

MANKENBERG

Firmly in control since 1885.
Looking forward to the future.

125 Years
1885 - 2010

Firmly in control since 1885.
Looking forward to the future.

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Dear Madam, dear Sir,

2010 is an historic year for us: it marks the 125th anniversary of our company. When Gustav Mankenberg founded the company in Heide in 1885, he laid the foundation stone for our current success.

Industrial valves by Mankenberg are used in a variety of industries across the world. Over many decades, we have expanded our manufacturing processes, developed innovative products and satisfied individual customer requirements, providing them with everything from our standard valves to specially customised solutions. In other words, we have made it possible to do things that once seemed impossible.

We want to use this landmark anniversary to present Mankenberg in all its glory. We are going to do this in an unusual way: instead of presenting the company's history in chronological order, each chapter will focus on specific themes. A continuous timeline

is located at the foot of each page of this anniversary brochure, which helps the reader to place the Mankenberg world in its overall historical context. Almost every chapter is complemented with specific examples of applications which show how our products are used in everyday life and across the most varied branches of industry.


In the following chapters, we will surprise you time and again with unexpected stories, exciting details and an eye for the larger picture. However, the main impression readers of this brochure will be left with is a feel for how interesting the world of industrial valves can be once you look into it in more depth. We hope you enjoy reading this brochure and discovering more about our work!

Axel Weidner

Axel Weidner
Managing Partner



Axel Weidner, 2010



Using tradition to shape the future

The German Empire, 1885. Gottlieb Daimler develops the first petrol-driven motor car to compete with horse-drawn carriages. While the Empire's trade with its colonies flourishes, the country itself is undergoing a dramatic change. The age of industrialisation, engines, electricity and machine construction has begun. The ideal environment for a valve expert with excellent ideas and superb business acumen: Gustav Mankenberg.



Gustav Mankenberg,
1922

An entrepreneur overnight

Gustav Mankenberg began his career as an entrepreneur in northern Germany, in the town of Heide, to be precise. The location was a smart choice for a foundry and workshop for manufacturing metal products. A number of sugar, oil and leather factories had been established in the Dithmarschen region of northern Germany around the middle of the 19th century. They were an obvious source of demand for metal fittings. With this in

the Gustav Mankenberg company on 1 May 1885, Gustav Mankenberg went from employee to entrepreneur with a keen instinct for the developments in the regional market. He was soon able to prove this. As more and more regional factories closed their doors in the following years, demand for the company's key products declined. With foresight Mankenberg expanded his product line: pressure reducing valves for air and carbonic acid tanks, air pumps and beer taps were all added to the existing line of bronze door and window fittings. A sample and sales warehouse at Rödingsmarkt in Hamburg turned national attention to the high-quality products from Mankenberg, generating additional sales of valves and construction hardware.

But the company's expansion was not completely positive. In 1891 Mankenberg felt compelled to invite an investor from Hamburg to visit him in Heide because a slump in the construction industry had caused a delay in payment. But the chemistry between Mankenberg and the son of a merchant was not constructive, leading them to part ways. While the construction fittings division remained in Heide, Mankenberg set out to explore new horizons in the valve manufacturing business: he relocated to the port city of Stettin (now Szczecin in Poland).



Gustav Mankenberg in 1894 (to the right of the air tank) with employees in front of the company's first headquarters in Heide, Germany

mind, Gustav Mankenberg decided to take advantage of the opportunity. He quit his job at the Leser valve factory in Hamburg to become the boss of his own company. The workshop of the Wallen brass foundry in Heide became

1885

Gustav Mankenberg establishes the Gustav Mankenberg company in Heide.

G. Mankenberg
Metallwarenfabrik und Giesserei.

1885

Reinhard and Max Mannesmann invent the skew-rolling method for manufacturing seamless tubes.

1886

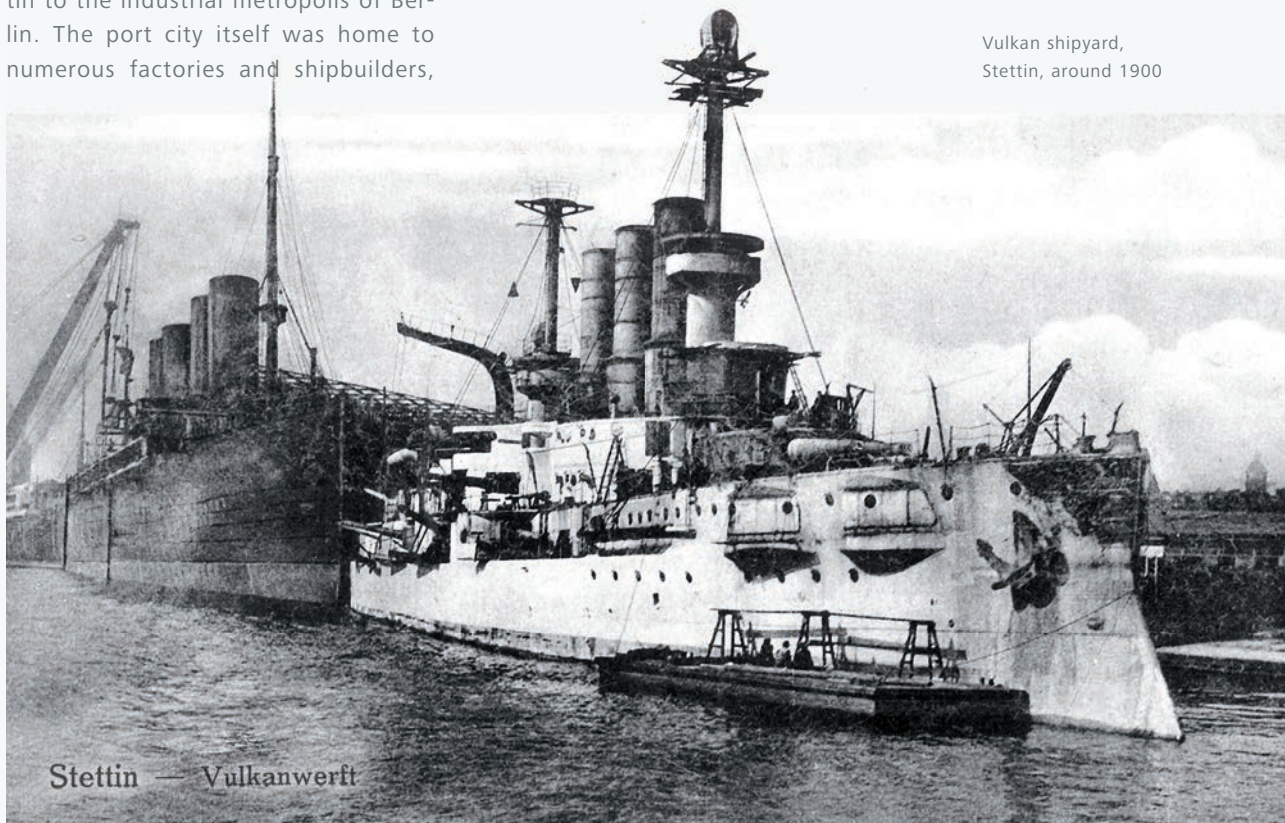
Carl Benz applies for a patent for his manufacture of an automobile.



1895
 On 1 May 1895, exactly ten years after the company was founded, Mankenberg took a chance by starting anew in the capital city of Pomerania. A chance that was to pay off. Following initial difficulties, the company profited from its new location at the mouth of the River Oder. The Finow canal, and later the Oder-Havel canal, connected Stettin to the industrial metropolis of Berlin. The port city itself was home to numerous factories and shipbuilders,

such as the famous Stettin-based shipbuilder Vulkan, meaning that there was a great demand for valves, not least for German and foreign warships. There were hardly any factories in Stettin which did not rely on Mankenberg products.

Vulkan shipyard, Stettin, around 1900



'The new samples enjoyed a positive reception and sold so well that after a few years we had to buy another plot of land and construct a factory.'

Gustav Mankenberg, 1898

1891

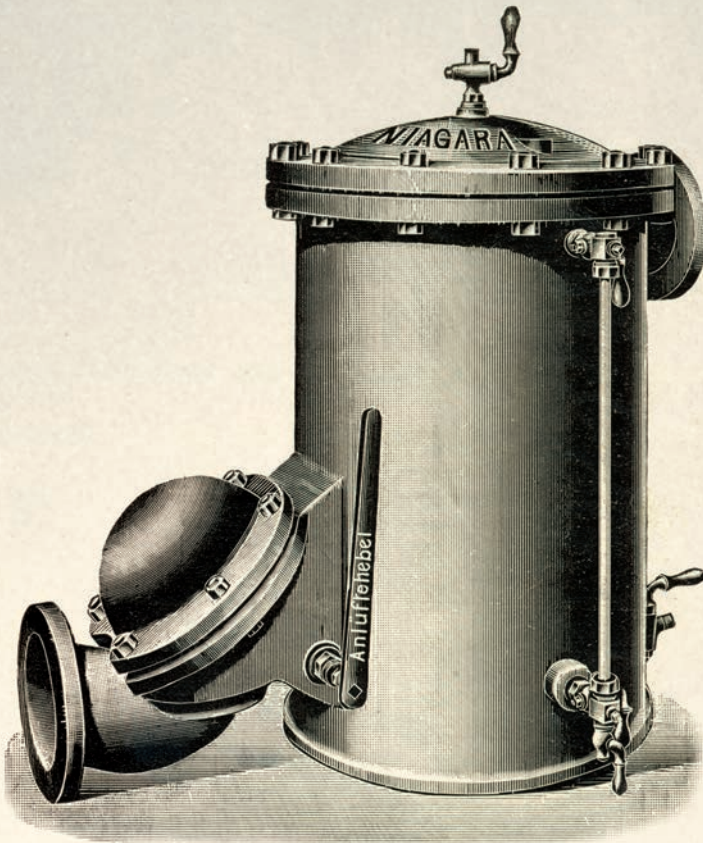
Construction of the Trans-Siberian Railway begins and the first stone is laid by Tsar Nicholas II in Vladivostok.

1891

The first telephone call is made from Paris to London via a telecommunications cable under the English Channel.

1895

Gustav Mankenberg moves the company to the shipbuilding and industrial city of Stettin, where he manufactures cast products and valves.



Three generations of
Niagara Steam Traps
Left: ca. 1900
Above right: 1950
model on an adver-
tising poster dating
from that period
Below right: 2009
model

If you rest, you rust

Mankenberg the entrepreneur was never satisfied with accepting the status quo and always thought in terms of the future. Striving to achieve growth meant finding ways to sell his newly developed products outside of Stettin. As an expert in steam valves, one thing was clear to him: the expansion traps with bimetal or curved liquid-filled spring tubes available on the market were not suitable for use with the increasingly high levels of steam pressure. Float tanks with bell steam traps, on the other hand, had performance levels that were too low, and high levels of



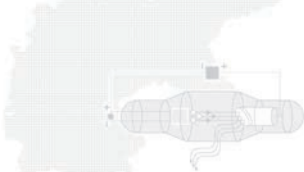
wear and tear.

While searching for a solution which could be used for high pressure as well as hot steam, Mankenberg came across a new manufacturing process: oxyacetylene welding.

As one of the pioneers in Stettin, he used this welding technique and developed a steam trap with a closed, welded steel ball float which he patented under the name Niagara as early as 1904. A product that was ahead of its time, as well as being a symbol of timelessness.

1895

Wilhelm Conrad Röntgen discovers X-rays on 8 November.



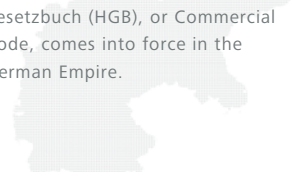
1896

By developing a photo plate of an X-ray attempt, Antoine Henri Becquerel discovers radioactivity.



1900

The Bürgerliches Gesetzbuch (BGB), or Civil Code, and the Handelsgesetzbuch (HGB), or Commercial Code, comes into force in the German Empire.



Niagara

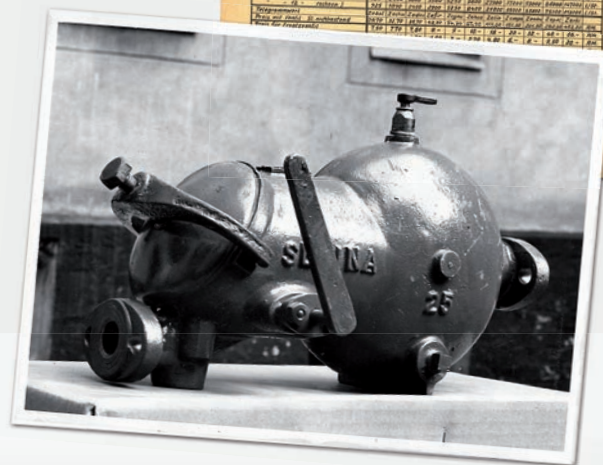
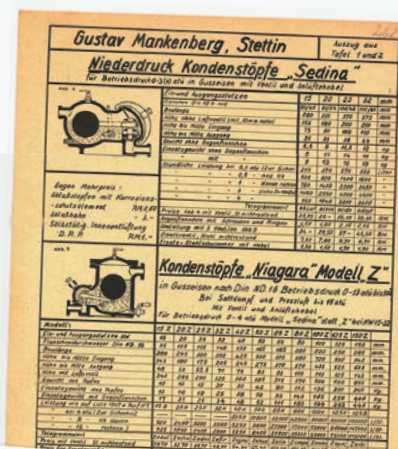
Steam traps with closed steel ball floats, such as the Niagara model, are preferred wherever it is important to have a working process which eliminates loss of steam. This is particularly valid in situations where pressure and performance levels vary enormously, even when no condensate is produced. But what is it that makes the Niagara model so special? It is an example of how Mankenberg uses new materials and processes in order to continuously expand and renew its product range. The Niagara steam trap is both innovative and an absolute classic. Its basic principle has remained almost unchanged for more than 100 years, and the company still supplies products according to this basic design today. Its name is derived from the large amounts of water that it is able to drain.

The Niagara model was developed at the beginning of the 20th century, just in time to remove condensate from the newly introduced steam pulp drying units in sugar production factories. The amount of condensate in these so-called 'steam devourers' was so huge that, in spite of their high output, up to ten drains had to be used. The Niagara has always incorporated cutting-edge materials and has been optimised for use with additional applications. It is therefore a fantastic example of the importance that Mankenberg places on continuous expansion and variation throughout its entire product range.

Sedina and Niagara data sheet, 1933
 Photo: Sedina low pressure model, around 1930

Where there's a will, there's a way

At Mankenberg, product development has always been achieved through in-depth discussions with customers. Understanding our customers and developing solutions that meet their requirements is a strong company principle. Issues surrounding the steam trap are no exception to this rule. Is the construction height of the Niagara too high for the heating systems of the time? No problem: Mankenberg will simply develop a new model, in this case the low pressure model Sedina. By developing this product, the company not only met the requirements of this specific customer group to the letter, but also left its own mark behind in the product name, Sedina being the Latin word for the company's home city of Stettin.



1901

Karl Landsteiner discovers the ABO blood group system and later receives the Nobel prize for his work.



1903

The Wright brothers fly the first mechanically controlled aeroplane.



1904

Mankenberg develops the Niagara, a steam trap with closed welded steel ball float, as well as the Luna, a crescent-shaped expansion steam trap.

Full steam ahead

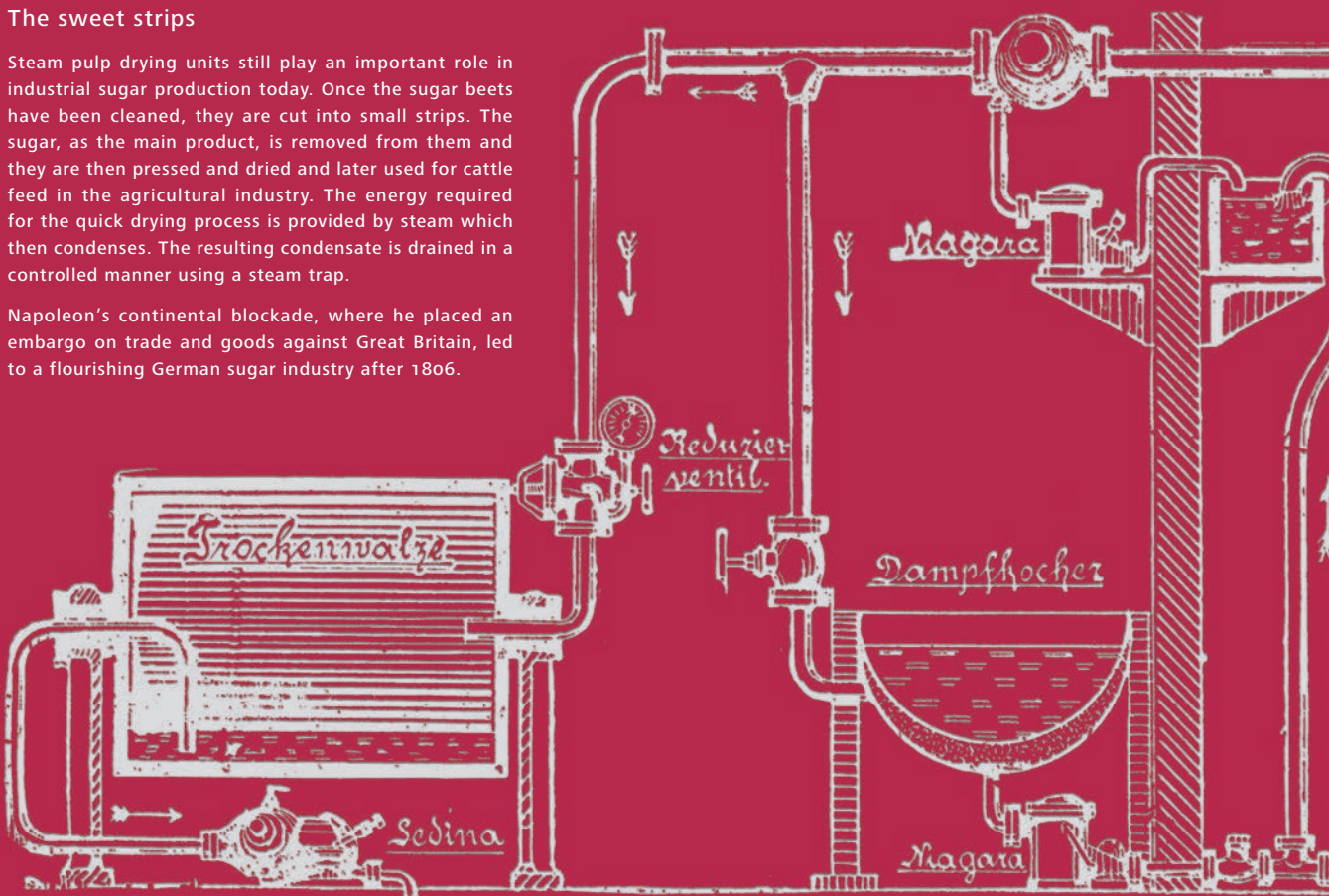
Gustav Mankenberg's strategy paid off. A high level of expertise in steam, a product range tailored to customer requirements and the willingness to work with new materials and manufacturing techniques were the three main drivers of innovation that enabled the company to expand further. In October 1910, Mankenberg acquired a larger factory building in Stettin. The

company's founder was nothing if not a perfectionist. And whatever he did, he did with passion and commitment. The way he perceived the engineering profession is testament to this: 'An engineer can only build usable equipment if he has precise knowledge of those who use steam and the practical needs of the steam industry. He must be able to think in steam.'

The sweet strips

Steam pulp drying units still play an important role in industrial sugar production today. Once the sugar beets have been cleaned, they are cut into small strips. The sugar, as the main product, is removed from them and they are then pressed and dried and later used for cattle feed in the agricultural industry. The energy required for the quick drying process is provided by steam which then condenses. The resulting condensate is drained in a controlled manner using a steam trap.

Napoleon's continental blockade, where he placed an embargo on trade and goods against Great Britain, led to a flourishing German sugar industry after 1806.



1904

Engineers in the US army begin building the Panama canal (construction phase to 1914).

1906

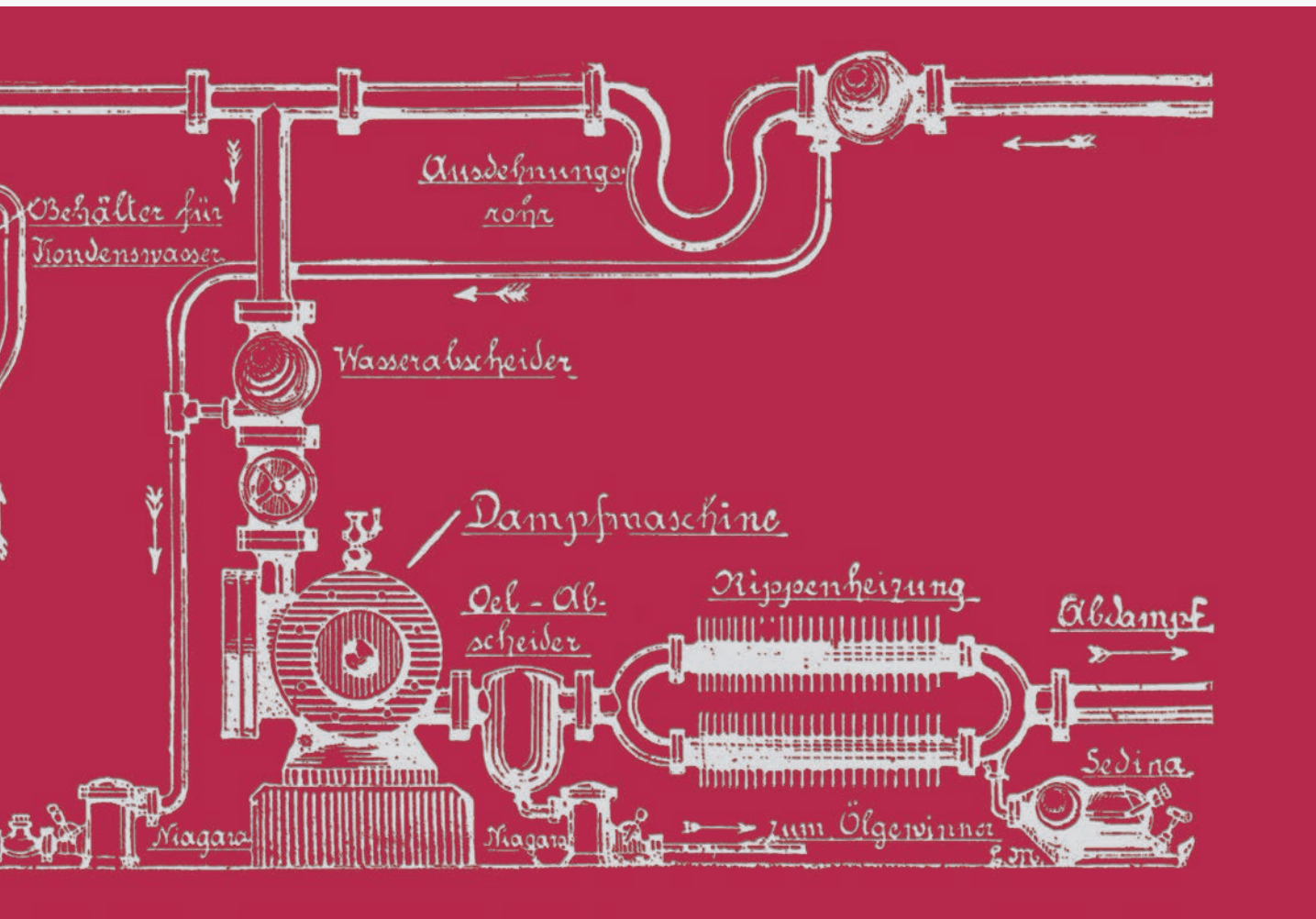
The German hairdresser Karl Nessler builds a piece of equipment which can be used on women's hair to give them a permanent wave.

1907

The German Empire sees the introduction of a unified vehicle registration scheme.

This entrepreneurial ethos was also shared by Mankenberg's eldest son, Ewald Mankenberg, who entered the firm as a partner in 1912. His training predestined him to become an expert in steam, as his practical experience was not limited to mechanical workshops and iron foundries, but also led him into the steam industry. An excellent schooling that enabled him

to provide expert advice to customers before finding a solution tailored to their needs.



1909

In Berlin, the Deutsche Reichspost introduces cashless payment processes in the form of cheques.



1910

Mankenberg moves into a newly constructed factory on Wiekenberg in Stettin.

G. Mankenberg
 Metallwarenfabrik und Giesserei.

1910

FC St. Pauli football club is founded in Hamburg.



The 'can-do' experts

The combination of target-oriented advice and expert technical implementation is what characterises Mankenberg's approach to this day. The company's ability to put itself in its customers' shoes, and observe their specific processes and requirements, is part of the tradition passed down by Gustav Mankenberg. His way of holding in-depth discussions with the customer to find the best solution combined with his willingness to embrace the new technological advances of the age, is what has and will continue to sustain our company.

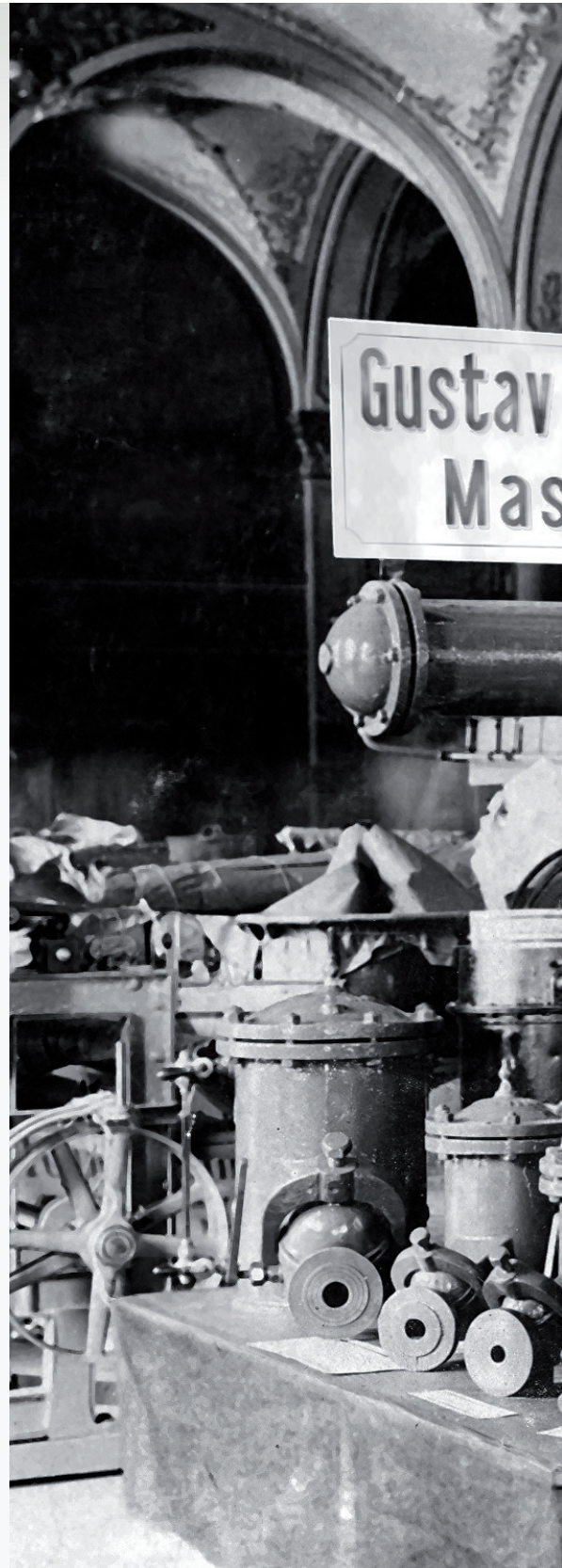
A flexible attitude results in versatile manufacturing. It is not for nothing that Mankenberg is still regarded as the specialist in special construction techniques

'Give me the opportunity to think and work for you as often as possible.'

Gustav Mankenberg

and niche solutions. As well as continuing to manufacture our classic products, we deal with the new challenges our customers present us every single day. Providing them with timely and well thought out offers that provide value for money is one of our strengths.

At the beginning of the century, export sales already accounted for a third of the company's turnover. A clear indication that Mankenberg quality was, and still is, valued across the world, not to mention a fantastic incentive for us to take advantage of the increasingly liberalised and global markets in the future.



1911

The Elbe tunnel opens in Hamburg.



1912

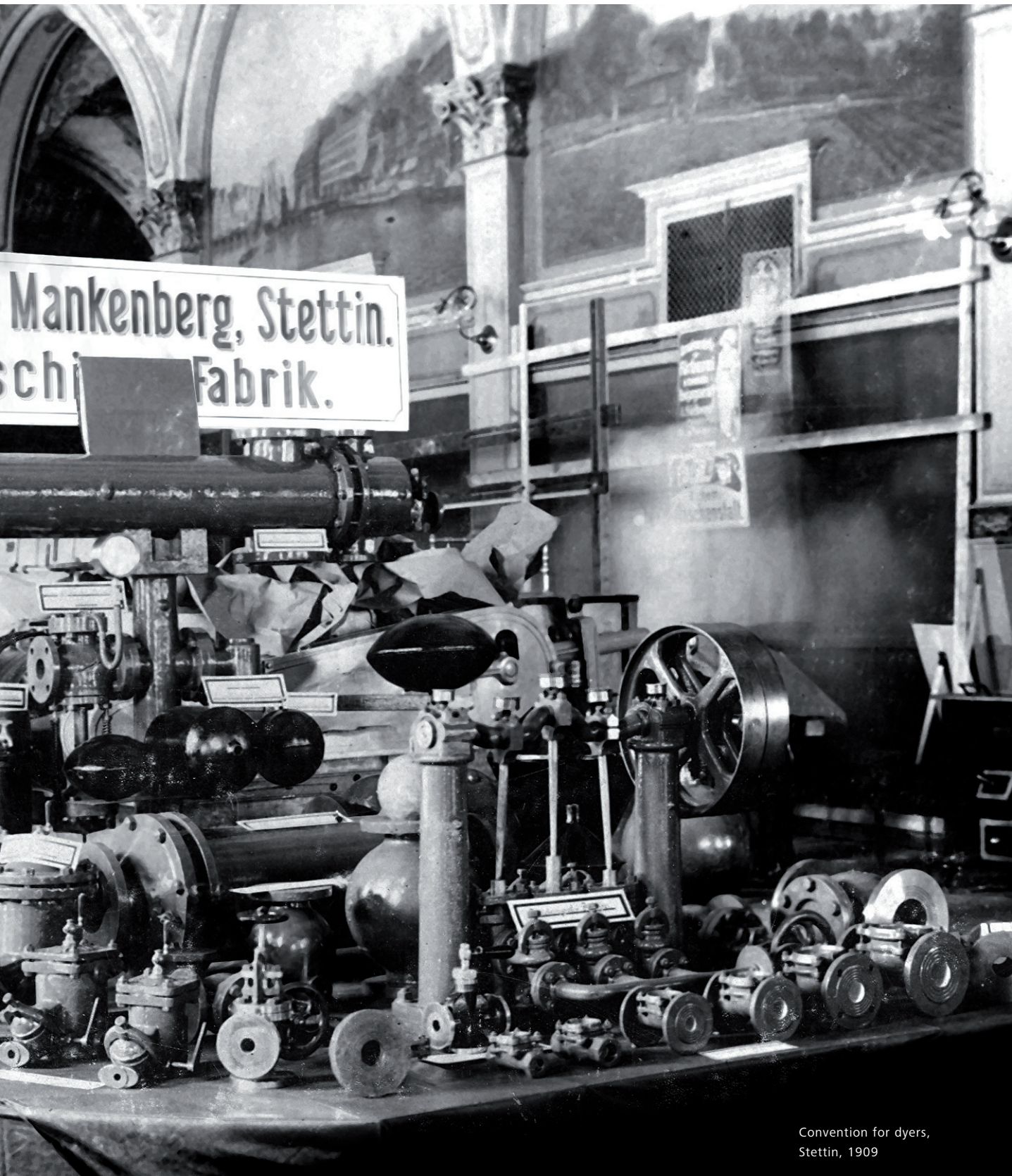
The first Hamburg underground line runs between the Rathaus and Barmbek.



1912

Gustav Mankenberg brings his eldest son Ewald Mankenberg into the company as a partner.

G. Mankenberg
Metallwarenfabrik und Giesserei.



Convention for dyers,
Stettin, 1909

1912

The world's first diesel locomotive, the Diesel-Sulzer-Klose-Thermolokomotive, is manufactured for the Prussian State Railways.



1913

Harry Brearley invents stainless steel.



1913

Charles Fabry discovers the ozone layer.



A human lifetime

The valve that kept functioning throughout the turmoil of the times

Application report

Project	Regulation of reservoir levels / drinking water reservoir in Stettin		
Client	NPI Spółka z o.o., Mirków		
Industry	Water supply	Valve(s)	NV 26ZW



Stettin Waterworks supplies the whole region with drinking water. In order to provide drinking water at times of peak demand, a large storage reservoir was constructed. This is filled at night with surplus water that can be fed back into the network as and when required. The float valve prevents the container from being overfilled.

The employees who supplied the NV 26ZW valve to Stettin Waterworks in the 1930s are now no longer at Mankenberg. However, in 2005, more than 70 years after the construction of the float-controlled valve with a nominal diameter of 400 mm, we were reminded of the time that the company was still based in Stettin. The reason? Stettin Waterworks was undergoing partial renovation and we were asked if we could supply replacement parts if the need arose. Despite the tumultuous years of the Second World War and the renovation works, the valve provided uninterrupted service for more than seven decades. Thanks to the great experiences they had had with Mankenberg in the past, Stettin Waterworks decided to opt for a technically updated valve of the same type. Newer materials and a coating suitable for use with drinking water are innovations that make this tried-and-tested valve a cutting-edge product even today.



1916

The Trans-Siberian Railway is built.



1917

The German industrial standards committee (precursor to the DIN) is founded.



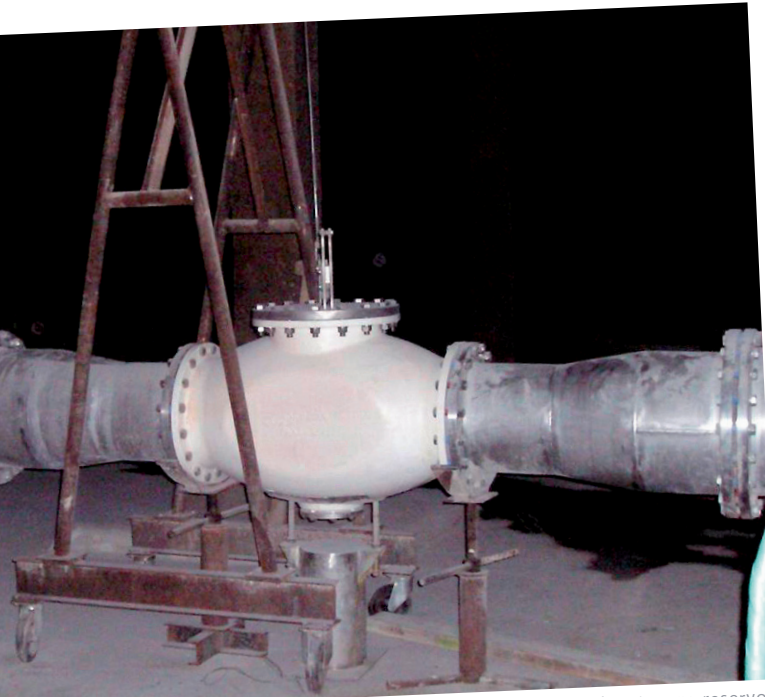
MANKENBERG



NV 26



Water pipe



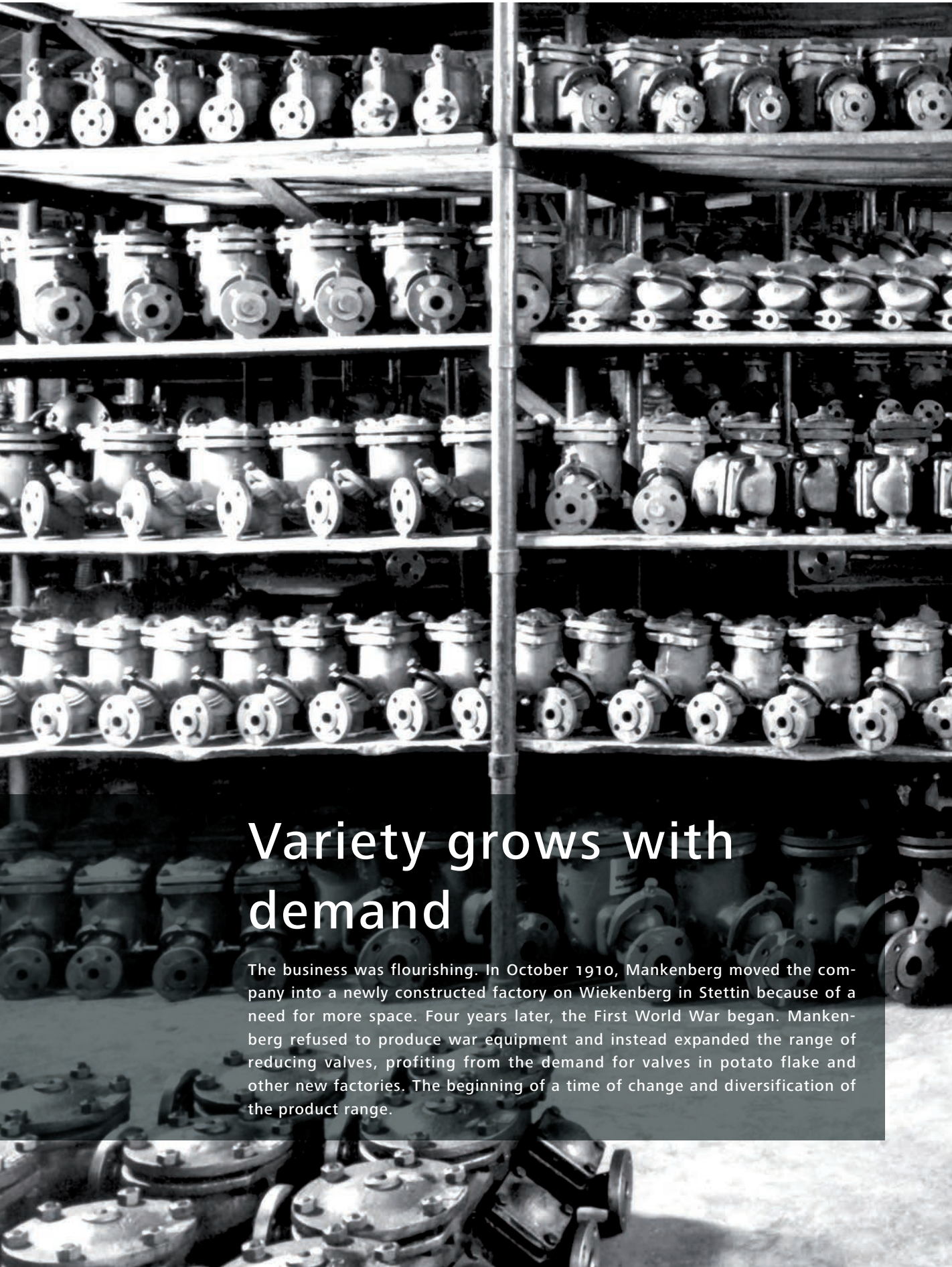
Incorporation of the new Float Valve NV 26ZW in a pumped-dry storage reservoir

NPI Spółka z o.o., Mirków



1917

Gustav Mankenberg brings his second son Hellmuth Mankenberg into the company as a partner.



Variety grows with demand

The business was flourishing. In October 1910, Mankenberg moved the company into a newly constructed factory on Wiekenberg in Stettin because of a need for more space. Four years later, the First World War began. Mankenberg refused to produce war equipment and instead expanded the range of reducing valves, profiting from the demand for valves in potato flake and other new factories. The beginning of a time of change and diversification of the product range.



A new era



Hellmuth Mankenberg,
1950



Ewald Mankenberg,
1950

In April 1919, after 34 years of successful business, Gustav Mankenberg handed over the reins of his company to his two sons Ewald and Hellmuth, while his third son Erwin later supported the company as a freelance sales representative. This was a time of economic crisis, where inflation and deflation posed new challenges for the company. With the generational change, the expansion of the business was continued both internally and externally. The brothers rebuilt the international business activities that had been destroyed by the war and restructured the domestic internal sales network. The product range was streamlined and repositioned. The Mankenbergs carefully manoeuvred the company through the difficult economic times with the enthusiastic help of their long-standing loyal employees.

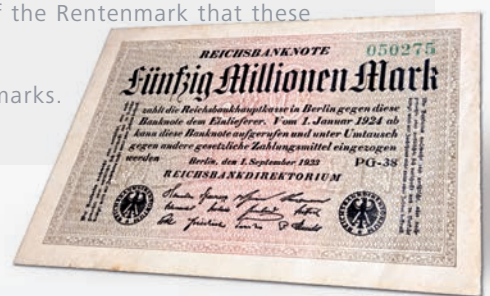
Gustav Mankenberg's strategy of developing and offering products for various industries and applications was a great success. Even now, it points the way forward for the company. The wide range of products has grown organically with the increasing industrialisation of the world. And the company has always cooperated closely with its customers. Discussions about specific requirements for customers' respective applications has made us a specialist in valves and regulation technology – from the standard valve to customised solutions, and from mass-produced ranges to small individual pieces and customer-specific one-off components.

Pressure regulation valves have always been a major part of the Mankenberg product portfolio. When you look at the history of our products, which

Suitcases full of money

In this day and age, it is almost impossible for us to imagine what life was like during the economic crisis of 1929. Before the introduction of the Rentenmark, it took hours to calculate prices in millions and billions, and new multiplying factors for wages had to be set every single day. At one point, Mankenberg's own records document the use of a factor of 1,376. Surcharges had to be added to price lists every day. Customers from Berlin often arrived at the office with a suitcase full of notes so that they could get rid of them before midday. This is because there was always the risk that the stock exchange would decrease the value of the mark considerably at midday. It was only with the introduction of the Rentenmark that these somewhat adventurous occurrences began to settle down.

On 1 November 1923, for example, a loaf of bread cost 3 billion marks. On 15 November, it cost 80 billion marks.



1914-1918

First World War.



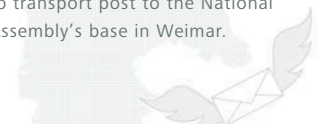
1919

Gustav Mankenberg hands over the reins of the firm to his sons Ewald and Hellmuth.

Gustav Mankenberg :: Stettin
Maschinen- und Apparaten-Fabrik :: Gusswerk

1919

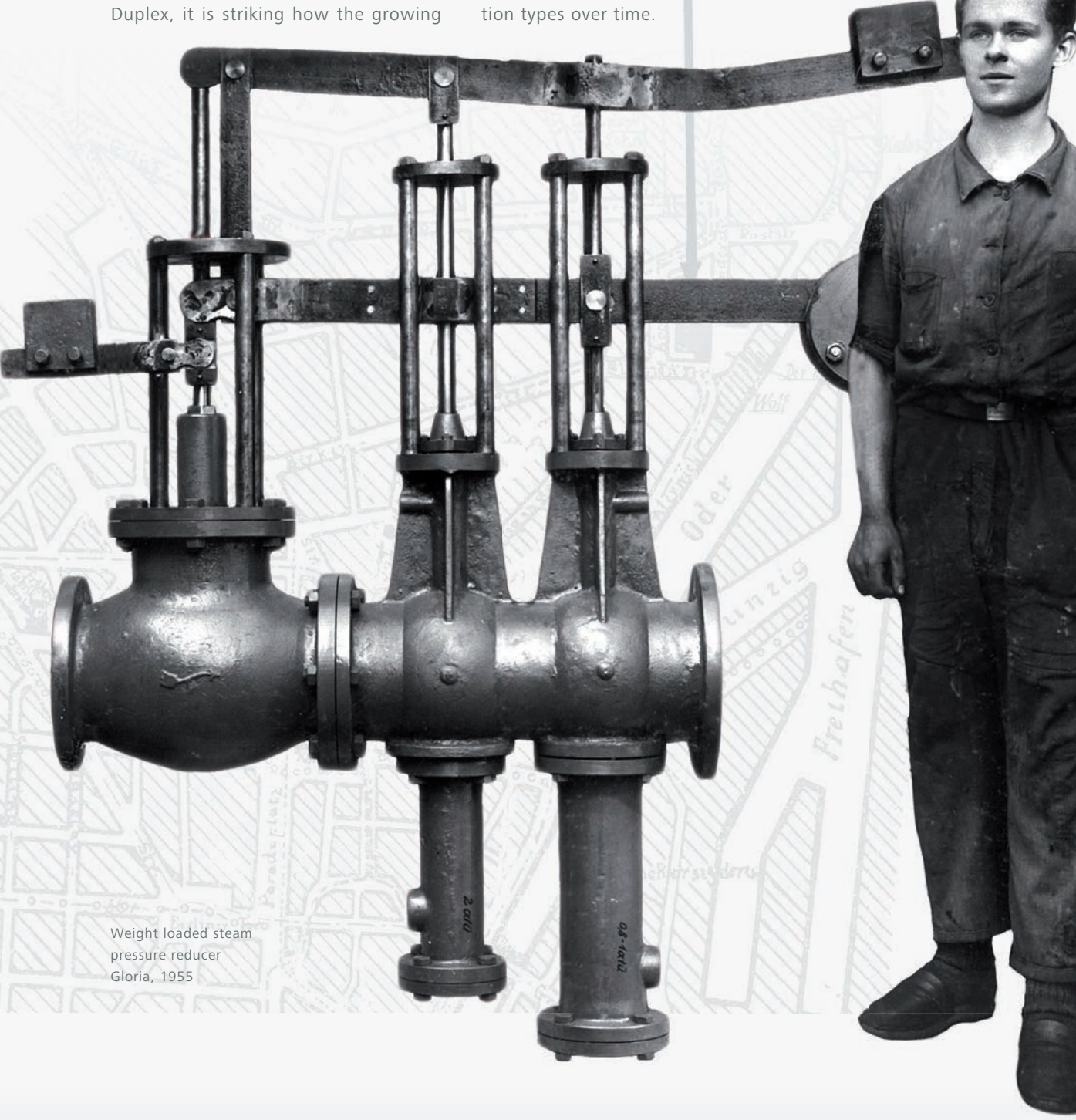
The era of civil airmail begins in Germany. Twice a day, aeroplanes fly into Berlin-Johannisthal in order to transport post to the National Assembly's base in Weimar.



*Fabrik von Gustav Mankenberg
 Alexanderstr. 46a.*

have melodious-sounding names such as Merkur, Gloria, Odin, Komet and Duplex, it is striking how the growing

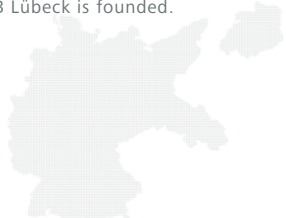
number of applications has led to a wide variety of models and construction types over time.



Weight loaded steam pressure reducer Gloria, 1955

1919

VfB Lübeck is founded.



1920

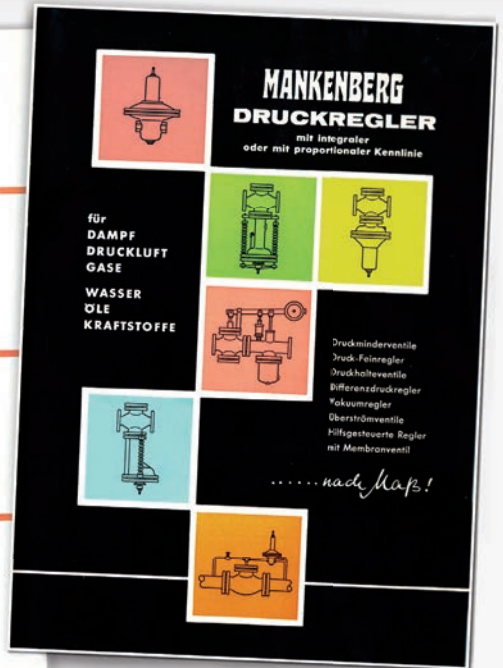
The Versailles peace treaty comes into force.



1921

The Deutsche Luft-Reederei (DLR), or German Air Transport Company, starts operating scheduled air services between Berlin and Munich.





Product catalogue from the 1950s

No two products the same

Using the example of pressure control valves, a product catalogue from the 1950s explains in an easy-to-understand way exactly why Mankenberg has such a variety of construction methods and designs: ‘The pressure control problems which occur in practice vary, depending on the levels of pressure, temperature, flow rate, control accuracy, etc. Even challenging pressure regulation situations can often be solved using simple pressure control valves.’ Or in other words: steam presents different challenges to water and oil. The principle is the same, but the design is what makes all the difference.

wide range of automatic valves, as well as its product variety. The portfolio comprises products which can accurately control low and high pressures, from 2 or 3 millibars to pressures greater than 300 bar, such as you might find in the chemical industry, for example. Our valves are divided into nine product groups, and perform key functions in units and pipelines in the most varied industrial and supply branches – from machine and plant construction to water supply and petrochemistry.



On the inside pages: A huge variety of pressure control valves!

Today, Mankenberg is known for its

1925

The first German seaplane route is set up between Hamburg-Altona and Dresden.



1926

Lufthansa is founded in Berlin.



1927

The Essen-based firm Friedrich Krupp presents the high-performance cutting material Widia at the Leipzig spring trade fair for the first time.



Variety times nine

Our valves and control technology are used with various materials, temperatures and pressures. The current Mankenberg product group at a glance:

- » Pressure Control Valves
- » Bleed and Venting Valves
- » Steam Traps
- » Float Valves
- » Pipeline Elements
- » Pumps
- » Control Valves
- » Replacement Parts and Accessories
- » Customised Solutions



Short catalogue 2010



How would you like it?

The nine product groups and their subgroups already form a large product range. But that is not enough. True to Gustav Mankenberg's motto 'If you rest, you rust', the company has expanded its expertise in various manufacturing techniques over the decades. Over 30 years of experience has made Mankenberg a renowned expert in stainless steel deep-drawing techniques. The variety and flexibility of deep-drawn stainless steel valves from Mankenberg makes them globally unique.

1927

Mankenberg takes part in ACHEMA in Essen for the first time.



1927

The Nürburgring is opened with an inaugural motorbike race.



1928

The LZ 127 airship is given the name 'Graf Zeppelin'.



A huge variety of pressure valves!

Pilot-operated Pressure Reducing Valve RP 814 1

Pressure reducing valve of the inline design in welded construction, pilot-operated inline valve for large flow rates | RP 815 with extended casing for maximum K_{VS} values, high pressure at large flow rates | body made of welded steel, CrNiMo steel | special versions available

DN	100 - 800	PN	16 - 100
		T	130 °C
p_2	1 - 20 bar	K_{VS}	60 - 2.100 m ³ /h

Valve for Small Flow Rates DM 505 2

Various flow rate performances (K_{VS} values) can be chosen | suitable for liquids and gases | completely made of deep-drawn CrNiMo steel | corrosion resistant, very lightweight and compact, requires no external energy | long operational lifespan, manageable installation, easy-to-maintain owing to the clamp system, can be actuated pneumatically, various designs and connection types

DN	10 - 25	PN	250
G / NPT	1/2	T	130 °C / 180 °C
p_2	0.005 - 20 bar	K_{VS}	0.2 - 1.5 m ³ /h

Millibar Control Valve DM 762 3

Millibar control valve for medium flow rates, very precise, available in various versions | suitable for liquids and gases | completely made of deep-drawn CrNiMo steel | optimal surface characteristics, highest regulating accuracy, lowest control ranges up to a limit of 2 millibars

DN	15 - 50	PN	16
G	1/2 - 2	T	130 °C
p_2	0.002 - 0,52 bar	K_{VS}	0.15 - 3.6 m ³ /h

Universal Valve DM 652 4

Balanced, various connections and special versions are available | suitable for liquids, gases, steam | completely made of deep-drawn CrNiMo steel | highest regulating accuracy, high flow rates, a multitude of control ranges | can be actuated pneumatically, variants of convincing quality for your individual application, easy-to-maintain owing to the clamp system

DN	15 - 50	PN	16 - 40
G	1/2 - 2	T	130 °C / 190 °C / 220 °C
p_2	0.02 - 12 bar	K_{VS}	4 - 22 m ³ /h

Standard Cast Valve DM 613 5

Universally deployable, steel/stainless steel, stainless steel diaphragm body | suitable for liquids and gases | body made of GGG-40, GS-C25, CrNiMo steel

DN	15 - 150	PN	16 - 40
		T	130 °C
p_2	0.02 - 10 bar	K_{VS}	4 - 160 m ³ /h

Valve for High Pressures + Temperatures DM 401 6

Double-seat pressure reducing valve, usable as soot blower with damping | suitable for steam | body made of GS-C 25, GS 17 CrMo 55 | especially sturdy, suitable for the largest flow rates and highest temperatures | offers long maintenance intervals, a long operational lifespan

DN	25 - 250	PN	16 - 250
		T	500 °C
p_2	1.5 - 32 bar	K_{VS}	6 - 360 m ³ /h

Valve for High Pressures DM 510 7

Highest variability in flow rates, connection, temperature suitability, body material choice | suitable for liquids and gases | body made of C-steel, CrNiMo steel, also available in special materials | NACE-compatible, high flow rate, highest pressures, up to 315 bar inlet pressure | worldwide novelty: valve for high pressures combined with medium flow rates

DN	15 - 50	PN	16 - 315
G / NPT	3/8 - 2	T	130 °C / 180 °C / 400 °C
p_2	0.005 - 20 bar	K_{VS}	0.15 - 5.5 m ³ /h

Pilot-operated Pressure Reducing Valve RP 810 8

Cast steel pilot-operated pressure reducing valve for large flow rates at high pressure | suitable for liquids and steam | body made of GGG-40, GS-C 25, CrNiMo steel | maintenance work can be done from above at the installed valve, special versions available

DN	40 - 400	PN	16 - 160
		T	130 °C
p_2	1 - 80 bar	K_{VS}	20 - 900 m ³ /h

Pilot-operated Pressure Reducing Valve RP 814 1

Millibar Control Valve DM 762 3

Universal Valve DM 652 4

Valve for Small Flow Rates DM 505 2

Valve for Hygiene Applications DM 152 9

Angled design suitable for small and medium flow rates | usable for liquids, gases, steam | completely made of deep-drawn CrNiMo steel | minimal dead space, can be electropolished, is corrosion resistant, lightweight and compact, requires no external energy | extended cleaning intervals for CIP/SIP cleaning procedures, less energy expenditure owing to thin wall thickness

DN	15 - 50	PN	2.5 - 10
		T	130 °C / 180 °C
p_2	0.3 - 5 bar	K_{VS}	2 - 7 m ³ /h

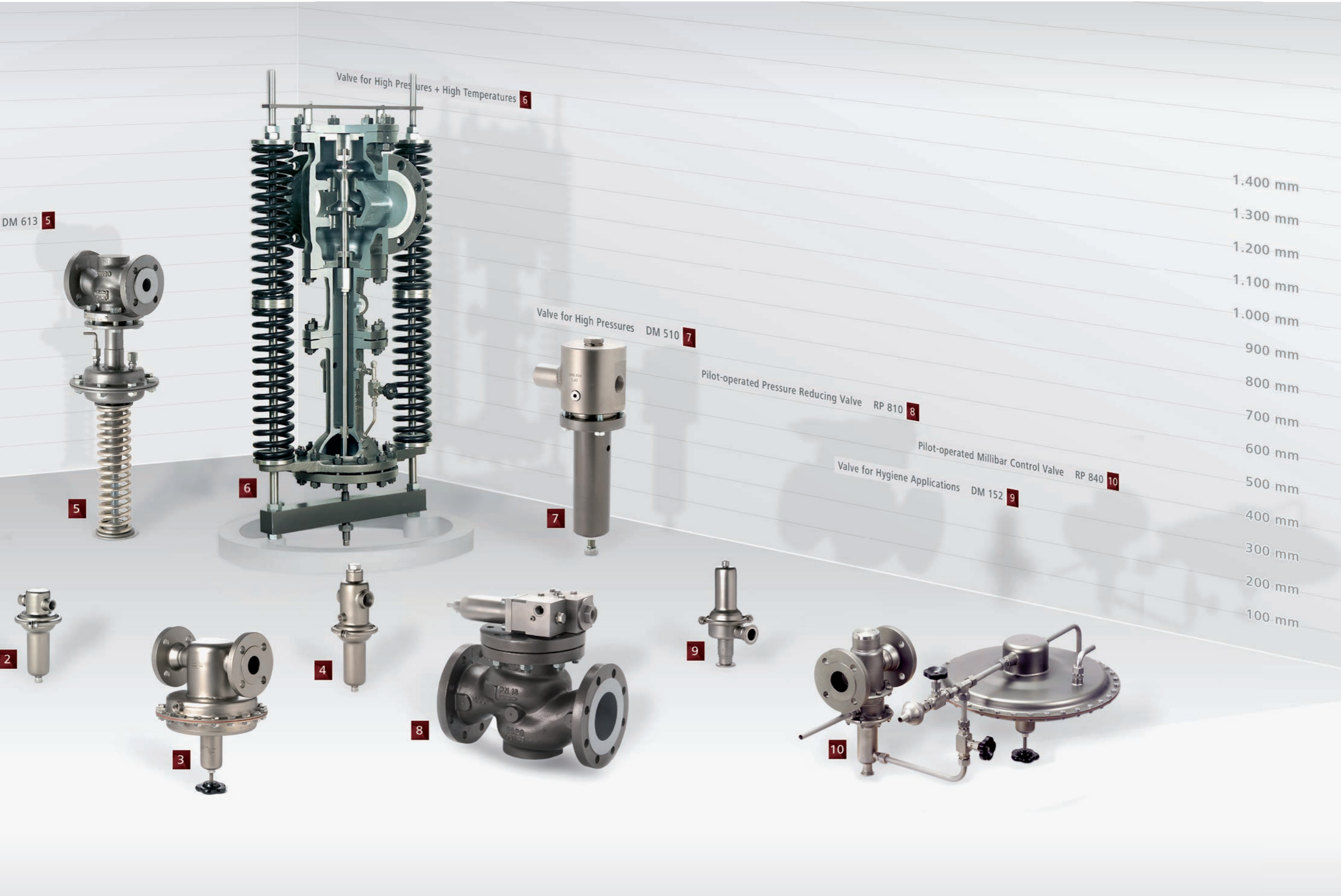
Pilot-operated Millibar Control Valve RP 840 10

Pilot-operated pressure reducing valves consisting of a differential pressure regulator for large flow rates combined with a High Grade Millibar Valve serving as a pilot valve, available as prefabricated unit in a rack

DN	50 - 150	PN	16 / 1
		T	130 °C
p_2	0.002 - 0.52 bar	K_{VS}	3.6 - 150 m ³ /h

Standard Cast Valve





Valve for High Pressures + High Temperatures 6

DM 613 5

Valve for High Pressures DM 510 7

Pilot-operated Pressure Reducing Valve RP 810 8

Pilot-operated Millibar Control Valve RP 840 10

Valve for Hygiene Applications DM 152 9

1.400 mm
 1.300 mm
 1.200 mm
 1.100 mm
 1.000 mm
 900 mm
 800 mm
 700 mm
 600 mm
 500 mm
 400 mm
 300 mm
 200 mm
 100 mm



Dr.-Ing. Günther Weidner (right), engrossed in constructive discussions, 1956

Bouncing ideas around



Dipl.-Ing. Ursula Weidner (née Mankenberg), qualified engineer, 1965

When it comes to choosing the right material, it is particularly important to discuss customers' needs directly with them. At Mankenberg, providing first-rate advice means having the ability to listen and ask the right questions. A product that is intended for use in a water treatment plant in the Middle East, for example, must be resistant to corrosion. A pressure reducing valve for ultrapure applications, such as those required in the pharmaceuticals

industry, has different requirements of the material than those of a similar model for a waterworks. Together with the customer, the company's experienced development department finds the optimal valve for the specific application time and again, and continuously develops the product range while doing so. This is a process which is extremely important to the company and one which it will continue to focus on in the future.

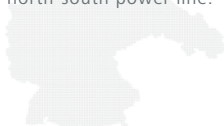
1929

The 100.000th Niagara leaves the factory on 22 February.



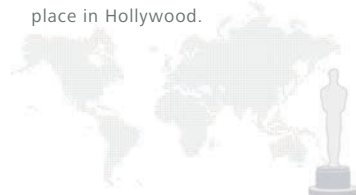
1929

The first power line in Germany, and also the first in the world, goes into operation with a voltage of 220 kV: the north-south power line.



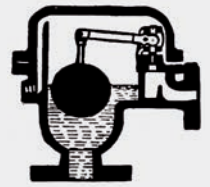
1929

The first Oscars ceremony takes place in Hollywood.

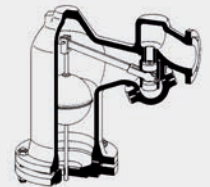




Advertising poster, 1956



I have been building automatic venting valves for 25 years. The model in figure 1 has been positively received and is used in water pipes and iron removal plants in municipal and private waterworks. One advantage is the easy access to the valve itself. (Excerpt from '50 years of Mankenberg', 1935)



Large Bleeding and Venting Valve made from cast metal, EB 1.20, 1965



Compact Standard Venting Valve from the High Grade Pure range, EB 1.12, 2008

One principle, several models

Bleeding and venting valves separate air or other gases from a liquid depending on the level of the liquid. Mankenberg has been building automatic venting valves since 1910, which serve to improve the efficiency and safety of plants. The original model has proven its worth through decades of use in water pipes in both municipal and private waterworks. Increasing industrialisation has meant that the range of materials used has also increased. Mankenberg now offers everything from cast metal to deep-drawn titanium models, although the functionality and operation of the valves themselves remain unchanged. Bleeding and venting valves from Mankenberg, which are required for use in the pharmaceuticals and foodstuffs industry, among others, are still suitable for use in the most demanding technical environments today. The materials we use are FDA-compliant.

1930

Max Schmeling becomes world heavyweight boxing champion.



1933

The first radio receiver is unveiled at the tenth radio exhibition in Berlin.



1935

The Gustav Mankenberg valve factory is 50 years old.

Pressure regulation

We provide perfect bleeding and venting

Application report

Project	Open-cast mining drainage in brown coal mining		
Client	Vattenfall Europe Mining AG, Cottbus		
Industry	Mining	Valve(s)	EB 1.59



Pockets of air in pipes can lead to dynamic variations in pressure because of the varying density of both the material and the compressibility of the air. These pockets of air reduce the flow cross-section and can lead to considerable losses in pressure. Pipes should therefore be ventilated to ensure that they remain as free of air as possible.

Vattenfall Europe mines around 60 million tonnes of brown coal every year. One essential prerequisite for mining is the drainage of water from the beds. The most important drainage process is filter well drainage, coupled with a surface pressure pipe system. The problem is that the high points of the pipeline can experience negative pressure which may result in water column separation. The ensuing collapse of the cavity leads to pressure peaks which can be avoided using effective ventilation.

Mankenberg rose to the challenges of this particular problem and developed a customised solution in the form of the bleeding and venting valve EB 1.59, which is made from deep-drawn stainless steel. This bleeding and venting valve is capable of continuously discharging small air amounts under operating pressure and drawing in an unequally high air quantity into the pipeline in case of pump failure or quick closing of the shut-off valves. The thin-walled PE pipe used can therefore be protected effectively against negative pressure and the whole pipe system is protected against pressure surges. Stainless steel is particularly suitable for use in mining situations because it is robust, frost-resistant, corrosion-resistant, low maintenance and can be easily connected. It provides fantastic performance and long-lasting service and is particularly suited for use in mining water.



1935

The first regular television programme in the world is broadcast from the Berlin radio tower.



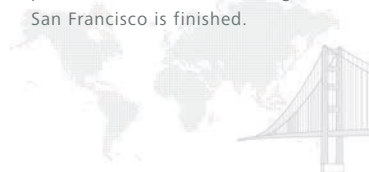
1936

The first diesel car enters mass production.



1937

Following a four-year construction period, the Golden Gate Bridge in San Francisco is finished.



MANKENBERG



Bleeding and Venting Valve EB 1.59



Open-cast mining excavator



Jämschwalde open-cast mine

Vattenfall Europe Mining AG, Cottbus



1938

The foundation stone is laid for the town of Wolfsburg and the Volkswagen factory.

1942

The founding declaration of the United Nations is signed by 26 countries in Washington D.C.

1944

Klöckner-Humboldt-Deutz AG, a company based in Cologne, develops a diesel motor with air cooling which is capable of being mass-produced.

MANKENBERG
Sonderarmaturen

2 Kennen Sie unsere Erzeugnisse? 2

Problems are only solutions

Following the Second World War and its escape from Stettin, the Hanseatic city of Lübeck was to provide a new beginning for the company. In July 1945, the company was granted a permit allowing it to start manufacturing once again. Manufacture continued on the new site with metalworkers and lathe operators from Stettin working alongside employees from Lübeck. During the subsequent years, the company expanded and loyal customers remained with the company while new ones joined them – and with them, the company's expertise in developing customer-specific solutions grew, guaranteeing its customers tailor-made functionality.

überno
nen Er
liegt.
Weiter
in Fran
Nr.5 an
Ich wür
In der H
zeichne

Geschäftszeit 8-17 Uhr, Sa. bis 13 Uhr
 Ruf. für Ferngespräche Nummer 30127
 Ruf. für Ortsgespräche Nummer 30128
 Drahtanschrift: Mankenberg - Stettin
 Reichsbank Giro-Konto Stettin
 Postscheck-Konto Stettin Nr. 4408
 Gegründet 1885 - R.M. Code

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Gustav Mankenberg, Stettin-Grabow
 Armaturenfabrik, Eisen- und Metallgießerei

Ich teile höflichst mit, dass mein Betrieb in Stettin nach
 Demontage durch die Russen, nach Lübeck verlegt worden ist, und nach
 Neueinrichtung die Lieferung der früher hergestellten Sonderarmaturen,
 die Kondensstöpfe, Dampfdruck-Reduzierventile, Entlüfter, Schwimmerventile
 und Entöler wieder aufgenommen hat.
 Da die meisten Modelle verloren gegangen sind, habe ich neue Modelle
 fertigen lassen, und dabei gleichzeitig die Erfahrungen, die ich im
 Laufe der Jahre gesammelt habe, zur Verbesserung der Apparate benutzt,
 dass Sie Erzeugnisse erhalten, die in jeder Weise den Anforderungen
 des Betriebes gerecht werden.
 Die Fabrikation ist soweit im Fluß, dass die meisten Teile kurzfristig
 geliefert werden können. Viele Stücke sind bereits auf Lager.
 Ein bisheriger Vertreter Herr G. Henninger ist während des Krieges
 in Frankfurt/Main ausgeblieben.
 Ich habe mit ihm vereinbart, das Vertragsverhältnis zu lösen. Die Vertre-
 ter für den dortigen Bezirk hat

Herr
 Dr. Ing. Erwin Mankenberg
 (16) Wiesbaden
 =====
 Thomaestr. 17

Ich bitte Sie bei erster Gelegenheit besuchen, um Sie mit mei-
 nen Erzeugnissen bekannt zu machen und um festzustellen, ob Bedarf vor-
 handen ist. Er wird Sie mit meiner Karte versehen.
 Ich mache ich darauf aufmerksam, dass ich vom 24. Juli bis 27. Juli 1949
 in Frankfurt am Main auf dem Stand.-Nr. 128 in der Ausstellungshalle
 der Dechema-Informationstagung sein werde.
 Ich hoffe mich sehr freuen, Sie dort begrüßen zu können.
 Ich hoffe, mit Ihnen in lebhaftere Geschäftsverbindung zu kommen,
 und hoffe, Sie bald zu sehen.

Hochachtungsvoll!

Gustav Mankenberg

A case for discussions

You only gain in experience if you share your own experiences with others. And the basis for sharing experience is discussions. In order to provide individual solutions to meet specific requirements, the sales and advice experts at Mankenberg take their time. Time to understand in depth exactly what is required. What

conditions will the product need to withstand in practice? Which technology and materials are best suited to the situation? And in spite of providing highly customised products, how can we guarantee a fair price-performance ratio?

At Mankenberg, salespeople and



Daily office life,
around 1960



Matthias Dühr, Managing Director Sales, and
Marc Bornemann, Sales, 2009

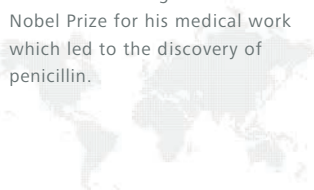
1939-1945

Second World War.



1945

Alexander Fleming receives the Nobel Prize for his medical work which led to the discovery of penicillin.



1945

Gustav Mankenberg dies at the age of 87 in Greifswald.

MANKENBERG
G M S

engineers work hand in hand when it comes to organising projects and offers. This has huge benefits for our customers: the technical and business aspects of customer requests are incorporated into the product selection process right from the start. For every order, Mankenberg checks customer-specific technical operation-

al data and recommends a solution. If the operational data show that a special solution is required, our engineers will develop one. This could be anything from minor modifications to existing valve models to complex systems.

Your operating data determine the solution

Individual technology, tailored to specific requirements

Various certification schemes available, e.g. NACE, Norsok

Various connections available: DIN, ANSI, JIS or aseptic flanges, welded connections and many more ...



From standard to special materials, such as Hastelloy®, titanium, Duplex-stahl®

From individual one-off products to mass-produced ranges

Then as now

1945

The factory in Stettin is no longer big enough: the occupying power grants the company permission to resume manufacturing in Broilingstrasse in Lübeck.



1947

The first post-war export trade fair opens in Hanover.



1947

An American Bell X-1 aircraft breaks the sound barrier.





Invitation to company tour as part of the waterworks supervisor conference in Travemünde, 2009

Image above left: Office discussion, 1959

Above right: Providing customer advice, 1976

Below: Jan Husen, Head of Chipping Produktion Department, explains various steps in the manufacturing process during a company tour as part of the company's 'Workshop Discussions' event series

Learn from one another, grow with one another

Not only do we give our customers our undivided attention when it comes to advice and product development and meeting their specific requirements, we also invite them to come to our premises and see how we work. To this end, Mankenberg organises cus-

tomers training sessions in Lübeck. By giving our customers a comprehensive overview of our manufacturing processes, we help them to understand the full range of individual solutions Mankenberg can offer them without having to compromise on quality.

1948

In Lübeck, Mankenberg develops the high pressure steam trap Corona, the trap with bell float Vineta and the Pressure Reducers Odin and Duplex.



1948

The Citroën 2 CV, known as the 'duck', is unveiled in Paris.



1949

The German constitution is published.



Anyone can provide standard products

It goes without saying that Mankenberg also produce standard products according to the highest-quality standards. These not only incorporate our long-standing experience as a valve manufacturer and the skilled craftsmanship of our highly trained employees, but also a guaranteed high level of quality. Regardless of which manufacturing technique we use, no product leaves our premises without having satisfied our strict self-imposed quality controls, which are the result of incorporating industrial logistics into manufacturing technology.

While our competitors are mainly limited to manufacturing standard product groups, the name Mankenberg stands for product variety and therefore also for quick fulfilment of special requirements without unnecessary red tape. It sometimes takes just a few weeks from the initial request for a special solution to delivery of the finished product. This is also the reason why many of our competitors recommend us when they reach the technical limits of what they can offer their customers.



Pressure Reducer DM 652SO with cut-out section for customer training purposes

‘Producing quantities of one is our daily bread.’

Axel Weidner, Managing Partner

1949

Mankenberg develops Gloria, the first weight loaded pressure reducer.



1949

Herta Heuwer invents the first Currywurst (curried sausage) in Berlin.



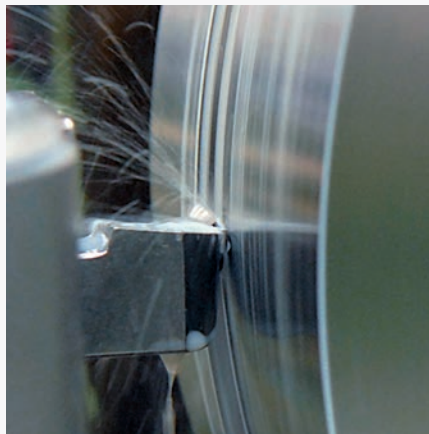
1951

The first German car exhibition takes place in Frankfurt am Main.



A lot to choose from

Whenever an individual design is required because of special requirements, valves made from solid metal are usually the best option. The raw material is turned, milled and drilled to produce a customised product for highly specific applications. Apart from the individual design, the advantage of this process is the variety of possible materials that can be used. Mankenberg can provide quick and affordable solutions, regardless of whether valves are made from Hastelloy®, titanium or seawater-resistant materials and no matter whether NACE or Norsok certification standards are required or whether customers require a specific industry standard.



Tailor-made for your application:

- » Individual design
- » Special materials
- » Certification schemes
- » Connections
- » Control functions



1952

The jury awards the Nobel Peace Prize to Albert Schweitzer.



1953

George Catlett Marshall wins the Nobel Peace Prize for his Marshall Plan.



1954

The first nuclear power station starts operations in Obninsk near Moscow.





Oliver Studier, Team
 Leader Test Bench
 Dept., 2010

1954

Dr.-Ing. Günther Weidner, Hellmuth Mankenberg's son-in-law, joins the company.



1954

Germany wins the Football World Cup.



1955

Germany joins NATO.



Where giants are measured

Standing at a MAN test bench decade after decade is not an easy job – not even for a valve

Application report

Project	Pressure control of the water brakes on a motor test bench		
Customer	MAN Diesel & Turbo SE, Augsburg		
Industry	Machinery and plant construction	Valve(s)	DM 4, DM 652, KA2X, FI 6.06



MAN Diesel & Turbo manufactures large diesel engines as generator drives for power plants and main engines for ships in Augsburg, Germany.

In the final production step, every single engine is sent to a test bench for around three days where fine adjustments are made and the performance is tested. To do this, the diesel engine is connected to a water brake, which simulates the load and enables the power output of the engine to be measured.

The DM 4 from Mankenberg comes into play here. It is used to control the pressure of the water in the water brake. The load on the engine varies with the pressure in the water system. The DM 4 features a lever mechanism that enables the pressure to be adjusted easily and effectively. At the same time, the controller is not sensitive to the temperature fluctuations and vibrations that are unavoidable during a test.



1957

An active partnership establishes Gustav Mankenberg Armaturen-fabrik GmbH with DM 300.000 in equity.



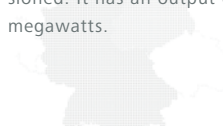
1957

The USSR inaugurates the Space Age with Sputnik 1.



1960

The Kahl experimental nuclear power plant, the first German nuclear power plant, is commissioned. It has an output of 15 megawatts.



MANKENBERG



Pressure Regulator DM 652



Steam Trap KA 2X



Engine testing bay with MAN diesel motor, model 20V32/44CR

MAN Diesel & Turbo SE, Augsburg



1961

The first manned space flight in history: the spaceship Vostok takes off with astronaut Yuri Gagarin on board.



1962

Walter Bruch develops the PAL television system, which he registers as a patent one year later.



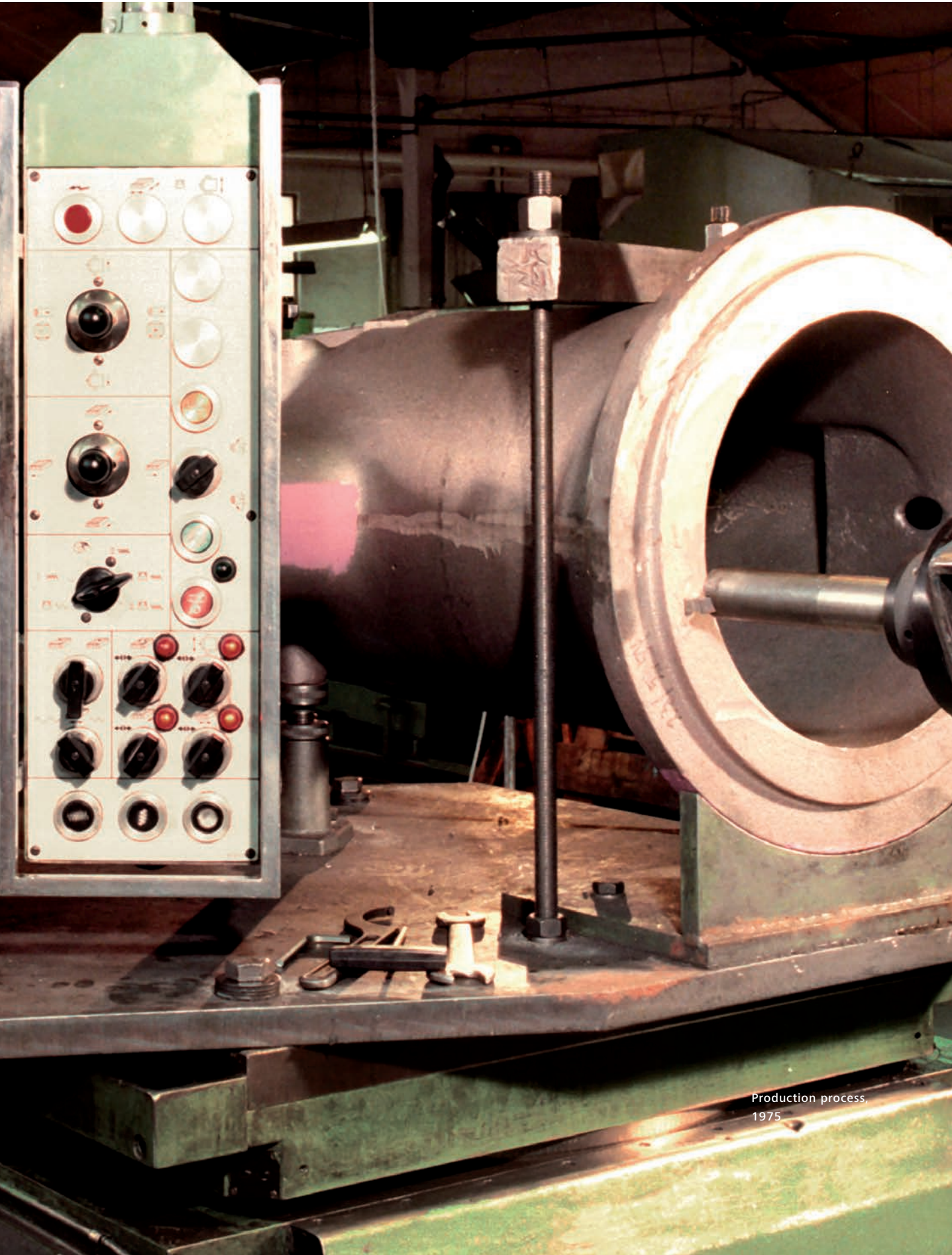
1965

As well as Ewald and Hellmuth Mankenberg, Dr.-Ing. Günther Weidner is brought into the firm as managing director with sole responsibility.



Of people and machines

In 1967, the Lübeck-based graduate engineer Hermann Thomsen was appointed manager of the technical division. At the turn of the century, he had become a partner and managing director with sole responsibility. Under his leadership, the company began a period of constructive change in terms of its organisation and technical aspects of its manufacturing. The product range was streamlined and made ready for a move from conventional to automatic machine manufacturing. Industrial production and skilled craftsmanship go hand in hand. At its Lübeck base, Mankenberg now has a striking degree of vertical integration: almost one hundred per cent.



Production process
1975

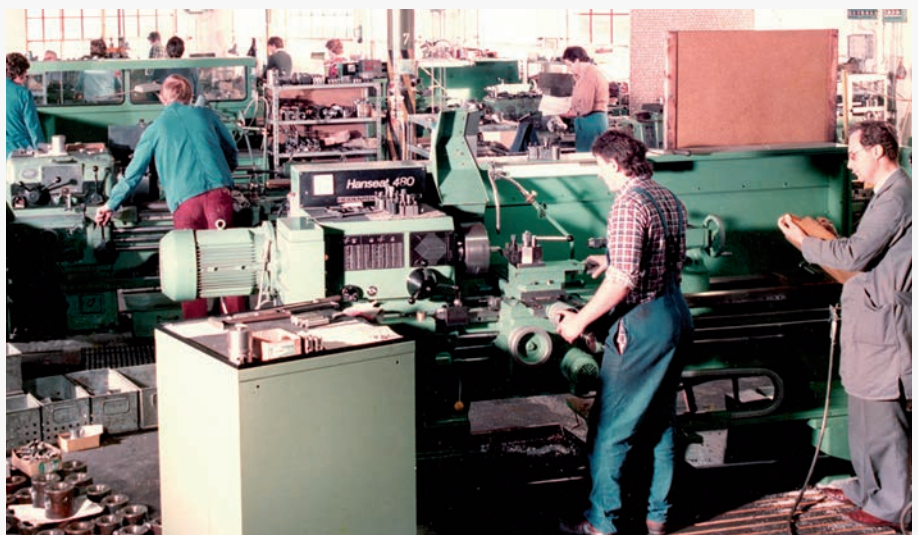
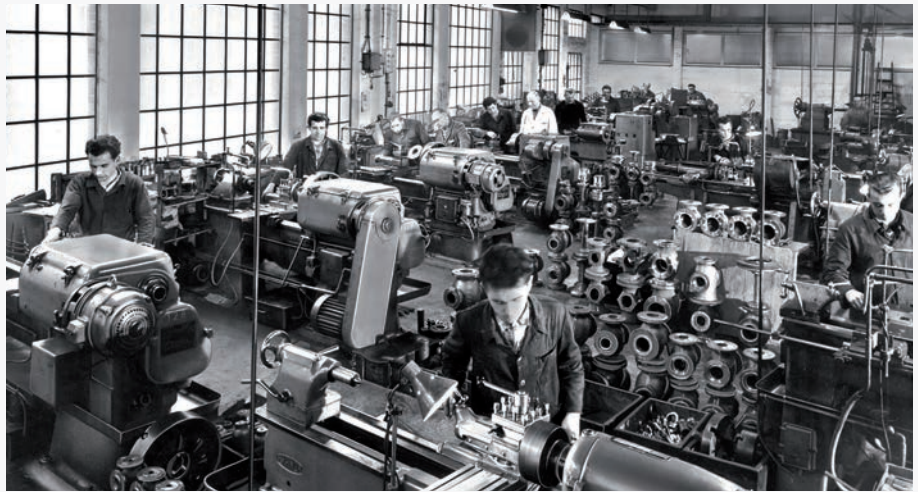
To stand still is to take a step backwards

The 1970s were dominated by changes in society and politics. The rapprochement of East and West, the oil crisis and the launch of the European currency system were milestones in an era that had a long-term effect on us, as a company based in northern Germany. During this period, Mankenberg's manufacturing process

also underwent modernisation. After Hermann Thomsen joined the company, the range of valves offered was gradually expanded until it exceeded even his remit in order to help the company react to the market situation in a proactive way. New materials were used, as well as expensive components and additional trades.



Hermann Thomsen, 1967



Above:
Turning shop, 1959
Below:
Systematic time recording in the turning shop, 1975

1967

Hermann Thomsen, a graduate engineer from Lübeck, becomes manager of the technical office.

1967

Dr Christiaan Barnard carries out the first heart transplant in Cape Town.



In a nutshell: while undertaking the transition from manufacturing plant to becoming an industrial manufacturer, Mankenberg had already put in most of the groundwork required. Today, we have all the skills we need in-house to produce everything from standard applications to special solutions, from mass-produced products

to one-off customised solutions and from consultation to delivery of top-quality products. At its Lübeck base, Mankenberg stands for a high degree of vertical integration and for quality products 'Made in Germany'.



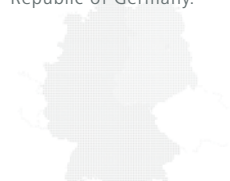
Jan Niederschabbehard
 at the NC automatic
 lathe, 2009

1968

Mankenberg develops the Axomat
 steam trap.

1968

VAT is introduced to the Federal
 Republic of Germany.





Images from the production line, 2008. Welding, drilling, milling



Below left: Heinz Niemann
Below right: Mike Engelmann

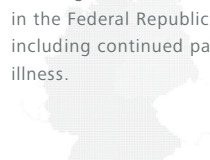
1969

Maiden flight of prototype of Concorde, the first supersonic passenger plane.



1970

Blue-collar workers are afforded the same rights as white-collar workers in the Federal Republic of Germany, including continued pay in case of illness.





Creativity and passion

In order to manufacture industrial valves with passion, you need a distinct love of technology. This is a firm tradition at Mankenberg. After all, the company founder Gustav Mankenberg used his knowledge, experience and creativity to the full benefit of his customers. This approach remains unchanged even today. Project management and development, the deep-drawing of stainless steel and special materials, turning and milling, sealing and membrane manufacture, tool construction, welding, surface finishing and assembly, and quality control procedures are all steps in our

manufacturing process and part of our overall value chain, and comprises everything from the sheet steel to the final valve.

It is true that we buy in the standard screws we need for constructing our products. But as far as everything else is concerned, if it has Mankenberg stamped on it, it is a Mankenberg product through and through. This also means that you may occasionally come across a Mankenberg product where you least expect to see one: as an OEM product in a range offered by some of our market competitors.

125 years of Mankenberg, the foundation of our success

1971

Dipl.-Ing. Hermann Thomsen becomes a partner at Mankenberg and takes over as Managing Director with sole responsibility.



1971

McDonald's opens its first German branch in Munich.





Recommended by leading competitors

Examples of manufacturing and processing

It may sound paradoxical, but it benefits both sides. Job order production, i.e. supplying other valve manufacturers and the industry with individual components or complete casings, is a welcome opportunity for Mankenberg to take advantage of market opportunities, utilise its manufacturing facilities to full capacity and also achieve further diversification of its product range.

Our customers also benefit from the expertise we have gained over years

of processing special materials. Our expert knowledge when it comes to the manufacture of pressure-bearing equipment according to the pressure equipment directive and AD 2000 is just one example. If our competitors reach the limits of what they can provide, then we can provide an offer whose quality and variety are highly appealing, from the prototype to small-scale mass production. Our unique expertise in the deep-drawing technique enables us to process thick stainless steel sheets, for example.

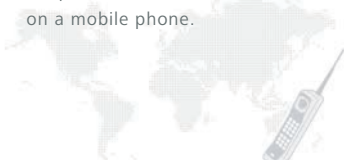
1972

Hewlett-Packard launches the HP-35, the first scientific calculator, on the market.



1973

Martin Cooper carries out the first telephone conversation in the world on a mobile phone.

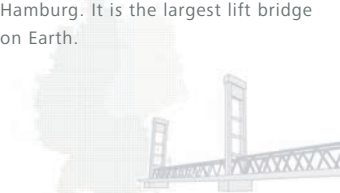




The combination of various manufacturing techniques for innovative products and applications expands our customers' horizons and provides them with a real competitive advantage. Job order production is a relatively new branch of Mankenberg's business activities, but the positive feedback we have received from our customers, as well as our own experiences, have convinced us that it has great development potential.

1973

The Kattwyk bridge is opened in Hamburg. It is the largest lift bridge on Earth.



1974

Germany wins the Football World Cup.



We create pressure

Compressing and increasing pressure is our job

Application report

Project	Oil supply to integrally geared turbo compressors		
Client	Borsig ZM Compression GmbH, Meerane		
Industry	Machine construction	Valve(s)	SF 2.00S, UV 5.1SO

BORSIG

Borsig ZM Compression GmbH manufactures integrally geared turbo compressors for increasing the pressure of process gases. Typical fields of application include chemical and petrochemical plants, process engineering processes in many branches of industry, fuel gas supply in gas turbine plants, flue gas desulphurisation plants, cooling processes in steel production, as well as the foodstuffs industry and biochemical plants.

In integrally geared turbo compressors, a central gearbox drives one or more compressor stages. The lubricant supplied to slide bearings in the gearbox must be extremely pure and have a constant pressure and temperature. For this task, an oil supply system is used, the design of which in this case meets the requirements of the API 614 guidelines (American Petroleum Institute). To guarantee a constant level of pressure for the lubricant, an overflow valve with separate control space was incorporated.

The special thing about this design is that the control pressure can be decreased immediately before the gearbox and the pressure in front of the cooler and filter can be adjusted. Varying pressure losses (depending on how dirty the filter is) have no influence on the final pressure of the gearbox.

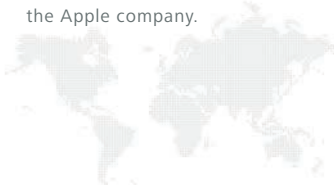
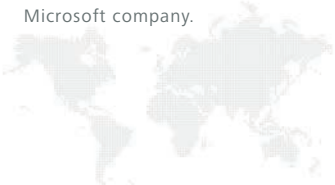


1975

Bill Gates and Paul Allen found the Microsoft company.

1976

Steve Jobs and Steve Wozniak found the Apple company.



MANKENBERG



Strainer SF 2.00



Overflow Valve UV 5.150



SFK lubricant skid plate with SF 2.00S

Borsig ZM Compression GmbH, Meerane



1977

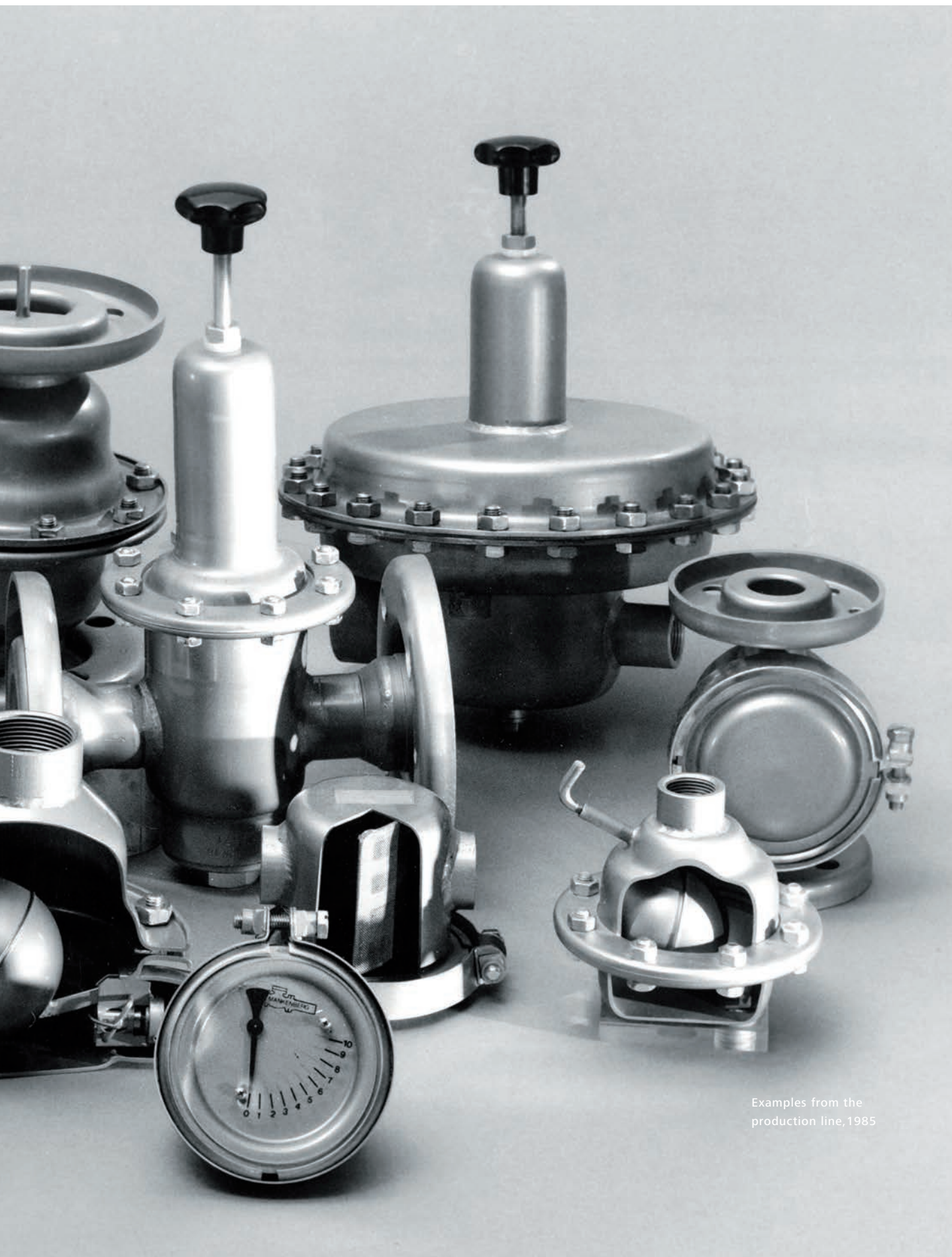
143 years of German industrial heritage come to an end: German Federal Railway takes its last steam locomotive out of service.





Even good things can be improved

At the height of the 1980s, Mankenberg already had a broad customer base. Industrial valves that were tailor-made for a customer needed to be capable of meeting various requirements and being customised to suit specific customer needs – and in the shortest possible production time. The solution? A new manufacturing process which involved the deep-drawing of stainless steel. The innovativeness and exceptional flexibility of this new process was incorporated into the modular High Grade system, which consists of deep-drawn control valves made from stainless steel.



Examples from the
production line, 1985

Pots and eggs

What came first? The idea or the demand? A bit like the chicken and the egg saga, the deep-drawing of stainless steel raises the interesting question of how this technique actually came into being. One thing is certain, however: Mankenberg is one of the pioneers of this technique. The first deep-drawn stainless steel pressure reducing valve was manufactured in Lübeck as early as 1979 and the first deep-drawn bleeding and venting valve range was made in 1980.

The Pressure Reducing Valve DM 662, one of the first deep-drawn valves, in comparison: Valve right, 1979 Valve left, 2009



1978

Volkswagen AG is the first foreign car manufacturer to open an assembly plant in the USA, in Westmoreland County (Pennsylvania).

1979

Mankenberg develops the first deep-drawn stainless steel pressure reducing valve (DM 662).

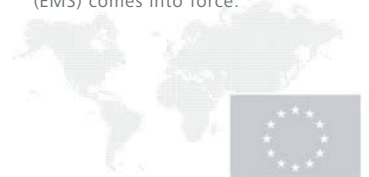




Aerial photograph,
2008 Mankenberg,
Spenglerstraße 99,
Lübeck

1979

The European Monetary System
(EMS) comes into force.



When it comes to this technique, it is worth going into some depth

There is a lot more to the term 'deep-drawing' than you might think. Stainless steel or materials such as Hastelloy® or titanium are very robust. Deep-drawing them without heat, i.e. 'cold', poses a huge technical challenge. At Mankenberg, deep-drawing is undertaken using cup-shaped components which form complex casings for valves in combination with the turned and milled cast-iron components that we manufacture ourselves. In order to join all these components together, we use the Wolfram inert gas welding technique (WIG).

For the deep-drawing process, you need hydraulic presses which can shape the material cold using a high level of force. Up to now, the largest press we have used at Mankenberg can apply a force of 2500 kN. Or in other words: six fully loaded lorries.

But how do you get the complex valve from a flat blank? The shape produced is basically the result of the tool used, which consists of a mould (to form the outer contour) and the punch (to form the inner contour). The space between the two shapes is what contains the shaped cup following completion of the drawing process. A round blank which undergoes a three-dimensional shaping process produces a cup-shaped mould which is buckled on the bottom. As the material is unyielding, the blank is compressed between the blank

holder and drawing ring and stretched again between the drawing ring and punch. This means that the bottom is more or less the same thickness as the original blank although it decreases towards the bottom and increases towards the top. This process requires the utmost attention because if the tensile load is too great, the material can tear during processing.

Thimbles were deep-drawn from brass as early as 1500, rather than cast. Later, the deep-drawing process was used to manufacture cooking pans from stainless steel as part of mass-production processes. Today, deep-drawing is best known for its use in vehicle body construction in the automotive industry. Mankenberg first used this manufacturing technique in the manufacture of valves which – because of design and safety aspects – were technically regarded as pressure containers and therefore subject to particular demands. The dimensioning of the wall thicknesses of the casing was dependent on the pressure load that the valve would be required to withstand in practice.

Another difficulty was that cold forming, which encourages the desired metallurgical process of strain hardening in the material, results not only in the required higher material strength, but also leads to increased brittleness. If several



On the inside pages:
One cup, several possibilities

1979

First global climate conference takes place in Geneva.



deep-drawing processes are undertaken consecutively, 'austenisation annealing' is used to remove the effects of strain hardening.

Thanks to the manufacture of this mass-produced material, the quality of the original blank is considerably higher than with cast materials, which may suffer from shrinkage, impurities and build-up of flaws in the mould. Deep-drawing does not have any negative impact on the high surface quality, meaning that this is exactly what our High Grade products are known for. Another advantage in comparison to cast iron is that stainless steel sheets (including deep-drawn) can be easily welded. This means that we can weld different components to create anything from small-scale production series to one-off special components. This makes High Grade products highly versatile, especially when it comes to installing them in pipelines. In a nutshell, deep-drawing stainless steel is a manufacturing technique which proves its worth through entire product ranges.



Joachim Andreas,
Teamleader of Sheet Metal
Forming and Logistics,

2010

1979

The American space probes
Voyager 1 and 2 discover volcanic
activity on Io, one of Jupiter's
moon



Our modular principle

Cups which we manufacture from deep-drawn stainless steel form the basic building blocks for our valves. The special feature of the deep-drawn procedure used at Mankenberg is that it enables us to use a mass-production technique even for customised solutions while keeping the number of parts to a minimum.

The first step is always the manufacture (or the selection) of the right tool for the deep-drawing process. The required cup shape is manufactured from high-quality stainless steel sheet using a hydraulic press as part of a process which comprises several phases.

A particular cup model can be used several times, giving rise to numerous combinations. The same component can be used for various end products. By swapping individual components such as the cone, membrane and spring cap, and the use of welded standard and precision cast iron parts, similar end products can be used for various applications.

This is exactly what the high-grade modular principle sets out to achieve: the combination of flexibility, quality and performance.

A glimpse into the deep-drawing process

Deep-drawing is the use of tensile compression to form a hollow body from a sheet blank. Related techniques include flow turning or hydroforming. The deep-drawing process begins with the blank (the punching) of the so-called round blank, the thickness and diameter of which determine the geometry of the cup.

The interim result

If the right balance is struck between the punch force and the holding pressure, the first draw results in the manufacture of medium-sized cups. The round blank is held in place with a pressure of around 60 bar while the punch creates the shape using a pressure of around 150 bar. The round blank is deep-drawn to form a cup which changes the diameter and wall thickness of the base material.



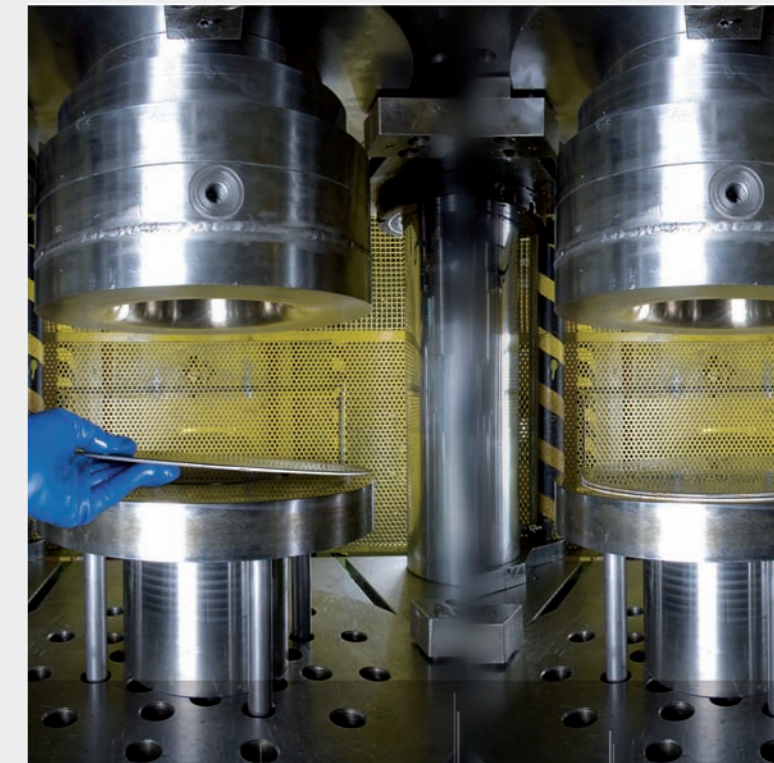
The end result

The shape produced by the first draw has a diameter of approx. 210 mm. The hollow body then undergoes further deforming to create a cup with a diameter of approx. 160 mm. The ratio between the diameter and cup depth changes from approximately 2:1 to 1:1. If the degree of deformation is too high, this can lead to stress cracks. Repeated skilful use of so-called stress relief heat treatment can be used to remedy this and enables deep cups to be manufactured.



The first run

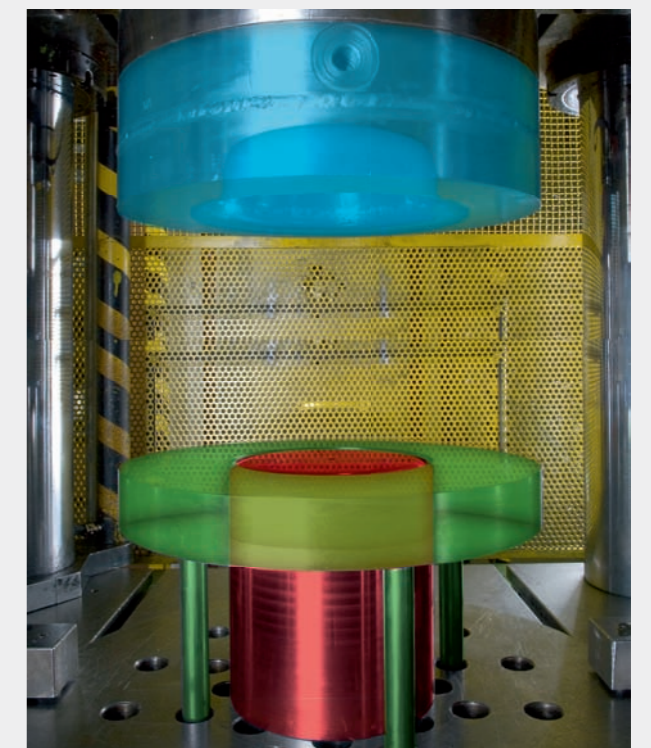
The round blank is placed in the press and the draw die is lowered to fix the blank in place between the die and the counter holder. The holding pressure and punch force are administered precisely according to the pre-programmed values. The system is unloaded and returned to the starting position ready for the next deepdrawing process.

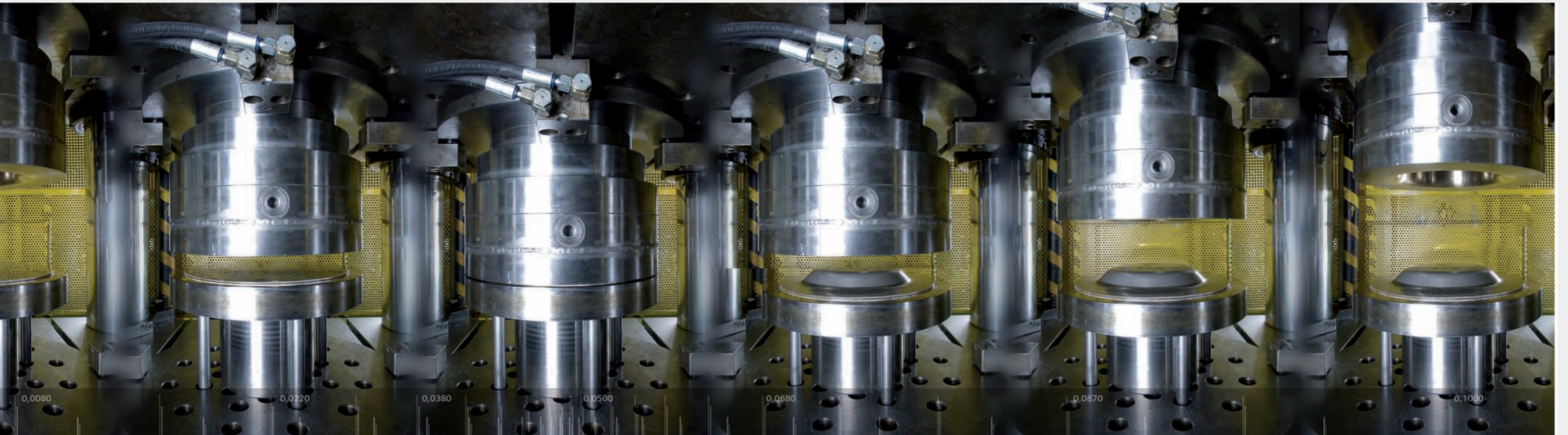


- Draw die
- Counter holder
- Drawing punch

The tools

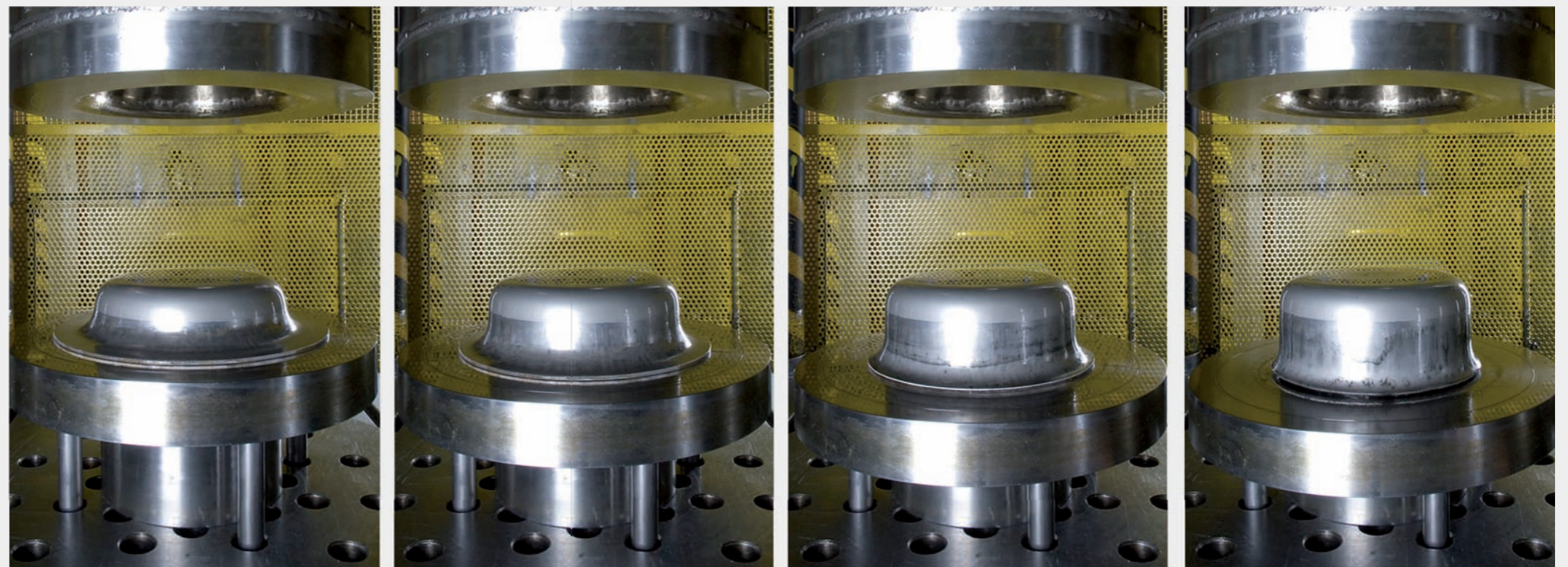
The most important parts in the press used for deepdrawing are the drawing punch, the draw die and the counter holder. The drawing punch is screwed tightly to the press table. The draw die also functions as a blank holder. The counter holder, which is connected to the die cushion using rods, positions the round blank centrally and also functions as a stripper plate. It is forced downwards through the draw die, while the blank fills the space between the drawing punch and draw die.





Step by step

During the second draw, the shape of the draw die and force of the drawing punch act on the preformed cup. The forming time and frictional forces are now crucial to the success of this process. Mankenberg's expertise in tool construction is invaluable when it comes to optimisation of the process parameters.





Pressure Reducing
Valve DM 652, 2009

High Grade – a world of advantages

For a long time, cast iron valves were the standard in terms of valve technology. They are robust and their weight alone means that they are solid and stable. This was one of the reasons why many of our customers regarded deep-drawn valves with some suspicion at first. Could such a lightweight piece of equipment really withstand the same load as the heavy cast steel models? The answer? Yes, of course! Furthermore, the stainless steel used in the form of our High Grade product range offers even more benefits.

ents forms the basis for this particular product series. These components can be combined and enable us to provide a wide range of standard products, as well as special solutions. The modular principle is simple: a mass-produced process in combination with individual connections provides the highest level of flexibility and a supply time of three days at the most. Moreover, special solutions can be offered for an optimal price-performance ratio.



The Mankenberg High
Grade seal

Of all the products in our range, the Mankenberg High Grade seal is given to deep-drawn control valves made from stainless steel. A flexible and globally unique modular system made up of deep-drawn stainless steel compon-

1980

In the 'Red Book', Philips and Sony define the standards for CDs, which went into production at the beginning of the 1980s.



On the safe side

The material characteristics of High Grade valves increase plant availability and reduce long-term operating costs, particularly their surface structure, ease of installation, long operating life and the corrosion-resistant properties of stainless steel. If an overpressure situation occurs, the Mankenberg

clamp system for deep-drawn stainless steel valves will yield slightly and therefore increase operational safety. Unlike with cast valves, this eliminates possible bursting.

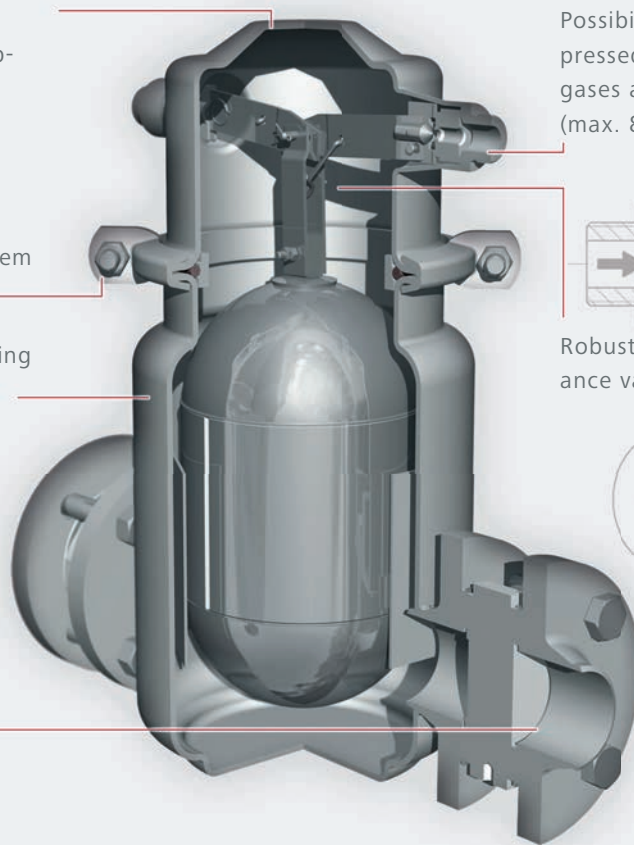
High Grade – making the case for high quality

Compact and pressure-resistant thanks to deep-drawn CrNiMo stainless steel (316L)

Mankenberg clamp system = fast service

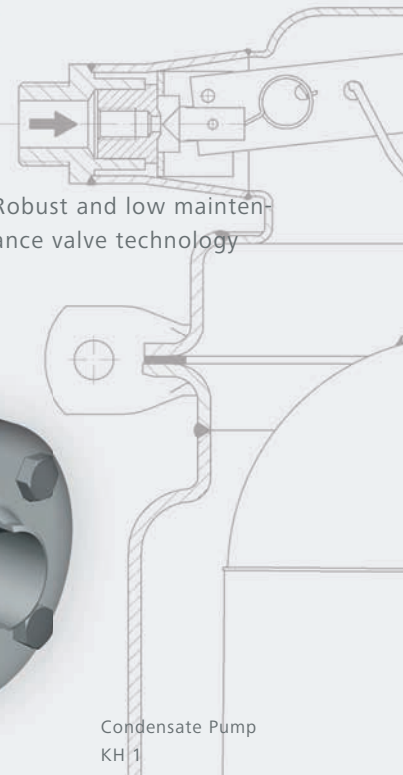
Standard surface of casing < Ra 1.6 µm

Deep inlet



Possibility of using compressed air, steam or inert gases as blowing agents (max. 8 bar)

Robust and low maintenance valve technology



Condensate Pump KH 1

1980

The first deep-drawn bleeding and venting valve (EB 1.12/EB 1.32) is developed by Mankenberg.

One cup, several possibilities

A simple cup is the best way of showcasing our High Grade modular system. It forms the basic casing for the Float Valve NV 66, as well as the Pressure Reducing Valve DM 664, the Strainer SF 6 and also the Bleeding and Venting Valves EB 1.74, EB 1.12 and EB 3.52.

The same component can be used for various end products. It is precisely the use of one deep-drawn cup for the most varied valves which enables us to use cost-effective mass-production processes such as deep-drawing. At the same time, the modular system provides a large number of possibilities and a higher level of flexibility for customer-specific solutions, as well as short supply times.

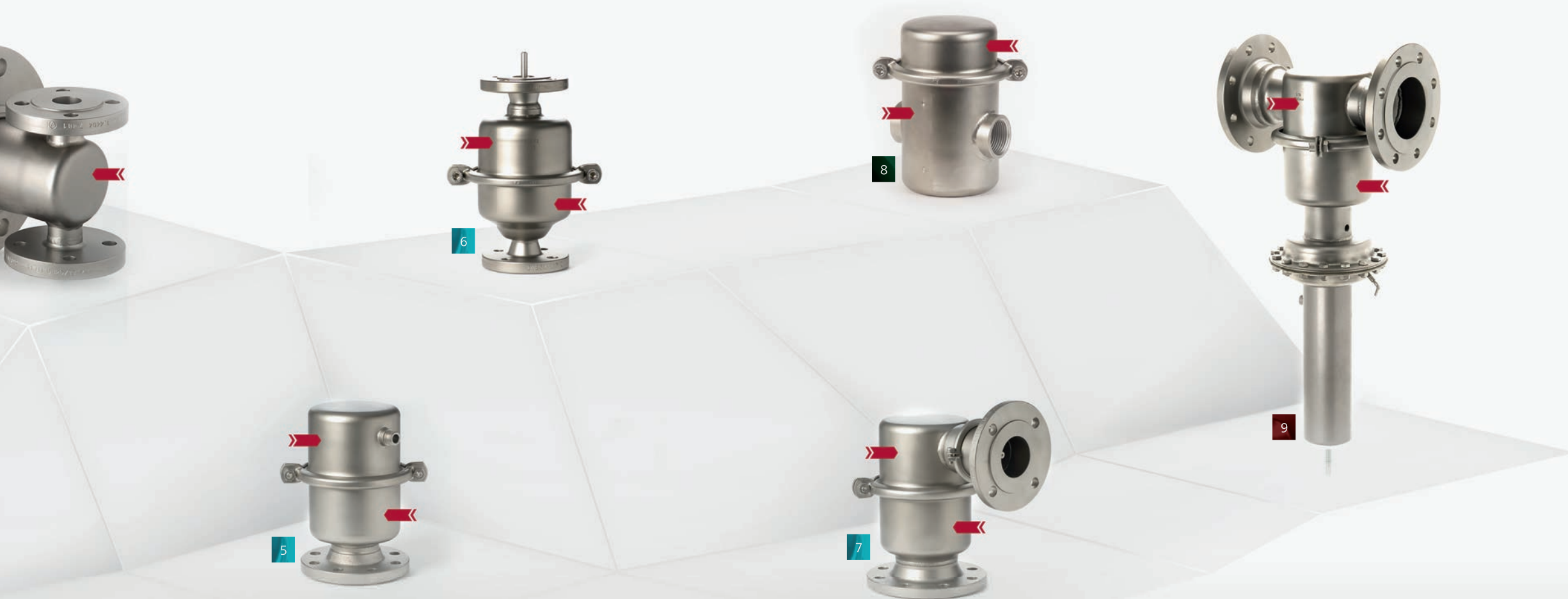


Level Regulating Valve	NV 66E	1
Combined Bleeding and Venting Valve	EB 1.84	2
Pressure Control Valve	UV 1.8SO	3
Level Regulating Valve	NV 67E	4
Continuous Bleeding and Venting Valve	EB 1.12	5
Start-up Bleeding and Venting Valve	EB 3.52	6
Combined Bleeding and Venting Valve	EB 1.74	7
Strainer made from stainless steel	SF 6	8
Pressure Control Valve	UV 4.8	9



Stay connected

In other words, keep track. The same valve model, the same body and an almost unlimited number of connection types, such as sockets, flanges or clamps: this results in a maximum number of similar but also very different valves and enables us to transform a standard valve into a solution suited to the individual customer.





The Mankenberg High Grade Pure seal



Pressure Reducing Valve DM 152 from the High Grade Pure range, 2009

To consider is to think ahead

The innovative High Grade range is itself a result of continuous development. We developed the High Grade Pure range especially for use in hygienic applications. High Grade Pure valves are characterised not only by their known advantages in comparison to High Grade, but also by an even better surface quality and special construction form. The polished valves have been especially designed for use in hygiene applications, e.g. in the pharmaceuticals and food-stuffs industry or for semiconductor production. Their construction design minimises dead pockets and ensures a low level of surface roughness, which guarantees maintenance of external purity requirements in hygienic processes. At the same time, they also provide a considerable reduction in the energy consumption required for CIP/SIP cleaning processes, thanks to the low heat capacity of the comparably thin casing walls. This saves costs and reduces downtime.

1980

Summer time is introduced in Germany.





Detailed view of a seawater desalination plant

Mastery of a craft is based on experience

More than three decades' experience has made Mankenberg an expert in the field of stainless steel deep-drawing. Over the years, we have been able to extend this principle to other materials. Deep-drawn valves made from titanium or Hastelloy® can be used wherever a high concentration of chloride ions or seawater makes for an aggressive environment. These high-quality materials are an investment, but they guarantee a high level of sustainability with the lowest follow-up costs.



Overflow Valve UV 5.1 titanium, 2009

1981

The American company IBM unveils the first personal computer (PC): the IBM 5150.



In the service of medicine

For medicines, you need the highest possible quality

Application report

Project	Media supply for pharmaceuticals bottling plants		
Client	Bausch + Ströbel, Ilshofen		
Industry	Pharmaceuticals industry	Valve(s)	DM 662



BAUSCH+STRÖBEL®

Bausch + Ströbel is a market leader in the manufacture of machines and whole production lines which process pharmaceutical containers.

Before being filled, the bottles, ampoules or sprays are washed, sterilised, dried and then closed. This process uses various types of water quality all the way up to pharmaceutical-grade water and sterile air. The media dispensers in the bottle washing machines are sometimes cleaned using sterile saturated steam in between production processes.

To control the pressure level when various media are used under varying operating conditions, a precise pressure control valve is required, in particular one which conforms to the strictest hygiene requirements and which has excellent resistance to media and temperature.

In photo 3, you can see the washing machines and sterilising tunnel from one such plant. The wall in the background separates the room from the neighbouring sterile room which contains the bottling and closing machines. On the washing machine in the foreground, you can see the Mankenberg pressure reducing valve in use, which guarantees the correct flushing pressure necessary for cleaning the bottles. In photo 2, you can see part of the product feeding mechanism in which Mankenberg pressure control valves monitor the varying pressure during production or in cleaning mode.



1982

The first Commodore 64 is launched on the market.



MANKENBERG



Pressure Reducing Valve DM 662

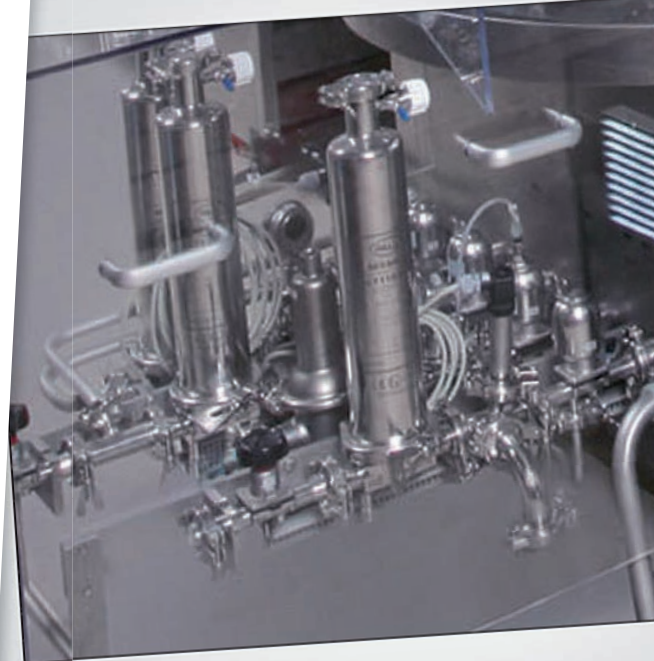


Product feeder mechanism



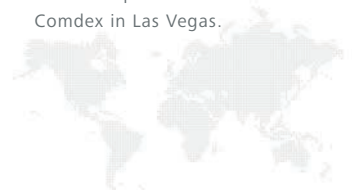
Washing machine and sterilising tunnel with Mankenberg pressure control valve

Bausch + Ströbel, Ilshofen



1983

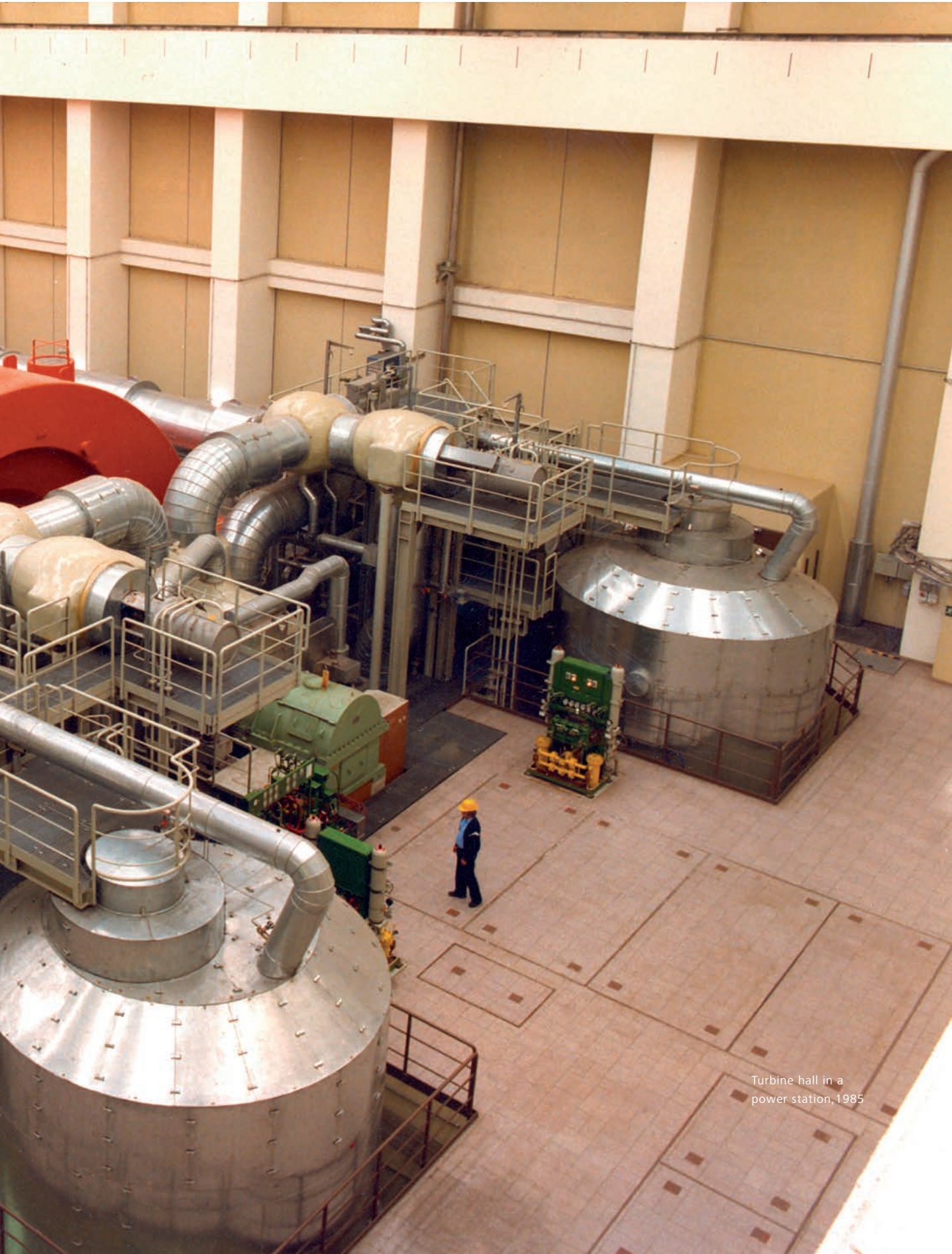
Microsoft presents Windows 1.0 at Comdex in Las Vegas.





Mankenberg – safety is paramount

During the 1970s, nuclear energy began to play an increasingly important role in energy supply. Mankenberg supplies nuclear power plants across the world with industrial valves. These obviously have to meet the strictest safety standards. The Nuclear Safety Standards Commission (KTA), which was set up by the Federal Ministry for Education and Science in 1972, monitors adherence to safety standards and their application in Germany. Mankenberg has been certified by the KTA since 1984: this is one of the best references the company could have when it comes to the issue of quality.



Turbine hall in a
power station, 1985

Quality has several faces

Industrial valves perform key functions in plants and pipelines and therefore have a considerable influence on customers' own processes: accuracy of control, reliability and safety are paramount. Quality control at Mankenberg is therefore a central theme which runs through all aspects of the production

process. At Mankenberg, quality control is a separate team whose members are directly answerable to the Managing Director. Everything that leaves our production halls has to be checked by the experienced hands of our quality control team. But if we are honest, even these high standards are not enough to satisfy us when it comes to quality.



Daniel Tesmer,
Team Leader
Inspection

Hans-Joachim Schultz,
Head of Quality Dept.

Marcus Köster,
Inspection

Malte Bromberg,
Checker and Team
Leader Test Bench
Dept.

Christiane Broszinsky,
Adviser, Quality
Control Dept.

Thorsten Vollstedt,
Successor to Head of
Quality Control Dept.

Oliver Studier,
Team Leader Test
Bench Dept.

Jasmina Gruhl,
Adviser, Quality
Control Dept.

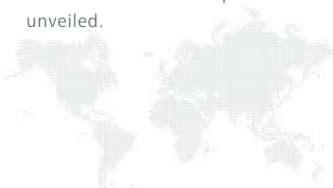
1983

First KWU (Kraftwerk Union) audit
of Gustav Mankenberg.



1983

The IBM Personal Computer XT is
unveiled.



Our secret – Mankenberg employees

Mankenberg products convince. Whether it is customer advice, construction, order processing, quality control, manufacture or after-sales care, our employees are crucial. Thanks to the experience of long-standing colleagues and the ideas of young employees, all our departments provide the highest level of quality with the aim of complete customer satisfaction. But just how do our employees make sure that Mankenberg continuously produces products of the highest quality?

The basis for this is, of course, quality of training. Almost 60 per cent of our employees were trained at Mankenberg itself, and are therefore familiar not only with manufacturing processes, administration and quality control, but also with our high demands in terms of craftsmanship. The willingness to always give their best is regarded as both a responsibility and a duty by Mankenberg employees.

If you walk through our production halls, you will be impressed by how precisely we document each stage of the production process and check the quality of our interim and final results. It goes without saying that we do this so that we can provide a traceable account of all our batches and working procedures. Our computer-controlled system for documentation

and quality control allows us to access each stage of the value chain at any time, helping us to identify exactly where the material came from and who was responsible for the previous stage of production.

Attention to the finest detail



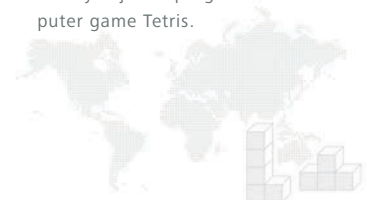
1984

The Krümmel nuclear power station is connected to the national grid for the first time.



1985

Alexey Pajitnov programs the computer game Tetris.



Certifications

- » ISO 9001 since 1994
- » Pressure Equipment Directive 97/23/EC
- » Certified Welders according to DIN EN – ISO 3834-2
- » Certificate from the VGB (Technical Association for Power and Heat Generation) in accordance with KTA 1401

Inspection certificates and material certificates

- » EN 10204/2.1
- » EN 10204/2.2
- » EN 10204/3.1
- » EN 10204/3.2

Approvals

- » German Technical Monitoring Association (TÜV)
- » Germanischer Lloyd (GL)
- » Lloyds Register of Shipping (LRS)
- » Bureau Veritas (BV)
- » Det Norske Veritas (DNV)
- » Registro Italiano Navale
- » American Bureau of Shipping (ABS)

Our standard rules and regulations

Our standard rules and regulations form the basis for our own high quality standards. We willingly commit ourselves to observe the following guidelines for the design and production of our valves.

Flanges

EN 1092-2, DIN 2526, DIN 2500

Leak rate for metallic seals

VDI/DE 2174

Leak rate for soft seals

DIN EN 12266-1 P12

Pressure and tightness test

DIN EN 12266-1 P10 P11

Body

AD 2000, data sheet A4

Weldings

AD 2000, data sheet HP-0/TRB200

Our quality is your safety

1986

The Soviet Union launches the core module of the Mir Space Station into the Earth's orbit.



1987

The Single European Act to create the European single market comes into force.





As it is on the inside, so it is on the outside

If Mankenberg quality is its hallmark, then the choice of the right suppliers is also of the utmost importance. In most cases, our relationships with our suppliers, like our general business relationships, are long-term relationships. We have trusted our partners for several decades and in several cases we also know them personally. And if we need to engage additional suppliers – to tap into new markets, for example – our sales team will visit suppliers personally, which makes for a good first impression. After all, nothing can replace a face-to-face discussion.

All Mankenberg suppliers are subject to a strict evaluation system. This incorporates the closed loop improvement process that we set up ourselves. When it comes to supplier relationships, feedback functions in both directions. This enables us to increase the degree of mutual transparency and trust.



The full programme

External quality control goes hand in hand with internal quality control: from selecting suitable suppliers to final quality control tests on the in-house test bench, our employees and quality control management team ensure that the Mankenberg name delivers what it promises – even under the most extreme operating conditions worldwide.

Left:
 Master craftsman Helmut Schröter, working on ultrasonic quality control at the beginning of the 1980s
 Right:
 Malte Bromberg, Checker and Team Leader Test Bench Dept. checking under medium, 2008

1989

The Berlin Wall falls.



1989

Mankenberg develops the first pilot operated welded pressure control valve (inline valve).



Perfect companion for filtration plants

If you need to release air efficiently, you can trust Mankenberg bleeding and venting valves

Application report

Project	Operational bleeding and venting of oil filtration plants		
Client	Karberg & Hennemann, Hamburg		
Industry	Machine construction	Valve(s)	EB 1.1250



Karberg & Hennemann manufactures fine filter units and fine filter separators which are used in shipping and other industries to monitor hydraulic oil, gear oil and lubricants, as well as several other operating liquids.

The filter body must be bled at regular intervals as air is constantly drawn in and collects in the upper part of the filter body. If this air is not released, the pressure indicator will not function well and it will not be possible to determine the saturation of the filter cartridges. Furthermore, the efficiency of the filtration process can be reduced depending on the amount of air present.

Automatic bleeding and venting valves with float control are used to automatically bleed the system during start-up and operation of the filter, as well as to bleed the system after filter cartridges have been changed.



1990

Axel Weidner joins the Gustav Mankenberg valve factory.



1990

Germany wins the Football World Cup.



MANKENBERG



Bleeding and Venting Valve EB 1.1250



Stainless steel bypass filter



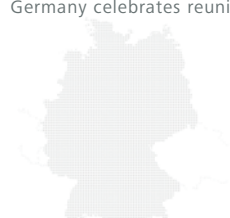
Automatic hydraulic filter unit

Karberg & Hennemann, Hamburg



1990

Germany celebrates reunification.





Looking at the world through the eyes of our customers

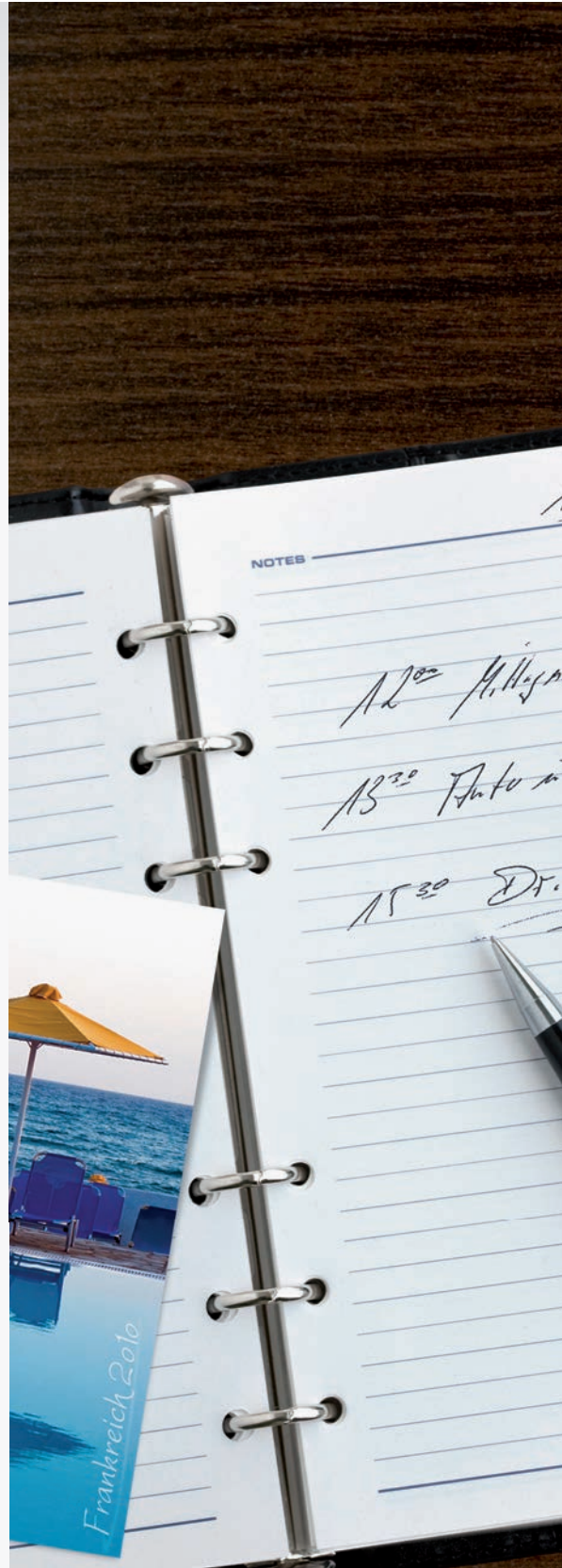
The evolution of industry is a continuous process and has provided numerous innovations over the decades. Since 1885, Mankenberg valves have played an essential part in making technology possible. From the beginnings of industrialisation to the modern use of steam traps in biotechnology, Mankenberg has been, and continues to be, a reliable partner for all branches of industry. A partner which immerses itself so deeply in each industry that it seems as though it has always been there. The result is stability and variety: Mankenberg valves can be found in almost every industry across the world.





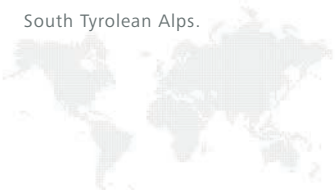
A day like any other

When you get up in the morning, look at your reflection in the bathroom mirror and squeeze some toothpaste onto your toothbrush, you will already have been in indirect contact with several Mankenberg products. After all, the energy, chemical, pharmaceuticals, and foodstuffs and drinks industry, as well as waterworks, all rely on industrial valves from Mankenberg. We are really at home when it comes to machine and plant construction. When you drive home in your car, use your mobile, and eat your lunch in the canteen, there will be a piece of Mankenberg in all the products you encounter. Do you like going to football matches at the weekend and drinking a pint of beer? Mankenberg is there as well. Beer dispensing units and bottling technology would not be able to function without our products, not to mention bottle cleaning and labelling plants. And even when you are lying by the pool in the sun on your well-earned holiday, it would be impossible to run a refreshing bath without a bleeding and venting valve. Our products are everywhere. They are an everyday part of modern life. And are therefore anything but ordinary.



1991

Ötzi the Iceman is found in the South Tyrolean Alps.





1991

Scheduled high-speed trains are introduced to Germany in the form of the Intercity express train.



Our success has many roots

Industry variety means stability – even in difficult economic times, our broad customer base compensates for the company's susceptibility to economic fluctuations. Our long-term customer relationships with companies in the most varied of industries have grown over the years. And our expertise has grown with them. Mankenberg finds solutions for every industry, regardless of whether the application in question is small or large, or whether standard products or special solutions are needed. We immerse ourselves in every application.

How do we manage to meet the needs of completely different customer groups and industries time and again? It is the joy of developing that drives us. Gustav Mankenberg was the first to recognise the satisfying feeling of having given his clients exactly what they needed. Nothing has changed in that respect.

If it can be done, we will make it possible. This means looking at the world through the eyes of our customers. Which solution is the right one? And how do we manage to adapt standard solutions to the specific needs of various branches? The answer is simple: we love technology.



Dietmar Pallasch,
Director Product
Management, in
discussion with a
customer at AICHEM
2009



On the inside pages:
Valves for every
situation

1991

The pressure reducing valve Type 152 with polished inner surfaces is developed for the foodstuffs and pharmaceutical industry.



Variety from A to Z

Our products for machine and plant construction range from A – such as the Atex standard, absolutely gas-tight design of the Steam Trap KA 2K for use in biogas applications – to Z – such as the ‘Zigarettenindustrie’, or tobacco industry, for whom we de-

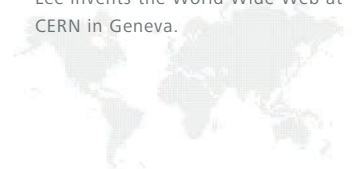
veloped a pressure reducing valve for glue used in the manufacture of cigarettes. Regardless of whether pressure is measured in millibars or for applications with extremely high pressures: we can control them all.

Pressure Reducing Valve DM 506, 2009
 Size 1:1



Getting stuck in

The designs of our special solutions are as special as the variety of industries which use Mankenberg products. One example is the Pressure Reducing Valve DM 506 used for glue in the manufacture of cigarettes. The device had to be small and compact and be able to adjust the pressure of the viscous adhesive precisely. This was the only way to avoid too much glue being applied to the paper. To this end, Mankenberg supplied a special pressure reducing valve furnished with an individual connection socket, which is now used in these types of machines across the world.



Valves for all situations

A good example of how we meet the individual requirements of the most varied customers and industries is the Pressure Reducing Valve DM 505.

The exact specifications are absolutely crucial. The medium, temperature, nominal pressure, control range and several other parameters influence the creation of the optimal valve, e.g. in terms of the combination of size, membrane, casing and material. On the basis of these requirements, a standard product is transformed into a one-off customer- and industry-specific solution. Take a look for yourself!

Valves for Small Flow Rates

DM 505

Pressure range*	Medium	Application
0.005 - 0.025	N ₂ (nitrogen)	Inert gas carrier
0.02 - 0.12	N ₂ (nitrogen)	Inert gas carrier
0.1 - 0.5	Process air, diesel, water, sodium hydroxide	Burner systems
0.2 - 1.1	Fuel, petrol, air, CO ₂ (carbon dioxide)	Test benches
0.8 - 2.5	Argon, CO ₂ (carbon dioxide), filtrate, fuel oil	Machine construction, industrial oils
1 - 5	Deionised water, N ₂ I, methane, petroleum gas, natural gas, fuel gas, air, ammonia	Sampling systems, gas supply, small, burner systems
4 - 12	Sterile instrument air, industrial gases of all types, CO ₂ (carbon dioxide), argon, N ₂ (nitrogen), hydrogen, oil, petroleum gas, condensate, trichlorosilane, hydraulic oil, heavy oil	Central gas supply, laboratories
10 - 20	Water, air, N ₂ (nitrogen), CO ₂ (carbon dioxide), propane	Water treatment, analysis technology, special liquids

*Pressure range [bar]





0.1 - 0.5



0.2 - 1.1



0.8 - 2.5



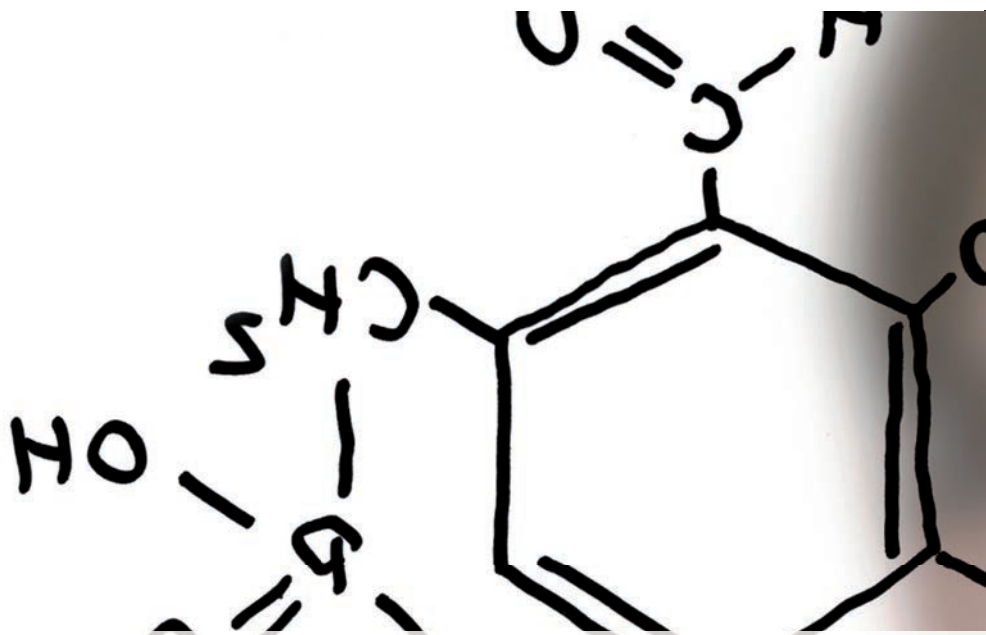
1 - 5



4 - 12



10 - 20



Making sure the chemistry is right

Our activities in the chemical industry reach back several years, as proven by our history at the largest trade fair for chemical technology, environmental protection and biotechnology, AICHEM in Frankfurt am Main. We have been presenting our products at this trade fair since 1927, when it still took place in Essen. We have also showcased our particular industry expertise through various applications for the chemical industry.

The conveyance of flammable liquids presents particular challenges for condensate pumps. In addition, processing plants in the chemical industry place greater importance on the material used. In bioethanol manufacture, for example, the Mankenberg Overflow Valve UV 1.8M DN 80 is used. But what exactly is it used for? While biodiesel is a biofuel substitute for mineral diesel fuel, bioethanol is the substitute for petrol. Bioethanol is produced by fermenting grain with

the help of yeast. An interim stage is the slurry, which is very inhomogeneous and has very variable dynamic viscosities.

During fermentation, the Overflow Valve UV 1.8 guarantees constant pressure in the fermentation chamber of, for example, 6 bar and ensures the continuity of the chemical process with a maximum overflow performance of approx. 40 m³/h. The advantages are obvious: the Mankenberg overflow valve combines the chemical resistance of the materials, sufficient pressure resistance and low valve weight with a high level of performance. Furthermore, this valve is suitable for mediums of varying viscosity.

1992

Mankenberg moves from Bolingstrasse into the newly constructed company headquarters on Spenglerstrasse in Lübeck.





Overflow Valve
UV 1.8

1992

The mobile phone networks D1 and D2 go into operation.



A quest for purity

The drinks and foodstuffs industry is extremely diverse and offers a range of applications for Mankenberg products. However, this world of multi-faceted opportunities and colourful packaging is one thing above all else for us: a question of quality and purity. And it is exactly here that customer requirements meet Mankenberg solutions.

How exactly does carbon dioxide (CO₂) get into drinks? As no CO₂ is actually dissolved in drinks, it has to be introduced using pressure. A set of pressure cylinders generate process gas by evaporation of liquefied CO₂, which is then incorporated into the drink's manufacturing process. Several identical valves work in parallel on several evaporators to ensure continuous operation even if one run fails. The pressure reducing valves reduce the operational pressure in the manufacturing process. Mankenberg's contribution? The DM 502 Pressure

Reducing Valve.

As particular emphasis is placed on hygiene standards in the foodstuffs industry, a stainless steel valve is used in these cases. These deep-drawn valves are characterised by their high level of corrosion resistance and surface quality. The reliable control valves require no auxiliary energy and can be easily maintained thanks to the clamp system.

1993

The German postal service introduces the five-figure postcode.





Pressure Reducing
Valve DM 502

1993/1994

Mankenberg introduces DIN ISO 9001 via TÜV Netherlands: first audit by KWU and TÜV Netherlands.



Valves for the pharmaceuticals industry

Interdisciplinary specialist areas such as the pharmaceuticals industry present us with complex challenges and technical problems which require effective solutions time and again. Flexibility in design, execution and choice of materials is an initial step in the right direction when it comes to valves. A good example of this is the Pressure Reducing Valve DM 462V. The valve is designed for use with various media, and appeals because of its compact design which allows it to be installed in tight spaces. The most compact version is made from solid steel. Its extreme high-quality surface means that it is ideal for use in the pharmaceuticals industry, and it has a varying range of connections, while the clamp system ensures easy maintenance. Mankenberg developed

and implemented specifications for this pressure reducing valve in direct cooperation with the pharmaceuticals plant construction industry. As well as its compatibility with all media and its adherence to the Basle standard, which has strict requirements insofar as surface roughness and delta-ferrite content, for example, are concerned, we also place great importance on the low mass of the valve. Less weight means that less heat is lost during steaming in automatic plants. This means that cycle times for processes can be organised in a more efficient way.

1994

The Eurotunnel between Calais in France and Folkestone in England is approved for passenger transportation.





**HIGH
GRADE**
pure

Pressure Reducing
Valve DM 462V from
the High Grade Pure
range

1995

Austria, Finland and Sweden join
the EU.



Quality and long operational life for power stations

Power station operators and energy suppliers have relied on Mankenberg industrial valves for decades. Quality and long operational life make our products highly attractive for this industry, which has high safety requirements and must control some exceptionally sensitive processes. Commended as one of the top suppliers to the international AREVA Group, we have already made a name for ourselves in this area.

But we do not see this as an excuse to simply rest on our laurels. Far from it, in fact: we have also put our skills to the test in other types of power

station. One of our solutions, for example, has been used for the process water network in flue gas desulphurisation plants: the Pressure Reducing Valve RP 115 DN 150.

A little background: the machine parts in flue gas desulphurisation plants in a coal-fired power station must be rinsed at regular intervals. Otherwise, deposits of halogenides such as fluorine, chlorine and iodine compounds lower the efficiency of the whole plant. This is why spray nozzles are used. The task of the Mankenberg pressure reducing valve is to reduce the pressure in the service water network.

1995

Axel Weidner becomes a partner in the Gustav Mankenberg valve factory.



1996

Mankenberg introduces CAD.





Pressure Reducing
Valve RP 115

1996

Along with Hermann Thomsen, Axel Weidner becomes Managing Director of Mankenberg.

Pipeline protection in Russia

Our valves love extremes

Application report

Project	Pressure limiting on marine loading arms		
Client	Alpensee Handelsanstalt / OOO Flowtec Ltd.		
Industry	B14 plant construction	Valve(s)	UV 6.2 DN 200

OOO Flowtec Ltd.

In the Black Sea port of Novorosiysk and also the Baltic Sea port of Primorsk, large tankers are loaded and unloaded at marine loading stations.

Mobile marine loading arms form the connection between land and ship. In order to secure the loading plant against any unwanted drift of the ship, the pipeline can be disconnected using quick-connect fittings together with an emergency conveyor shut-off.

If a malfunction occurs and the system is shut down, the kinetic energy in the liquid column can lead to a dangerous pressure peak. An overflow valve which opens quickly must immediately divert the excess oil into a collection tank and automatically close once the pressure falls below the set pressure level.

The valve is a medium-controlled valve and the set pressure is adjusted via a pilot valve.



1999

The euro is introduced as an accounting currency in eleven EU states.

1999

Mankenberg carries out its first customer training session.



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Overflow Valve UV 6.2



Overflow Valve UV 6.2



Part of the marine loading station at Primorsk Commercial Sea Port

Alpensee Handelsanstalt / OOO Flowtec Ltd.



2001

Mankenberg switches to TÜV Nord
(ISO 9001 and Pressure Equipment
Directive EN 729-Z).



Our location shows where we stand

In 2002, Axel Weidner, Gustav Mankenberg's great-grandson, became sole Managing Director of Mankenberg GmbH. As well as building on a long tradition of manufacturing coupled with skilled craftsmanship, and in combination with implementing modern industrial manufacturing logistics, the management team also focused on renewal. The new leadership style is characterised by its extremely high level of transparency and openness. At the same time, Mankenberg has taken on more responsibility, both for its employees and for the business location of Lübeck and the surrounding region.

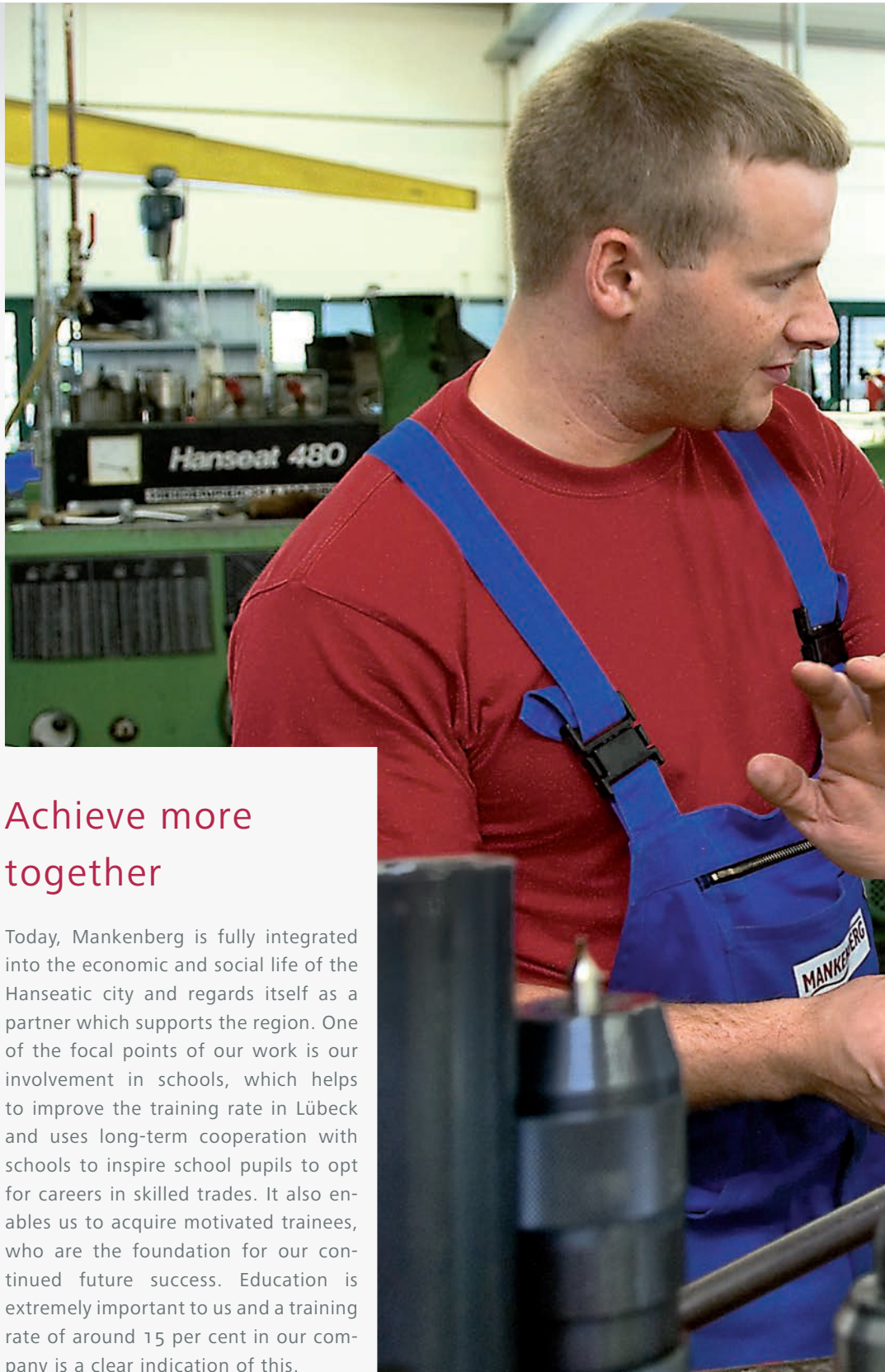


Holstentor, Lübeck,
2003

A look into the training workshop at Manken-
berg, 2008

Christian Mebius,
Team Leader Machining
Training

Wladimir Wachruschew,
Machine Mechanic



Achieve more together

Today, Mankenberg is fully integrated into the economic and social life of the Hanseatic city and regards itself as a partner which supports the region. One of the focal points of our work is our involvement in schools, which helps to improve the training rate in Lübeck and uses long-term cooperation with schools to inspire school pupils to opt for careers in skilled trades. It also enables us to acquire motivated trainees, who are the foundation for our continued future success. Education is extremely important to us and a training rate of around 15 per cent in our company is a clear indication of this.

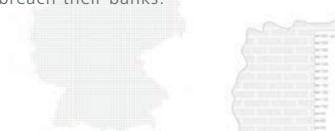
2002

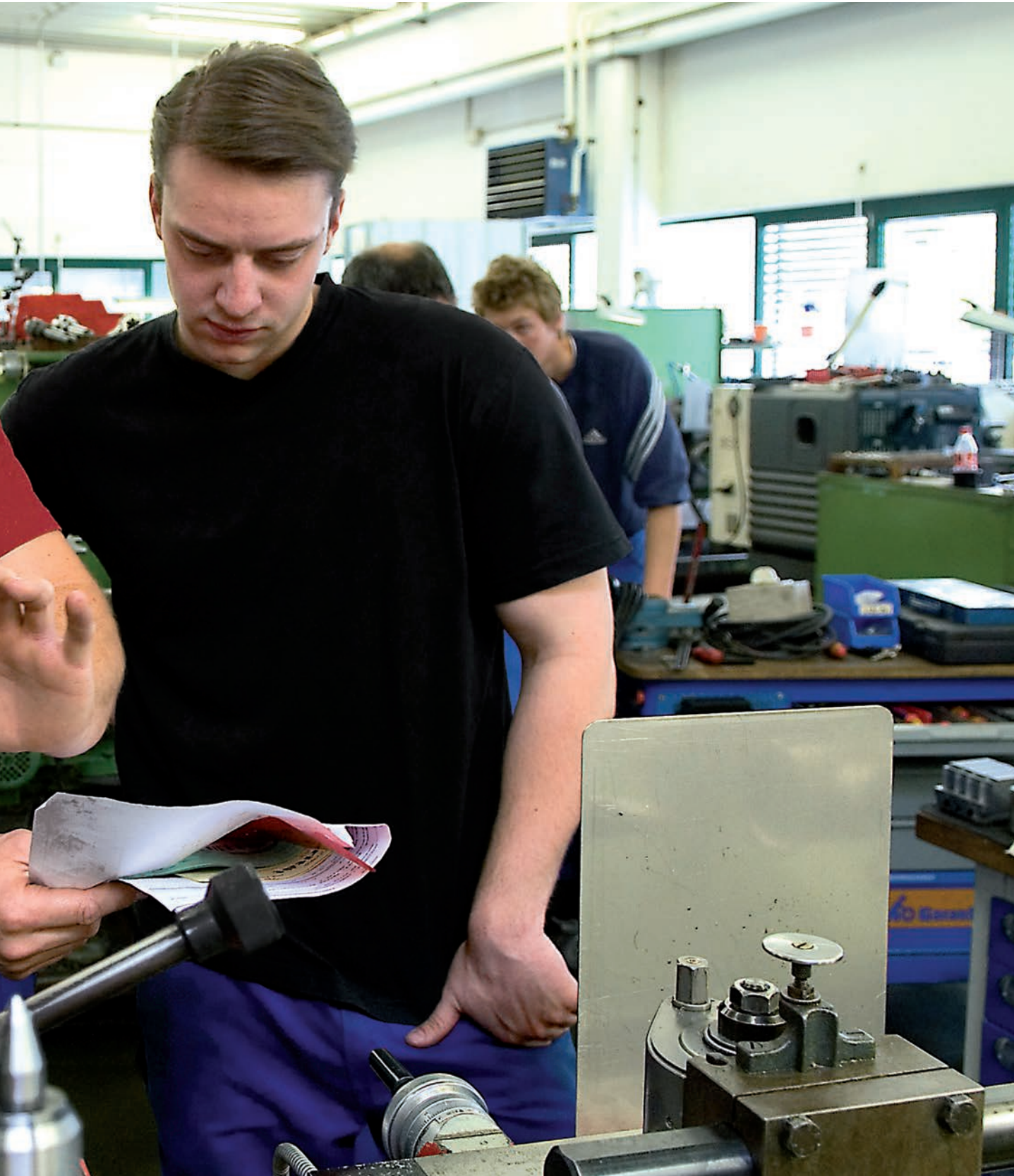
According to Gartner Group calculations, April sees the sale of the billionth PC.



2002

Flood of the century in Germany: due to continuous heavy rainfall, the Elbe and many of its tributaries breach their banks.





2002

Sven Hannawald is the first ski jumper to win all four individual jumps at the Four Hills Tournament.

2002

Hermann Thomsen retires from the Gustav Mankenberg valve factory, leaving Axel Weidner as sole Managing Director.



Images from a Money Box Rally at Mankenberg

Björn Flack, Technician, explains a CAD drawing

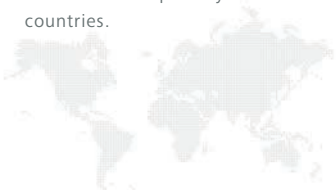
How to create the future using money boxes

Discovering industry and production at Mankenberg in a fun way with money boxes – this is what schoolchildren in years 8 and 9 have been doing regularly since October 2005. The so-called Money Box Rally has become a fixed component of our annual calendar and an important part of our efforts to preserve training within the company. In the words of Axel Weidner, 'We have a responsibility to and for society; who will look after us in our old age if there is no work available for anyone?'

The aim of our sponsorship schemes with the Kooperativen Gesamtschule Reinfeld school, as well as the Grund- und Gemeinschaftsschule Heinrich-Mann-Schule, is to create a long-term link which benefits everyone. Schoolchildren receive a practical insight into the on-the-job training options available at Mankenberg, the company can recruit motivated trainees and the trainees already at Mankenberg can gain additional qualifications by organising the Money Box Rally themselves. But what exactly lies behind this idea?

2002

The euro is adopted by 15 countries.



2003

The Gustav Mankenberg valve factory changes its name to Mankenberg GmbH.

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Many teachers have never experienced the reality of industry for themselves but have to prepare their pupils for professional life beyond school. These are the gaps that Mankenberg aims to fill with the Money Box Rally. The main focus of the one-day event is to introduce pupils to three types of on-the-job training (industrial businessman, industrial mechanic and machine mechanic), as well as to learn about the whole production process using the manufacture of a money box made from stainless steel. Mankenberg trainees organise the event and carry it out single-handedly. In this way, they learn how to apply presentation and design skills independently and can gain additional qualifications. This is perhaps a reason why many of our trainees are the best in their year. The school groups, who spend a day at Mankenberg, are given a no-holds-barred chance to learn about the company and training opportunities. Following a short theoretical introduction, a tour is undertaken through the various stations of the company: from order processing to shipping of the finished product.

Before they are taken round the factory, the schoolchildren receive a parts list which lists the different individual components for their money boxes. They must then find the locations of the components and collect them. While on the tour of the production process, they learn about the various stages of manufacture which turn a piece of stainless steel into a valve or – in this case – a money box: drilling/



turning, CNC turning, deep-drawing, welding, sandblasting, assembly and test bench.

Trainee Andreas Drews, Machine Mechanic, explains deep-drawing to the class

As well as the Money Box Rally, Mankenberg also holds career information days. Trainers and trainees visit schools and tell them about their working day and the various career opportunities available at the company. Another platform via which young people can be recruited to work in the industry is the annual careers orientation fair in Lübeck. At this educational trade fair, trainees use practical examples to show visitors exactly what is involved in careers at Mankenberg. And they put in a huge amount of effort. Mankenberg has devised an internal competition specifically for this purpose. All these campaigns are aimed at raising the profile of on-the-job training options in the industry. With huge success, too: many of the schoolchildren we spoke to have later applied for a training place at Mankenberg.

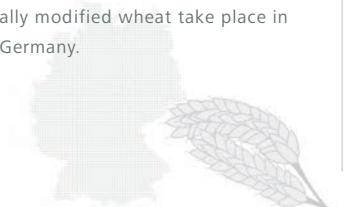
2003

Production of the VW Beetle is discontinued, following the manufacture of over 21.5 million Beetles worldwide.



2004

First attempts to create genetically modified wheat take place in Germany.





In UNICEF's name

2007

In 2007, Lübeck became the 15th city partner of the United Nations child aid organisation UNICEF. With this accolade, it took on the responsibility of presenting itself as a cosmopolitan Hanseatic city which understands the problems that the world is currently facing. The projects supported by the city vary widely, as do the ideas for collecting money. Mankenberg is a part of this. As part of the Money Box Rally, schoolchildren make collection boxes with a UNICEF logo which are distributed throughout the city. A practical contribution which benefits everyone – but mostly children in Africa.

2004

The Niagara steam trap is 100 years old.

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2004

Formula 1: Michael Schumacher wins his seventh world champion title.



A network consists of opportunities

If you are economically successful as a business, you should give something back. One way we do this is via the campaigns mentioned on the preceding pages. Another way is to give young academics an opportunity to learn about industrial practice. As an industrial company, Mankenberg of course offers students in the fields of machine construction and indus-

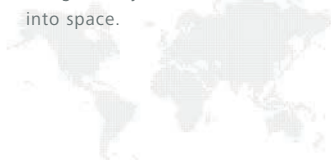
trial engineering the chance to undertake industrial work experience lasting several months. Five to six diploma theses are supervised in Lübeck every year. The results from these theses, which are based on practical topics such as process analysis, are then put into practice.

Advertisement in
 Fachhochschule
 Lübeck student hand-
 book 2010/2011



2005

The first satellite for the European navigation system Galileo is sent into space.



2005

Mankenberg develops the first deep-drawn valve made from titanium.

People are our strongest resource

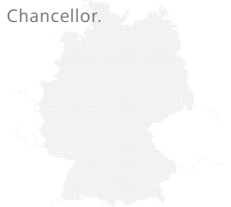
It is one of our basic principles to invest a lot in our employees. After all, we know that they will give us a lot back. Motivated and highly trained staff are crucial to the success of a company. Our expertise in development and manufacture, product quality and, of course, customer satisfaction are due in no small measure to our employees. Mankenberg is a member of a corporate organisation for small and medium-sized businesses, which works together with Lübeck's business development committee to promote professional staff development and organisational development in businesses.

This involves continuous discussions as well as training in the fields of technology and sales. New employees receive a comprehensive induction plan and get to know departments, processes and, of course, their colleagues. Employees who come into contact with foreign customers can take part in in-house English lessons. Internal training sessions on IT and safety in the workplace complement the specialist training courses, and can be attended either on an individual or a group basis.



2005

Angela Merkel becomes first female Chancellor.



2006

The first buses to operate on hydrogen begin running in Berlin.





Internal High Grade training session, 2009

2007

The first possibly habitable exoplanet is discovered. It orbits the Gliese 581 star, 20.5 light years away.

2007

Start of the project 'Development of a new generation of pipeline valves with large nominal bores for water, oil and gas' which is sponsored by the WTSH (Business Development and Technology Transfer Corporation of Schleswig-Holstein).



Torsten Boye, Team Leader Sales, 2010

A new dimension of transparency

Transparency and openness are a fixed component of our corporate culture. This guarantees that all employees have managerial skills, and the company also expects them to put these into practice – regardless of their position within the company. The technical side of this is taken care of by one of our ERP systems for company-wide transparent resource planning. Another important indication of our commitment to transparency and openness is the use of the recently introduced integrated management system (IMS), a software-supported system aimed at increasing efficiency. The implementation of this kind of system is unusual for a company of our size. This displays all economic and administrative processes graphically and provides access to the information according to hierarchical access rights. The system lists company-specific rules for industrial production, as well as detailed pro-

cedures for overall processes. It grows organically with our organisation and structure.

Parallel to this, the software-based Mankenberg Hausmeister (Mankenberg caretaker) makes the organisation of the relevant processes linked to building and machine management easier: from operating instructions for the coffee machines, individual energy consumption and maintenance handbooks for machines to a shopping list of cleaning materials. This is also an unusual investment for a company of our size to make and is an expression of a new management style.

Mankenberg computer icons for the IMS program (integrated management system) and the Mankenberg Hausmeister (buildings and machine management).



2007

Mankenberg receives process and welding inspection approval for titanium in accordance with the Pressure Equipment Directive.



2007

An electronic commercial and cooperative society register is established in Germany.



G. Mankenberg
 Metallwarenfabrik und Giesserei.

Logo 1885-1912

Gustav Mankenberg :: Stettin
 Maschinen- und Armaturen-Fabrik :: Giesserei.

Logo 1913-1922



Logo 1923-1970



Logo 1971-2002



Logo 2003-2008



Logo since 2009

Our goals determine our direction

A company needs orientation, as do the employees who work for it. This is why we have developed a vision of how we see Mankenberg: our corporate vision. It determines the route we take and functions as a point of orientation for employees, customers, investors and suppliers. Our corporate vision is formulated in a clear manner, but is not a straitjacket. Quite the contrary, in fact: it is flexible, just like the markets and economic situations in which we work and move. The following is an excerpt from our corporate vision:

'Open, sustainable external communication based on partnership enables us to understand the needs of our customers and accurately estimate the capabilities of our suppliers. Open internal communication, with a high degree of transparency in company processes for each and every employee, helps us to solve together the tasks that customers present us with. Our collaborative organisation will help the company to adapt to the markets in an age of globalisation, as well as continuously improve internal processes.'

2008

Mankenberg develops the first
 Condensate Pump made from deep-
 drawn stainless steel.



Identification – the key to motivation

This is something our employees prove to us time and again. Identifying themselves with Mankenberg as a company begins with simple things, such as our uniform work clothes, which were developed on the basis of our newly developed corporate identity. The fact that they identify themselves with the company is also evident in company sports or mutual leisure activities which help staff to gel and promote team spirit.

The range of activities aimed at incorporating the Mankenberg spirit into its employees' lives varies from the legendary dragon boat races on the Trave to golf and photography courses and grill parties, as well as our own company football and bowling teams. The company has a low turnover and employees often work for the company for many years, evidence that we are well and truly on the right path.

Michael Schröter,
Technical Direktor,
and his son,
Janis Schröter,
Machine Mechanic
two generations – one
company

2008

Mankenberg introduces CFD (computational fluid dynamics).

2008

Tempelhof airport in Berlin is closed.

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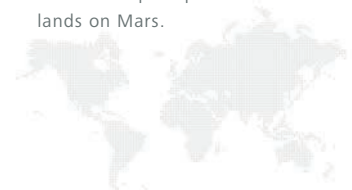
Michael Hell,
Regional Manager East Germany,
Wolfgang Frick,
Regional Manager Central Germany,
at ACHEMA 2009



'Valve pilots' in
action: dragon boat
racing, Lübeck, 2009

2008

The NASA space probe Phoenix
lands on Mars.



Water off a duck's back

Even air temperatures of $-30\text{ }^{\circ}\text{C}$ pose no problems for our bleeding and venting valves

Application report

Project	Water drainage in open-cast mining		
Client	MIBRAG mbH, Zeitz		
Industry	Mining	Valve(s)	EB 1.74



The Mitteldeutsche Braunkohlengesellschaft mbH mines brown coal in open-cast mines.

This requires continuous lowering of ground water at the extraction sites. The ground water is conveyed in large amounts from deep wells and transported via surface pressure pipes.

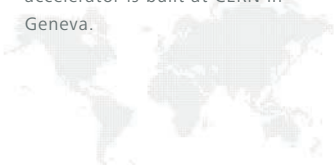
Outgassing water can lead to unwanted two-phase streams. Air pockets at high points reduce the free cross section of pipelines and must be continuously removed. Expansion connectors on pumps and quick-closing mechanism of closing valves ensure that if negative pressure occurs, the level does not fall below the minimum level for the PE pipe. For this reason, venting can take place in large volumes if required.

The combined float-controlled bleeding and venting valve bleeds air during continuous operation and vents at high capacities to prevent an implosion.



2008

The Large Hadron Collider particle accelerator is built at CERN in Geneva.



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Bleeding and Venting Valve EB 1.74



Photograph taken by Horst Fechner



Bleeding and Venting Valve EB 1.74

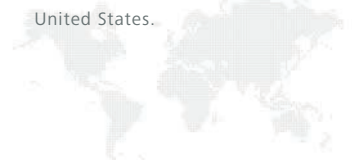
MIBRAG mbH, Zeitz



Photograph taken by Uwe Winkler

2008

Barack Obama becomes the first African-American President of the United States.





Up to now and beyond

125 years' worth of experience is a valuable asset to have. Such a memorable anniversary not only gives us the occasion to look back at the past but also forward to the future. What are our future aims? What route do we want to take? We are facing completely new challenges today. Liberalised markets and global competition require flexibility. At the same time, we want to steadily continue increasing our international activities. The foundation for this has to be laid now. To this end, we rely on our own strengths, as well as our worldwide network of strong partners.



■ Mankenberg GmbH
■ Distributor

Our partners provide us with insights into the world

125 years have passed since Mankenberg was founded. For 65 of those years, the company has been based in Lübeck. The world has changed dramatically over the last few decades. Economic areas have grown together and new markets have been established. Even now, everything is pointing towards the fact that emerging countries and China will form a considerable part of our future international growth. But we also want to grow organically in traditional markets, such as Russia, Eastern Europe and the Middle East, because their key industries have a huge demand for high-quality industrial valves made by Mankenberg.

For us, the key to working abroad is our sales partners worldwide. We already work with manufacturers, dealers and engineering firms in many countries across the world. They enable us to be close to markets and customers across the world, and help us shape our future beyond our own national borders. This network is being continuously expanded.

Many of our products supplied abroad are supplied together with a plant. Mankenberg is particularly sought after when it comes to replacement parts or maintenance – thanks to its high-quality standards, the time intervals in both cases are often very



Markus Scharunge
Despatch, 2008



2009

The corporate design of Mankenberg is overhauled and a new corporate identity designed.

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2009

The Federal Republic of Germany celebrates 60 years of its existence.



far apart. In addition, as an Original Equipment Manufacturer, we complete the product portfolios of other important manufacturers with our components and products, thus quietly expanding our international presence.

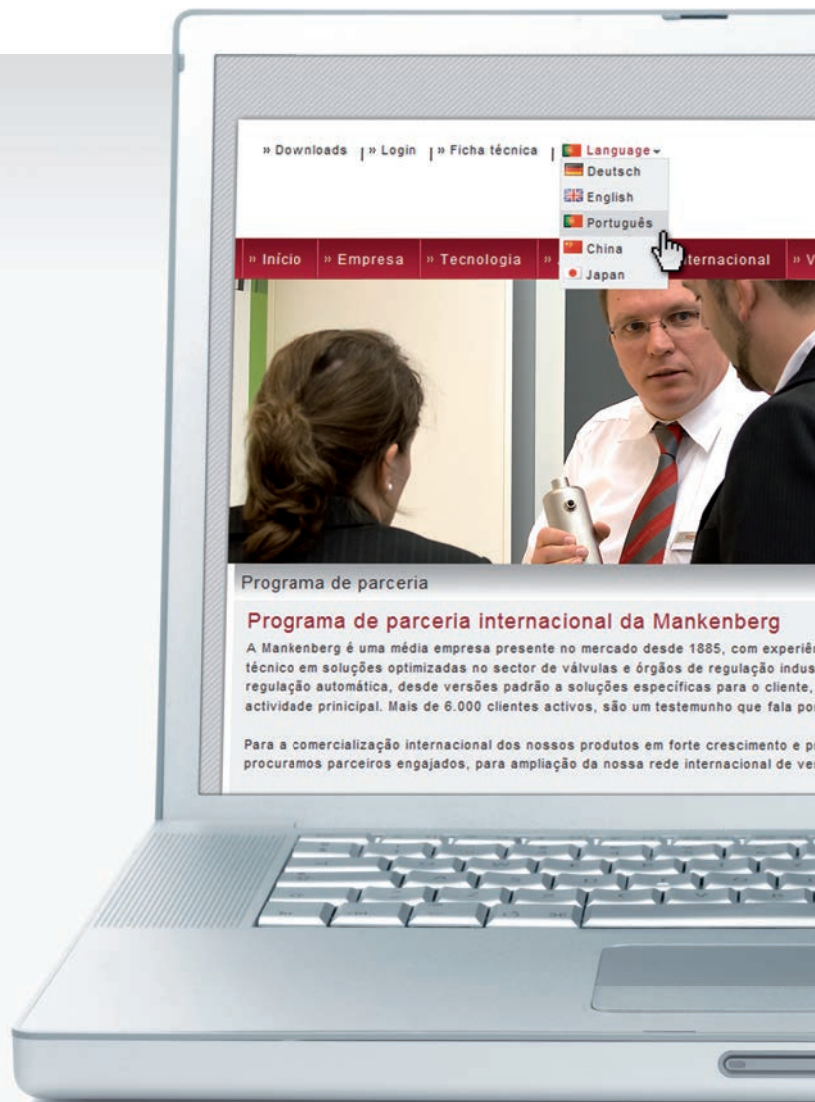
Our network of distributors guarantees us direct access to international markets and new customer groups abroad. Our partners often have a technical background, which is extremely useful for us. After all, Mankenberg valves are products and special solutions which often need explanation and require an exact appraisal of customer needs, as well as techni-

cal advice. In order to guarantee this, our standards are just as high when it comes to the selection of our partners, as they are when it comes to choosing our suppliers. Quick decisions and long-term relationships are important to us. They are what dominate the external perception of Mankenberg.



2009

The weight loaded pressure reducing valve Gloria celebrates its 60th birthday.



Partner programme under construction

Growth is important to us, but not at any cost. This is why we choose our partners with the utmost care. As part of our international partner programme, which is currently under construction, we offer interested manufacturers and dealers various options for collaboration. Mankenberg provides sales and marketing support as part of strategic partnerships. Depending on the level of partnership, this includes several visits by our employees each year, market-

ing budget allowances, marketing tools, and advice and support for customer and partner training sessions. In addition, we help with new customer acquisition and provide service offers that go far beyond sales. Our international premium partners also benefit from attractive discounts and credit limits. In other words, we provide maximum benefits.

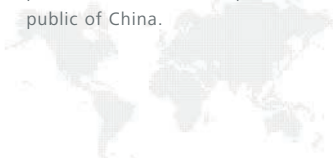
2009

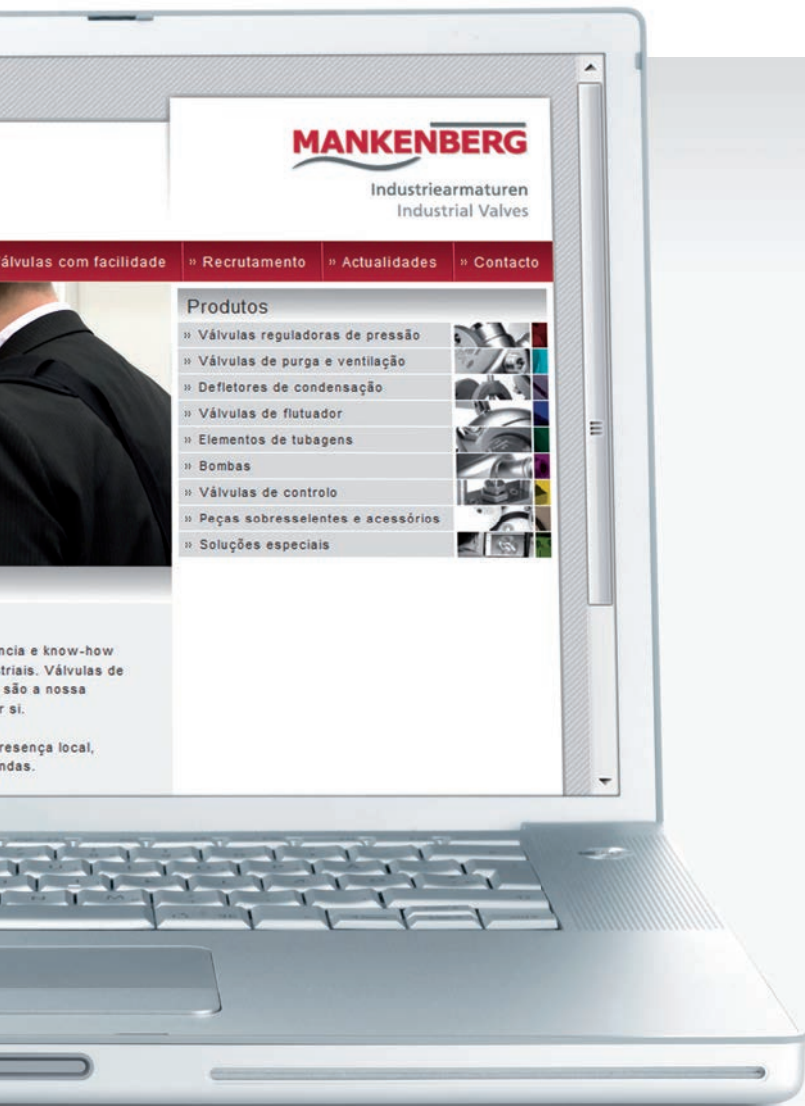
The company magazine Mankenberg Inside is launched.

2009

60th anniversary of Mao Zedong's proclamation of the People's Republic of China.

MANKENBERG





Overcoming borders together

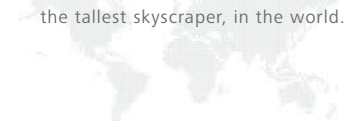
Like our business relationships, our partner programme is geared towards long-term relationships. A high level of commitment reaps dividends for all those involved. However, Mankenberg's international orientation is also evident at its base in Lübeck. Our quotations department works at least 12 hours a day to ensure availability for international customers based in other time zones. Mastery of the English language is as much a matter of course for our

team as expertise in the most varied branches of industry.

In our anniversary year **2010**, we are taking a clear step forward in terms of internationality and our external communication. Our Internet presence at www.mankenberg.de is now available in German and eight other languages: English, Russian, Spanish, French, Portuguese, Italian, Japanese and Chinese.

2009

The Burj Khalifa in Dubai reaches its maximum height of 828 metres and is the tallest construction, as well as the tallest skyscraper, in the world.





Asia also needs quality

The Asian markets are not just of huge interest for Mankenberg because of their size. German products also enjoy an excellent reputation in Asia. The 'Made in Germany' tag is a quality seal for many international decision makers, and one which they willingly trust when it comes to elementary applications such as industrial valves. Furthermore, the variety and flexibility of our modular system is a distinct advantage when promoting use of Mankenberg products in Asian factories.

Access to Asian markets was not easy given the very different cultures and attitudes. A good job, then, that Mankenberg employs native speakers who help us to build bridges worldwide and speak to people from other cultures in their own language. The success of this strategy was clearly evident to us during training sessions and customer visits in China.

Events like this help us to give dealers, users and suppliers an overview of our product range for standard and special solutions, as well as specific examples of their use. Personal contact without encountering language barriers guarantees clearer communication and ensures that no information is lost. The aim of these measures is to provide distant markets with the high-quality specialist advice, product choice and service that our European customers already enjoy.

2010

Eruption of the Eyjafjallajökull volcano in Iceland leads to the closure of three-quarters of European airspace.





Customer seminar,
 2009, Shanghai, China
 'Selection and use of
 control valves made
 easy'.
 At the whiteboard:
 Jing Yuan-Töpperwien,
 Regional Sales Man-
 ager China and
 Taiwan,
 Sven Kretzschmar-
 Hagelstein, Business
 Development Manager
 Asia

2010

Mankenberg celebrates its 125th
 anniversary.

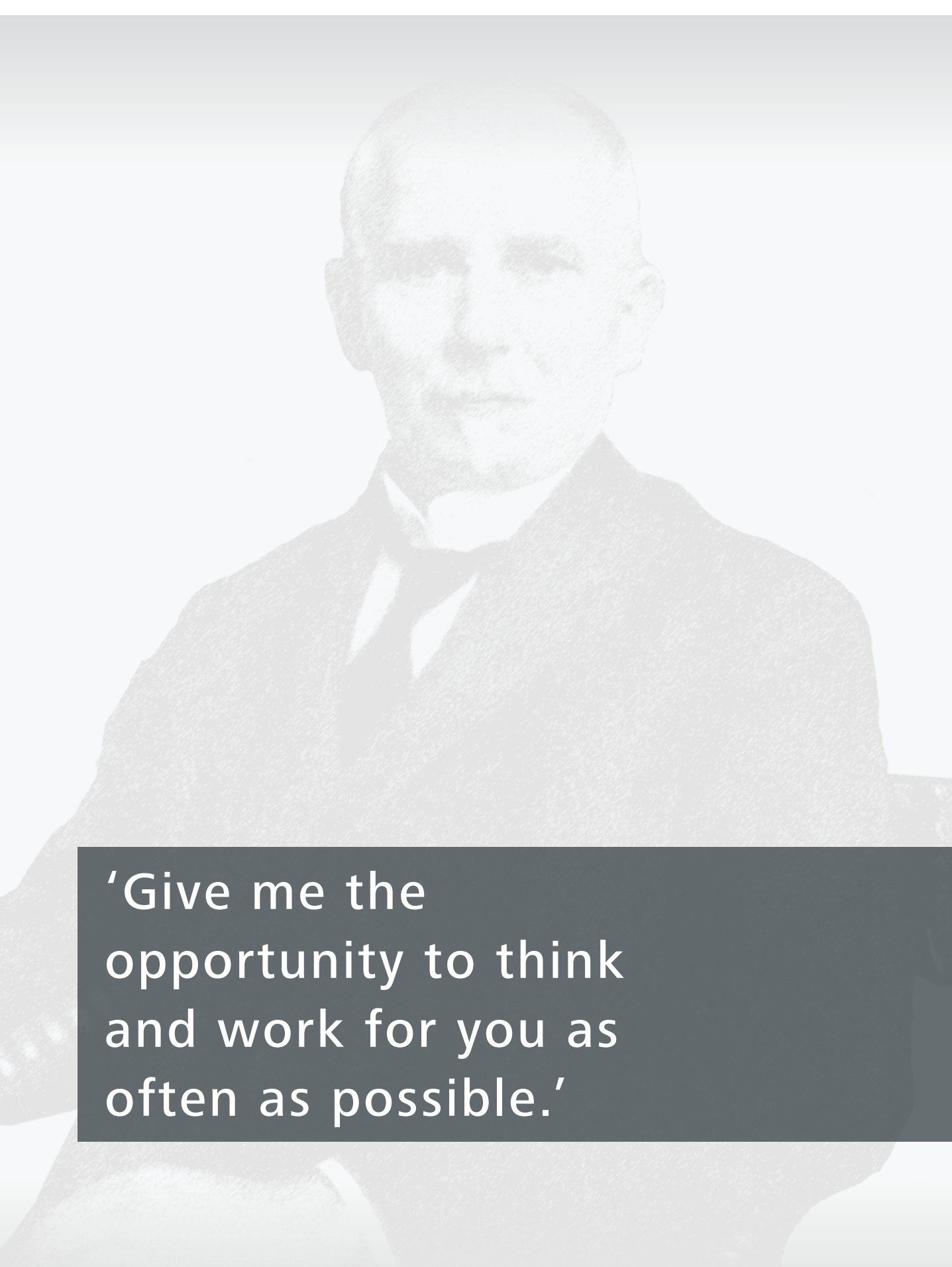
Recognising potential and taking advantage of opportunities

Energy and transport are core areas of growth and will be a pivotal issue for future economic development in emerging countries. During this period of change, Mankenberg can win over potential customers with its products and expertise, but above all quality. The machine and plant construction industry, both in Asia as well as in Europe, is undergoing a period of diversification, and new technologies are being developed, which must be refined given the threat of global climate change. Seawater desalination plants, for example, are an important topic in Arabic countries. So-called clean technologies are on the increase, and we are searching for answers on key issues surrounding resource management in light of dwindling fossil fuels.

Mankenberg can help provide some answers to these issues. With highly developed engineering skills and an absolute passion for technology, we apply our expertise and experience in relevant skills to many industries. Our enthusiasm for what we do is evident in the quality of our products, the loving attention we pay to detail and the challenge of finding the right solution for every application. We do everything to make sure that our customers are as convinced by our products as we are. Behind each exciting service we provide, there is one special human quality: passion.

Or, as Gustav Mankenberg used to say:



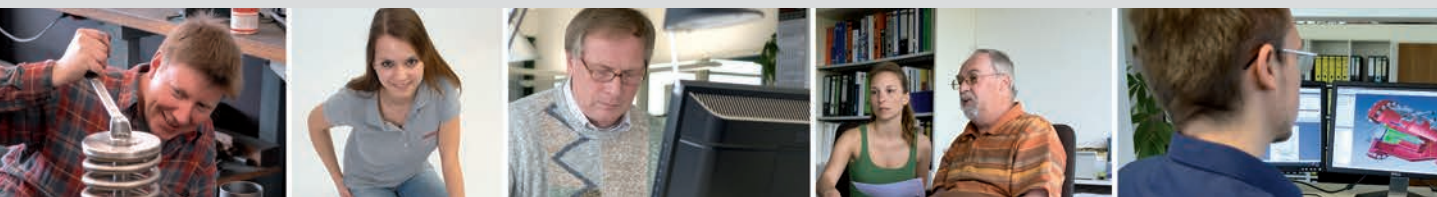


'Give me the opportunity to think and work for you as often as possible.'





Wir regeln das schon, seit 1885.
Firmly in Control since 1885.



Glossary of technical terms

_Austenisation annealing

Austenisation annealing is a heat-treatment process for metals where the heat improves the plasticity or other characteristics of the material. The material – such as copper, brass or steel - is heated until it glows and is kept at that temperature for a period of time. It is then left to cool down slowly. The soft annealing process reduces the hardness and makes further processing stages, such as rolling, wire drawing and punching, considerably easier because it eliminates the risk of cracks.

_Batch

In production technology, a batch denotes a number of items which share the same characteristics and which have been manufactured using the same production process.

_CIP cleaning

The term CIP cleaning stands for 'cleaning in place'. This means that the respective plant is cleaned in cycles or in continuous operation without disassembling it.

_Compressibility

Compressibility is a measure of the relative volume change as a response to a change in pressure.

_Dead pocket

Dead pocket denotes a space in a valve which does not have media flowing through it. In this so-called 'dead pocket', media may collect which cannot be removed by cleaning. Valves without dead pockets are particularly important in the pharmaceuticals and foodstuffs industry.

_Deep-drawing

Deep-drawing is the forming of a sheet blank using tensile compression to form a hollow body which is open on one side. The process is also used to reduce the cross section of a hollow body without altering the sheet thickness.

_Duplex steel® Material number 1.4462

Duplex steel® is a type of steel which has a dual-phase structure consisting of a ferrite (α -iron) matrix with austenite islands (γ -iron). The special feature of duplex steel is that it is particularly rust- and acid-resistant.

_Fermentation

In biotechnology, fermentation is the conversion of biological materials with the help of bacteria, fungus or cell cultures or the use of artificial enzymes (fermenters).

_Food and Drug Administration (FDA)

The Food and Drug Administration (FDA) is a public authority which regulates food safety and manages drug approval procedures in the United States. It is an agency of the Department of Health.

_Halogenides

Halogenides are chemical compounds of elements in group 7 (or group 17, to be more precise) of the periodic table, the so-called halogens, and elements of other groups.

_Hastelloy® Material number 2.4610

Hastelloy® is the brand name for a nickel-based alloy made by the American firm Haynes International, Inc. The group of materials classified under this name are resistant to many aggressive chemicals.

_Integrated management system

The integrated management system (IMS) combines methods and instruments which are used in the implementation and maintenance of specific requirements in various fields (e.g. quality, environmental protection, workplace safety and general safety) within a unified structure which forms part of the company's corporate governance (i.e. the management and monitoring of organisational aspects). In contrast to individual isolated management systems, the use of synergies and bundling of resources leads to a more streamlined and efficient management.

_Mazut

Mazut (Russian 'mazut', from Turkic/Tatar) is a viscous high boiling distillation residue of crude oil, which has a boiling point of over 350 °C. Crude oil (depending on origin) can comprise of up to two-thirds mazut. It is used as a heating material and lubricant or is processed into petrol via a cracking process. Mazut contains low amounts of minerals, mainly iron and calcium oxide.

_NACE

The code 'Nomenclature of Economic Activities' (NACE) lists economic activities for statistical purposes. It is maintained by the European Union and is therefore mainly used in Europe.

_NORSOK

The NORSOK standards were developed by the Norwegian oil industry. They guarantee adequate safety and cost efficiency for development projects and the operation of plants in this economic field. The NORSOK standard M-650 'Qualification of Manufacturers of Special Materials' includes the description of a range of skills required of the manufacturer for materials to be produced and established in the desired shapes and sizes with acceptable characteristics.

_Original Equipment Manufacturer

An Original Equipment Manufacturer (abbreviated to OEM) denotes a manufacturing company of components or products which are produced in the company's own factories but which the company does not sell itself.

_Oxidator

An oxidator is a chemical compound which gently oxidises another substance. In practice, it mostly emits oxygen.

_SIP cleaning

The term SIP stands for 'sterilisation in place' and denotes a cleaning procedure in processing plants (particularly in pharmaceuticals production plants and biological plants). The surfaces of the plant which come into contact with products are cleaned without disassembling the plant. Normally, sterilisation is carried out using hot steam or with the help of special chemicals.

_The Nuclear Safety Standards Commission (KTA)

The task of the Nuclear Safety Standards Commission (KTA) is to establish safety regulations and promote their implementation in fields which rely on nuclear technology. It steps in wherever a consensus has been reached, based on experience, between experts of the manufacturers, builders and operators of nuclear power plants, appraisers and the authorities. The Nuclear Safety Standards Commission (KTA) was founded in 1972 by the Federal Ministry of Education and Science following the example of the German Steam Boiler Committee, and is now under the legal responsibility of the Federal Ministry for the Environment, Nature Conservation and Reactor Safety. The KTA programme of standards currently comprises 106 different standards.

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Mankenberg GmbH
Spenglerstraße 99
23556 Lübeck | Germany
Phone: +49 (0) 451 8 79 75 0
Fax: +49 (0) 451 8 79 75 99
info@mankenberg.de
www.mankenberg.de

_Editorial director, conception

Andrea Marks

_Editorial contributions

Axel Weidner
Matthias Dühr
Dietmar Pallasch

_Conception, design, implementation

SPRAFKEVISION, Lübeck

_Text

Stefan Böckler, Hamburg

_Photography

Mankenberg GmbH

Hans-Joachim Stöcker, Lübeck

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