form of presentations or in the subsequent discussions on the topic."

New responsibility

Staying on the topic of sealing, it is also our pleasure to inform you that Christoph Klinger-Lohr has been elected Vice Chairman of the Flange Gaskets Division of the European Sealing Association (ESA). Established in 1992, the non-profit trade association ESA represents the manufacturers and suppliers of sealing devices and materials. Its members make up the majority of the sealing industry in Europe. With regard to its goals the ESA has committed itself to the following: The development of appropriate standards, legislation as well as sealing technology which meets the association's commitment towards safety, energy efficiency and environmental protection. We wish Christoph Klinger-Lohr all the best for his new position!

GUARDIANS OF THE WIND

KLINGER Germany keeps wind turbines in peak condition



Talk to any European energy sector expert and you will almost certainly end up discussing the so-called energy transition. Spearheaded by countries such as Germany, it entails a switch from conventional forms of energy to generation via renewable sources such as biomass, wind, solar and hydro power. At present a lot of questions remain unanswered, for example when and how to retire existing base-load power plants or what can be done to increase energy storage levels. Whatever the outcome, KLINGER Germany is making certain that wind turbines, which already make up more than a third of the country's renewables mix, will remain both safe and operational.

With their sedately rotating three blades, horizontal-axis wind turbines remind us of gentle and fragile stick-like giants, standing together and gazing out into the open landscape. Wind turbines mostly feature a uniform design, comprising the upwind rotor with the blades and the nacelle,

which houses the generator and the low-speed shaft. Last but not least, we have the tower, which enables the wind turbine to harness the wind at its lofty summit. And while both the nacelle and the different rotor designs are without doubt impressive feats of engineering, today we are more interested in the tower and how KLINGER Germany is keeping this vital component in top condition.

Seen from an economic point of view, the tower represents between 15 and 25 % of the total wind turbine cost. Made of steel, these towers consist of individual steel plate segments, which are cut, rolled and then longitudinally welded. Depending on the manufacturer and the intended height, the sections feature a length of 15 to 35 meters and are fitted with a flange on both sides. During construction at the actual site of the wind turbine, these segments are combined and the flanges screwed together. So far, a very straightforward approach – so where does KLINGER Germany come in and what is it contributing to the success of alternative sources of energy?

Strength and weaknesses

Next to the actual investment cost, plant operators around the world also have to keep a close eye on the lifecycle costs: Maintenance means downtime, and downtime means loss of income. In other words, the longer a facility stays in operation due to the durability and quality of its components, or if a longer production halt can be avoided through timely and targeted maintenance, the better the result for the operator and his customers. And in this regard, wind turbines have to be able to withstand a great number of challenging conditions: These include, among others, storms, rain, snow, intensive solar irradiation, temperature changes, wind pressure and torque. Furthermore, if they are installed offshore or in coastal areas, salt water and salt-laden air are also factors that have to be taken into account. The obvious counter-measure is to treat the exposed areas with substances that protect against corrosion. This approach, however, has a weak spot: It cannot include the flange surface, as the protective coating would subsequently shatter as a result of the applied

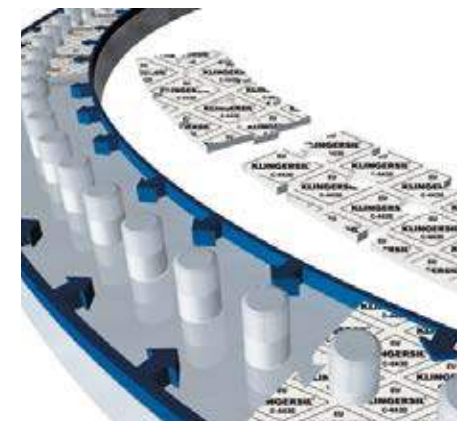
KLINGER® KNS WE:

- » Modular sealing components for individual material selection and tailored application
- » Load bearing ring in segments
- » Ideal for major contact pressures as overpressuring the elastomer sealing ring is impossible
- » High resistance against additional forces and pressure surges
- » Cost-efficient due to reduction of transport volume

forces. Manufacturers have in the past argued that the plane parallelism of the flange surfaces and firm screwing not only represents a force-locked, but also a sealed connection. At this point anybody who has ever worked in major pipeline construction is bound to raise an eyebrow. And rightfully so. Because experience has shown us that no flange is ever plane parallel enough and sufficiently free of forces to be tight without an integrated seal. And in the case of the tower of a wind turbine, this is of great importance as water, in the form of rain, snow, condensed and salt water or spray unerringly finds its way into even the smallest cracks and leads to corrosion between the flange surfaces. The implications for the operator are clear: The wind turbine's total lifecycle is reduced, complex and lengthy corrosion removal becomes imperative. Enter KLINGER Germany.

Expertise across industries

Working with their generation and industry-spanning expertise in ensuring that all types of media-transporting lines remain tight, KLINGER Germany closely analyzed the corrosion-related phenomena occurring in wind turbines. As the challenges encountered are similar to those found in pipeline construction, the company quickly focused its research on compression-stop joint connections. The result: The development of the KLINGER KNS WE – specifically designed for wind turbines.



KLINGER KNS WE – Mounted parts on the flange

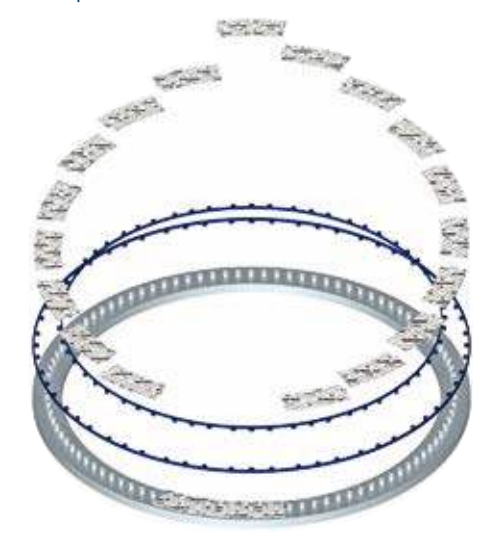
The load bearing ring is delivered in segments. Together with the two single-piece elastomer sealing rings, these segments are subsequently connected via "puzzle" or "jigsaw" connections. As standard, KLINGER KNS WE gaskets are manufactured from KLINGERSIL®C-4430. This material is ideally suited to handle static and dynamic forces occurring in wind turbines, such as for example the weight of the nacelle and the rotor blades, or bending moments caused by the wind.

Within the tower flange, two elastomer sealing rings take over the sealing function. In terms of design execution, these sealing rings are thicker than the load bearing ring. During bolting, they are subsequently compressed to the thickness of the load bearing ring. Based on this design principle, the sealing rings are able to withstand even major forces.

Reliable & easy to install

This execution offers a wide range of advantages: The load bearing ring is capable of distributing the applied forces and can simultaneously withstand very high contact pressures, while the elastomer gasket elements ensure tightness to the atmosphere. Furthermore, the volume and cost of transportation are reduced as all elements always fit on a Euro-Pallette (and the gasket can even have a diameter of 8 m). Only one or two workers are required to install the gasket and no further tools are required. Ultimately, it achieves a highly stable flange connection and can handle contact pressures of up to 250 MPa while simultaneously ensuring tightness and limitation of the forces applied to the elastomer profiles. Summed up, these characteristics greatly increase the longevity of the ring.

With the KLINGER KNS WE operators can now rely on their wind turbines passing the test of time and withstanding the elements they are exposed to. And while this may not solve the unanswered questions of the energy transition, KLINGER Germany's revolutionary approach to keeping wind turbines in operation will ensure that everybody can continuously benefit from the power of the wind – consumers and producers alike.



The segmented load bearing ring for easy assembly

THEN AND NOW

Our Portuguese water-experts



The KLINGER Portugal team in Porto

 **Water. One oxygen atom, two hydrogen atoms – a very basic chemical formula. And it provides no calories or organic nutrients. Life on Earth as we know it, however, could not exist without this transparent fluid which covers around 71 % of our planet's surface. Next to its role as a life-giving substance, water also plays an important role in human affairs: In the form of irrigation water for crops, in sanitation and as a solvent for chemicals in industrial applications, in industrial cooling or as a transport medium. And the demand for water, either as potable or as process water, is constantly on the rise all over the world – which is why water expertise, provided for example by KLINGER Portugal, is essential.**

Every new beginning comes from some other beginning's end. As is often the case in economic life, the history of KLINGER Portugal has a lot to do with changing economic conditions and the willingness to seek new opportunities: In the 90s, Valadas, a 140-staff strong company with five branches, many years of experience and associated with the

KLINGER Group, was no longer able to cope with the economic changes brought about by the country joining the EU in 1986. The company slowly faded away and KLINGER Portugal, the spiritual successor, was born into these troubled times. Being part of a network of companies, however, ensured that KLINGER Portugal received support from other members of the KLINGER "family", first and foremost from its sister company SAIDI in Spain. Profiting from the experience and know-how of their Spanish colleagues, KLINGER Portugal went on to acquire its own valve experience in refinery and EPC projects. At the same time, suppliers such as Saunders or Orbinox helped the young company to gain a foothold in the chemical, the mining and the pulp & paper industry.

Waterworld

In the mid-nineties, Portugal's market saw a steady increase in water tenders, dealing mainly with the construction of potable and wastewater treatment plants. For KLINGER Portugal this represented an opportunity to build up a reputation as an industry expert for the water and wastewater field.

With success: In 1995, the colleagues from Portugal were awarded their first important project by SOGEA, a Paris-based company with a strong operational base in Africa. Projects won by KLINGER Portugal included the wastewater treatment plants "Etar do Freixo" in the north of Portugal, the "Etar do Barreiro", as well as the waterworks "Eta da Boavista" and "Eta de Maputo" in Mozambique. For these projects, KLINGER Portugal provided a wide range of products, such as penstock, knife gate and butterfly valves as well as rubber seated gate valves and actuators.



Water treatment plant "Eta da Boavista" project Efacec Engenharia e sistemas



Water treatment plant "Eta de Maputo" Project Efacec Engenharia e Serviços

Having established itself as a high-quality supplier of valves and actuators for the industry, KLINGER Portugal sought new opportunities to put its in the meantime substantial and wide-ranging experience to good use. This approach paid off five to six years ago, when the company was able to win the "Ervidel" and the "Canal do Sado" tenders. While still a "player" in the waterworks and wastewater treatment field, the company was now able to add irrigation, pump station and water distribution expertise to its list of references.

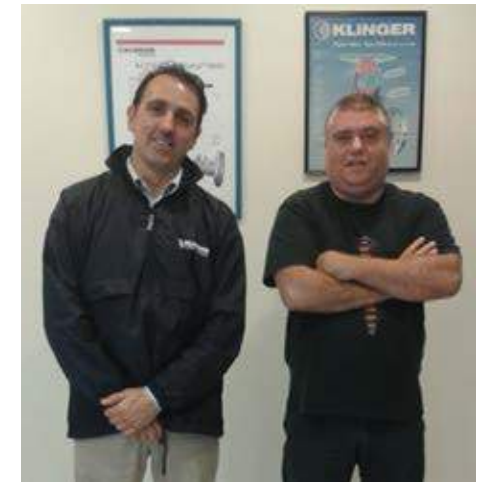
The water challenge

Jesús Sánchez, Managing Director of KLINGER Portugal, had the following to say about the water business: "In the water business, we have to make our customers, usually a constructor or an EPC company, interested in us as a supplier. In order to actually win the project, we require the end customer's authorization. In most cases this an administrative body, which has to approve our products. Our high-quality portfolio, certificates and expertise help a lot in this regard. KLINGER KGS rubber metal gaskets are very much in demand for irrigation projects as we offer excellent large-scale solutions. And we are also quite successful with penstock and knife gate valves, butterfly valves, stop logs as well as mechanical joints."

Bearing in mind its humble beginnings around 20 years ago and its subsequent transformation from a typical industry supplier to a provider of water solutions expertise, there is one thing we can say that is certainly true for KLINGER Portugal: This is a company which has not been afraid to redefine itself. Jesús Sánchez: "I am very proud of the achievements of my colleagues here at KLINGER Portugal. Personally, I believe this has a lot to do with the right mindset and being able to think outside the box. Amongst others, KLINGER is, and always has been, an expert in fluid control solutions. Our approach in Portugal has been to embrace this expertise and focus it on a certain fluid – water. And in the future the importance of the water business will even increase more due to climate effects."

Setting the standard

Although KLINGER Portugal has also enjoyed international success, this is actually the exception rather than the rule in the European water business: Each country has its own standards and legislation for materials and products coming into contact with drinking water. As explained above, manufacturers have to go through a different approval procedure for each country, which is neither efficient, cost-effective and it certainly does not reduce administrative efforts. Interesting in this regard is the fact that this is actually in violation of the



Team Lisboa Branch

fundamental principle of the free market cherished by the European Union.

As a member of the European Sealing Association (ESA), KLINGER Dichtungstechnik has initiated a motion to work on harmonizing the market standards for drinking water. With success: The ESA members are now joining forces under the lead of the ESA's Director for legislation to achieve a common European standard or even mutual recognition. "ESA attended the latest meeting of the newly named European Drinking Water (the former Industry Consortium for Products in Contact with Drinking Water – ICPCDW) on July 1," confirms Stephan Piringer, R&D Head at KLINGER Dichtungstechnik, adding: "From our point of view, this is definitely the correct group for ESA to be involved with, as they are very active with the TC 164 committee – which deals with questions regarding safe water supply, products that come into contact with water as well as water treatment." At present the EDW is focusing on plastics used in drinking water. The next meeting on November 4, however, is scheduled to also cover elastomers and polymers. Stephan Piringer: "Furthermore, ESA is also pushing for mutual recognition which might be more likely than the establishment of one common standard". The KLINGER News will continue to keep you posted on the latest developments.

NIGHTLIFE

KLINGER Argentina brings valves into shape



Buenos Aires by night



In our everyday life, we accept that having hot water, electricity and heat available around the clock is a given fact. We rarely find out what goes on in the background to ensure that we can switch the light on in the middle of the night, or are able to take a shower at 4 am in the morning before catching a flight to Paris. But what does it actually take to keep the pulse of a city beating day and night? KLINGER Argentina has the answer.

When speaking about the reliability and durability of valves in industrial applications, there are always three aspects that have to be taken into consideration: The first is quality. The second is whether the valves at hand meet the necessary requirements, i.e. the to be expected pressure and temperature ranges or types of media they will be exposed to. The third aspect, which may seem banal and obvious at first glance, is the correct installation of the valves with the right tools. It should,

however, not be underestimated. The 2003 study "Assessment of valve failures in the offshore and oil & gas sector", prepared for the UK Health and Safety Executive (HSE), comes to the conclusion that inadequate design and deficient materials make up 45 percent of the causes for valve failure. The second-highest "offender", responsible for 22 percent of all valve failures, is recorded in the survey as "lack of training / inexperienced staff". Initiatives such as EN 1591-4, which aim at providing the industry with certified personnel trained in the assembly of bolted connections of critical service pressurized systems, are already helping to reduce this rather alarming figure. Needless to say, some "black sheep" do remain, and the damage they can do is considerable – as KLINGER Argentina recently found out.

Third party, first-class problem

When our Argentinian colleagues were asked to visit the hydrofluoric unit of a major refinery in Buenos Aires, they

were unaware that the job at hand would literally result in a "sleepless night". The engineer in charge of maintenance at the plant explained that he had been using various sleeved plug valves from different manufacturers without problems for years. All of a sudden, literally over night, however, this had changed: Valves that had been in service for only a short period of time, were failing one after the other. Concerned by this sudden and severe drop in service life, he turned to the company with an excellent reputation not only for quality provided, but also for in-depth knowledge in their respective field: KLINGER.

Looking through the various maintenance logs together, the culprit was quickly identified: A third party had been contracted to conduct the latest round of maintenance and service and had, regrettably, done the facility a disservice. The valves found on-site had been repaired by people without the necessary expertise, the replacements carried out with inferior

parts and without the correct tools. KLINGER Argentina was subsequently provided with a valve for repair and testing purposes. The result: Three months later, the repaired valve was still functioning as expected with no premature failures.

Sleepless in Buenos Aires

Following this episode, Claudio Pacheco, Sales Manager at KLINGER Argentina was again contacted by the refinery he had recently visited. "Would you be willing to handle the repair of 35 sleeved plug valves during the turnaround period of the hydrofluoric acid unit" was the question. There was a catch, however. The valves would all have to be repaired and tested during the night and be ready for mounting first thing in the morning. Knowing that his company is always willing to go the extra mile, Claudio accepted the challenge. What followed can only be described as a controlled race against the clock. After shutdown of the HF unit, the valves were disassembled by KLINGER's technical staff and subsequently repaired. At 4:30 in the morning, the valve inspector was able to carry out the final leakage tests as per ANSI 598 and the HF unit went online without further delay or interruptions.

With this article, we hope to have conveyed an insight into what happens behind the scenes of city management. Refinery customers, among them the engineer in charge of maintenance at a certain hydrofluoric unit in Buenos Aires, know something else: What it takes to keep such a city running day and night, 365 days a year: It takes a reliable partner who has the necessary industry expertise, and it takes a company able to rise to the challenge. Somebody like KLINGER Argentina.



10:00 pm: KLINGER technical personnel disassembling an 8" sleeved plug valve



4:30 am: The valve inspector carries out the leakage test as per ANSI 598

RICHES OF THE EARTH

KLINGER Zambia supports African mining process plants



The mineral endowments of the Democratic Republic of Congo (DRC) and Zambia are well known, especially for their copper and cobalt content

Africa is blessed with tremendous natural sources and hosts about 30 % of the planet's mineral reserves. The continent is richly endowed with reserves of platinum, diamond, chromite, cobalt, phosphate, manganese, gold and bauxite. For copper and cobalt, Africa has the potential to significantly contribute to meeting the global demand in the medium to long term. This is mainly due to the high-grade copper-cobalt mineralization found in the geological structure called the Lufilian Arc, which runs across the territories of the Democratic Republic of Congo (DRC) and Zambia. To miners, this region is better known as the Central African Copperbelt. KLINGER Zambia is on-site to ensure that no sulfuric acid leaks occur at the mining process plants.

True to KLINGER's credo of providing expertise wherever the customer is, KLINGER Zambia's head office is located in the city of Chingola in the Copperbelt Province. Locally referred to as either "Copala" or "Kopala" in the native tongue, the province spans more than 31,000 km² and is home to around 1.6 million inhabitants. The term refers

to the mineral copper mined here and clearly shows the importance of the copper and cobalt deposits occurring in very large stratiform deposits throughout the province.

For David Halstead, in charge of business development at KLINGER Zambia, the hard work he and his colleagues have put in over the past two years since the formation of the company in 2014, is starting to pay off. Via a large South African contractor they have just been awarded a contract to provide a total of 4,200 full face gaskets for a mine in the Democratic Republic of Congo (DRC). "KLINGER

is trusted. worldwide." smiles David, "the Lufilian Arc of Zambia and the DRC are no exceptions in this regard." Unexpectedly, the climate in Chingola is rather mild, with temperatures rarely, if ever, exceeding 30 °C and rainfalls mostly at the start and at the end of the year. Of course, this says nothing about the conditions below ground, where the copper and cobalt deposits are mined.

Seeking copper

Copper is extracted mostly in the form of copper sulfides either through open pit or underground mining. On average, the ore features a concentration of less



The open pit mining operation at First Quantum Solwezi

than one percent copper. Various steps are required to separate the copper from its ores. This includes concentrating the ore, i.e. crushing it, a term known as "beneficating" in the mining business. Ultimately, two methods are in use to refine concentrated copper: Smelting or the so-called hydrometallurgical process. The latter involves the creation of an electrolytic solution by adding sulfuric acid to an organic copper solution. In the subsequent electrolytic process, the copper then plates out onto a cathode, which is why this technique is also referred to as electro-winning.

Needful things

And while the steps involved may seem complex and time-consuming, the results are well worth the effort. Copper is valued as a heat and electricity conductor, is resistant to corrosion and can be recycled. As a consequence, it is extensively used in manufacturing and construction applications as well as in the automotive and the energy sector. And the actual figures these areas of utilization equate to, are staggering: According to the March 2016 press release of the International Copper Study Group (ICSG), the global consumption of refined copper is expected to exceed 23 million tons in 2017, with China alone accounting for 45 % of the global copper demand.

Cobalt, on the other hand, is becoming increasingly valuable as an additive in rechargeable batteries and catalysts with a focus on environmentally friendly and renewable energy systems as well as in technological applications. And cobalt also has a long tradition in the Central African Copperbelt: According to the British Geological Survey, the Copperbelt deposits of the Katanga Province in the DRC were the top-producers of cobalt in 2005, holding a 40 % global share. Last but not least, cobalt is also in high demand in applications requiring both corrosion resistance and the ability to withstand high operating temperatures.

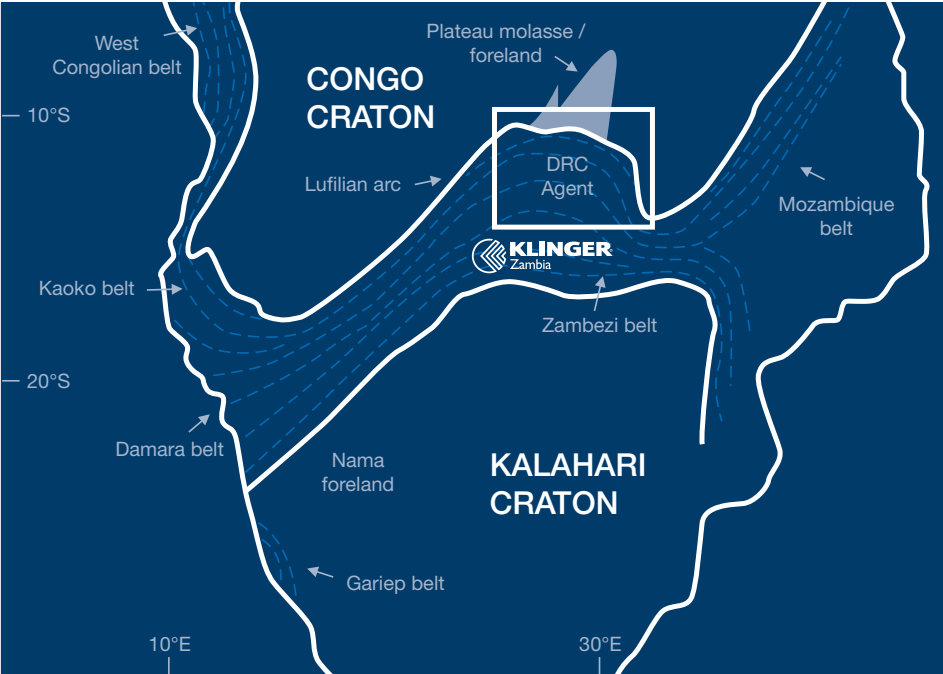
Enter KLINGER

Larger mining operations have recently established themselves in both Zambia and the DRC to take advantage of the rich sources of copper to be found here. And as the subsequent copper treatment process requires large amounts of sulfuric acid, KLINGER Zambia and its agent in the DRC contacted the operators to discuss the benefits of having an industry expert literally at their doorstep – on both sides of the border. "Looking at these new plant builds, particularly the acid plants, we quickly decided to offer our prospective customers PTFE alternatives from the KLINGER top-chem range," recounts David Halstead, and adds: "Having established business relations, we paid the mines daily site visits. I believe that this combination, i.e. a product specifically designed for the applications at hand and the certainty of having an expert a phone call away in the event of trouble, ultimately led to the success we are enjoying here." Another product offering provided by our Zambian colleagues to the acid plant operators is KLINGER SEALEX: Essentially a "gasket on a roll", it is highly versatile and has proved its worth time



A typical sulfuric acid plant in Zambia

and again as a quick fix maintenance solution. As an industry expert which puts the customer first, KLINGER not only looks to its own products for the ideal solution: "We have recently added a comprehensive range of PTFE safety spray shields for flanges, valves and expansion joints to our mining operator offering. These are manufactured by Drake Specialties," confirms David, adding: "At the end of the day our job is to ensure that sulfuric acid stays in the process and does not contaminate the environment. This is essentially what our expertise is for."



Both KLINGER Zambia and the DRC agent are situated in the heart of the copper country

PRACTICE MAKES PERFECT

The "Kempchen Praxistage" 2016



The visitors had the opportunity to visit the entire Kempchen site: From the laboratory ...

Established five years ago, the "Kempchen Praxistage" have in the meantime been recognized as a well-established expert platform for professionals. Attracting 300 participants from the industry and featuring high-profile guest speakers from all the fields, including authorities, universities and industry leaders, the "Kempchen Praxistage" are a must for all those wanting to keep abreast of the latest developments in the sealing industry. Held from June 15 to 16 at the Kempchen business location in Oberhausen, Germany, this year's installment of the "Kempchen Praxistage" did not disappoint, either.

"The strengths and weakness of various gaskets", "Evaluation of flange connections – gaskets in the new Pressure Equipment Directive", "ZERO HARM – Vision or reality": These were but a few topics covered in the course of the fifth "Kempchen Praxistage" held in mid June of this year. "As an industry

expert for gaskets, packings and compensators, we follow a dual strategy," confirms Klaus Schonebeck, Managing Director of Kempchen, and adds: "On the one hand, we provide our customers with state of the art products and solutions for their specific requirements. On the other hand, we see it as part of our mission to keep them up-to-date with the latest developments and to

enable them to exchange experiences and views with other industry leaders and decision-makers. And this is what the 'Kempchen Praxistage' are for."

Full attendance, full agenda

This year, the "Praxistage" reached a new record high in terms of its participants. 300 visitors were welcomed



... to manufacturing



Klaus Schonebeck opening the 5th Kempchen Praxistage



A full agenda with presentations ...

to the Kempchen business location in Oberhausen. Next to a wide range of presentations which also focused on topics such as practical applications of flange connections, an introduction to corrosion and an in-depth analysis of DIN EN 1591-1, i.e. flanges and their joints and the corresponding design rules for gasketed circular flange connections, the attendees were also

given the opportunity to tour the plant. "The feedback we have received from our participants is very good," says a visibly satisfied Dirk Schmidt, in charge of sales at Kempchen, and adds: "Some of our guests even went so far as to say that this was the best event they had ever attended in their 30 year-history in the pumps and valve business. Others have informed us that the quality of the

speakers was extremely good – the talk on DIN EN 1591-1 came up several times in this regard."

Key to success

Asked why he believes the "Kempchen Praxistage" are so successful, Klaus Schonebeck stated: "I think it is the mix we offer our customers and partners. Our speakers come from all parts of the industry. In this year, for example, we had major corporations such as HUNTSMAN and STREICHER Maschinenbau on board, complemented by the TÜV and the University of Stuttgart. And Rolf Limpert, even if he is no longer active, is a renowned expert when it comes to the DIN. In other words, the topics are addressed from all directions and include every possible point of view. And this is what makes the 'Kempchen Praxistage' unique."



... and also with time for networking and exchanging ideas

