



Witzenmann GmbH

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



FUNDAMENTAL INSIGHT

We are in times of constant change. In all areas of society we are facing and being challenged by profound changes at increasingly shorter intervals. For this reason, not only must the environment as the natural habitat be preserved but our growing structure of social, economic and social values, too. The Witzenmann-Group regards its sustainable practice as an important contribution towards this. For us, sustainable economic activity means preserving the natural environment for generations to come, and ensuring that the way we earn our living provides a long-standing basis for security and increased prosperity.

To this end, it is important to reflect on our fundamental insights and competencies, to further develop proven skills and to maintain values as formulated, for example, in the corporate mission statement.

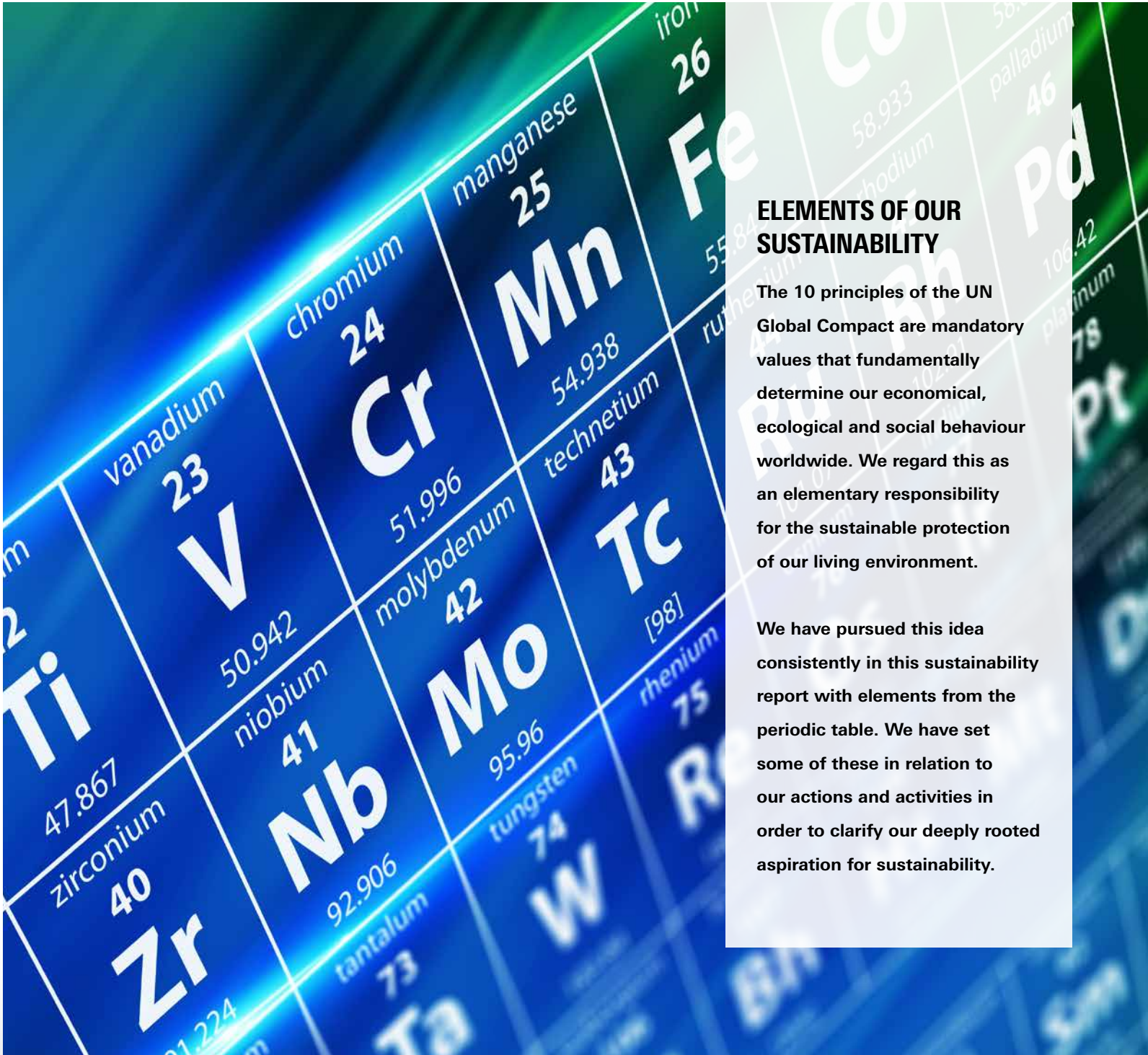
Based on this firm foundation, answers and solutions must be developed for the challenges ahead. A healthy, sustainable development requires that we embrace changes in the course of time and confront them with appropriate tools. We can only achieve sustainable progress by further developing proven knowledge and experience. The Witzenmann Group achieves this by breaking down the challenges to the essential, basic core, analysing the challenge single-mindedly and applying the correct tools in a focused and responsible manner.

- Dr. Andreas Kämpfe
Chairman of the Board of Management

Philip Paschen
*Dipl.-Ing./Dipl.-Wirtsch.-Ing.
Vice Chairman of the board of management*

Dr. Gerhard Flöck
Managing Director

Dr. Eberhard Wildermuth
Managing Director



ELEMENTS OF OUR SUSTAINABILITY

The 10 principles of the UN Global Compact are mandatory values that fundamentally determine our economical, ecological and social behaviour worldwide. We regard this as an elementary responsibility for the sustainable protection of our living environment.

We have pursued this idea consistently in this sustainability report with elements from the periodic table. We have set some of these in relation to our actions and activities in order to clarify our deeply rooted aspiration for sustainability.

CONTENTS

<div><div>1</div><div>H</div><div>HYDROGEN 1.0079</div></div>	Vehicle technology Mobility of the future	6
<div><div>14</div><div>Si</div><div>SILICON 28.086</div></div>	Industry Industry in a time of change	8
<div><div>22</div><div>Ti</div><div>TITANIUM 47.867</div></div>	Aerospace Light Giants	10
<div><div>8</div><div>O</div><div>OXYGEN 15.999</div></div>	Technical building equipment Simply take a breath	12
<div><div>6</div><div>C</div><div>CARBON 12.011</div></div>	Global Compact Basis for life	14
<div><div>18</div><div>Ar</div><div>ARGON 39.948</div></div>	Sustainability in practice Welding in the high-tech sector	16
<div><div>20</div><div>Ca</div><div>CALCIUM 40.078</div></div>	Conformity with regulations Irrefutable	18



From the business divisions: Industry in a time of change



Welding: Core competence in the high-tech sector



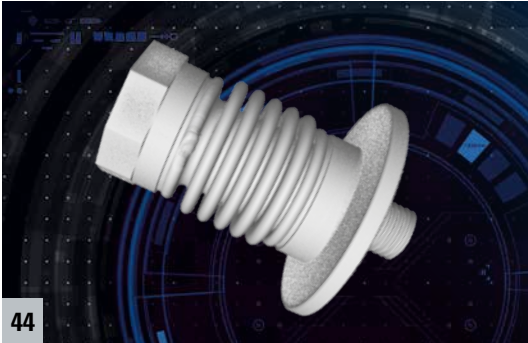
Set in stone: Conformity with regulations



Made in Germany made globally: Engineering & Quality



Witzenmann-Employees: Consistent & valuable



Sustainable CT Plant: 8 tons for 25 micrometers

<div><div>29</div><div>Cu</div><div>COPPER 63.546</div></div>	Economy Nordic Gold	20
<div><div>104</div><div>Wi</div><div>WITZENMANN 4.139</div></div>	Global commitment Voluntary, honorary and spontaneous	24
<div><div>32</div><div>Ge</div><div>GERMANIUM 72.64</div></div>	Sustainability in practice Made in Germany made globally	26
<div><div>79</div><div>Au</div><div>GOLD 196.97</div></div>	Employees & social policy Consistent & valuable	28
<div><div>42</div><div>Mo</div><div>MOLYBDENUM 95.95</div></div>	Occupational safety Safety according to Plan	32
<div><div>43</div><div>Tr</div><div>TECHNETIUM 98.906</div></div>	Environmental report Future as Responsibility	34
<div><div>26</div><div>Fe</div><div>IRON 55.845W</div></div>	Environmental Report	36
	Environmental Goals	38
	Climate Protection (CliCCC)	40
<div><div>35</div><div>Br</div><div>BROMINE 79.904</div></div>	Sustainability in practice Faster, better & more environmentally friendly	44
	Contact, Imprint	46



Flammable gas, the lightest element. Accounts for about 90% of the atoms in the universe and the sun. Constituent part of water and nearly all organic compounds.. Hydrogen is regarded as THE molecule of life.

MOBILITY OF THE FUTURE

Hydrogen as an energy source of the future. Apart from the electric motor, hydrogen could replace the use of petroleum products in hydrogen combustion engines or via fuel cells in the foreseeable future. Witzenmann hose assemblies for hydrogen applications are already used today for the compensation of movements and assembly tolerances in fuel lines of fuel cells.

Witzenmann products such as decoupling elements and engine pipes in cars, commercial vehicles, agricultural and construction equipment help to make individual and commercial mobility efficient, environmentally friendly and permanently reliable. Bellows for fuel pumps or for piezo injectors are used for optimising the fuel consumption in the traditional combustion engine. Conduit elements, cooling and degassing elements for electric vehicles are enabling the Witzenmann automotive components business division to bridge the gap to the time after the combustion engine.



* The hose assemblies are used for the compensation of movements and assembly tolerances in the fuel lines of fuel cells.

Hard semimetal (has metallic as well as non-metallic characteristics). Deposits in quartz, granite, sand, earth, clay and ceramic. For industrial use silicon is mainly found in semiconductors, solar cells and computer chips.



INDUSTRY IN A TIME OF CHANGE



The industrial product portfolio of the Witzenmann Group also changed and grew similarly to the diverse changes and intensive growth of industry. Today, on the threshold of the fourth industrial revolution, system and service solutions are becoming increasingly important in addition to the products. Expansion joints, bellows and hoses for various applications – functionally expanded – are integrated into networked, intelligent systems as digital functional elements. There, they then contribute towards increasing efficiency and conserving resources.

The digital shift also means extending the areas of application of the products for the Witzenmann Group. Apart from the "classics", such as valve industry, chemical plants, fibre optics, high-temperature applications, power plants, measurement and control technology, offshore technology, petrochemistry, shipbuilding, trendsetting industries such as vacuum technology or semiconductor manufacturing are becoming increasingly important.

** Metal bellows are used as flexible sealing elements in vacuum technology. The main areas of application include the sealing of vacuum valves and vacuum switches. Vacuum bellows are characterised by a low spring rate and long service life.*



LIGHT GIANTS

Extreme resilience and maximum reliability are the requirements for the components in astronautics. Apart from the physical characteristics of the selected materials, high standards in production and quality assurance ensure the highest possible safety. Material expertise and process knowhow is not only characterised in Witzenmann engineering but particularly in astronautics.

The material titanium exemplifies this. It is very suitable for applications that require high corrosion resistance, strength and low weight such as in aerospace.. Flexible elements in the Airbus, Eurocopter, in Rolls-Royce engines or the Ariane 5 rocket are just a few examples for successful product solutions of the Witzenmann Group in the aerospace future market.

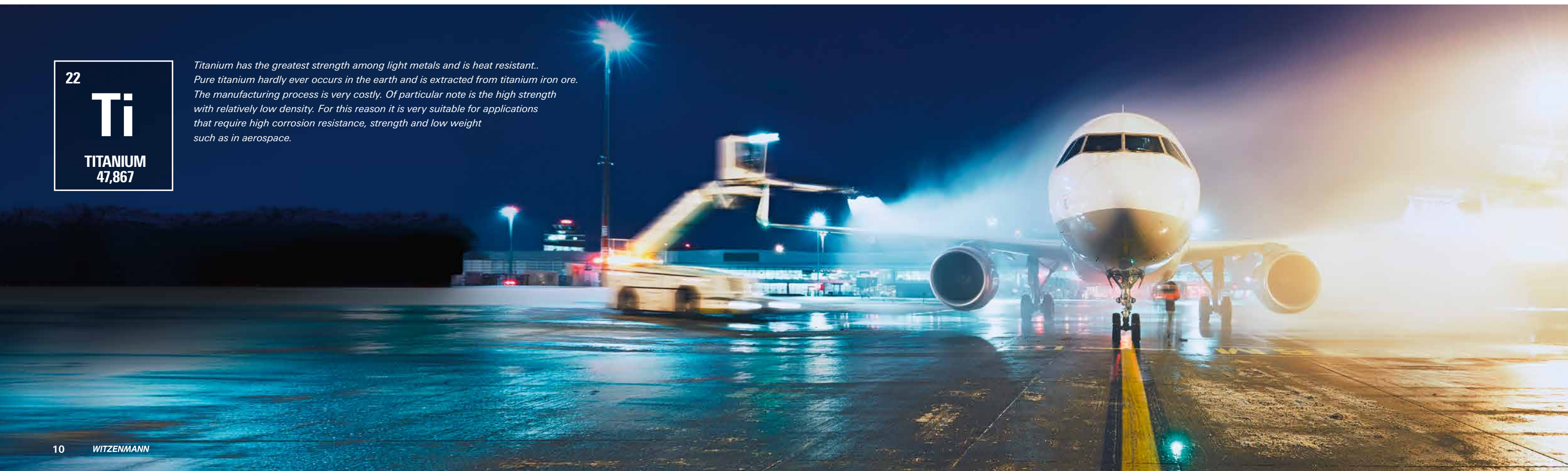
*The flexible adapter with titanium bellows connects the auxiliary tanks in the cargo hold of planes with the rigid jet fuel pipelines.

22

Ti

TITANIUM
47,867

Titanium has the greatest strength among light metals and is heat resistant.. Pure titanium hardly ever occurs in the earth and is extracted from titanium iron ore. The manufacturing process is very costly. Of particular note is the high strength with relatively low density. For this reason it is very suitable for applications that require high corrosion resistance, strength and low weight such as in aerospace.



JUST TAKE A BREATH

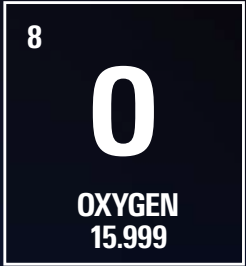


Energy-efficient construction is not possible without modern ventilation systems. They enable aeration and ventilation of the rooms as needed and energy-saving waste heat recovery from the exhaust air. Furthermore, they ensure a healthy indoor climate not only in passive buildings.

The Witzenmann Group ranks among the pioneers in Germany in matters involving flat ducts for exhaust air.

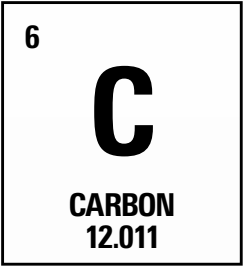
The flat design allows optimum routing of the ventilation systems in buildings and technical advantages compared with other designs. Continuous improvements and certifications have allowed the Witzenmann Group to become the technologically leading manufacturer in this segment.

**The flat ducting component programme enables flexible, space-saving assembly in walls, floors, and ceilings. The range of dimensions and designs have been selected so that optimum adjustment to the corresponding required air volumes is achieved and zeta values/current losses are as low as possible.*



Colourless gas and ubiquitous elixir of life Accounts for approx. 21 % of the air. 48.9 % of the earth's crust consists of oxygen At about 30 %, it is the most frequent element of the earth's crust.. Almost all living beings need oxygen to live. Plants generally emit more oxygen than they need during the photosynthesis process. Oxygen is involved in many combustion and corrosion processes.





Is present as hard diamond or soft graphite. Has the most extensive range of chemical compounds among all elements. This characteristic makes carbon the basis of life on earth. Known deposits are the fossil resources, coal, oil and natural gas. Diamonds originated through the conversion of vegetable (coal) and animal (oil, natural gas) remains under high pressure.



BASIS FOR LIFE

What do diamonds and the principles of global compact have in common? Both have high symbolic power, but are also characterised by great, pragmatic benefits. They are priceless, often fervently desired, and major expenditure and the most extreme conditions are required for them to come into existence or be implemented.

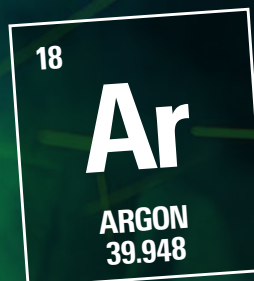
The diamond represents the hardest natural material in the world. A characteristic that is also preferable for the ten principles of the Global Compact – in combination with the corresponding resilience and assertiveness they are just as valuable to us as a high-carat diamond.

The Witzenmann Group is expressly committed to the ten principles of the Global Compact. We want to ...

- #1 ... support and respect the protection of internationally proclaimed **human rights**.
- #2 ... ensure that they are not complicit in **human rights abuses**.
- #3 ... uphold the freedom of association and the effective recognition of the right to **collective bargaining**.
- #4 ... uphold the elimination of all forms of **forced and compulsory labour**.
- #5 ... uphold the effective abolition of **child labour**.
- #6 ... uphold the elimination of **discrimination** in employment and occupation.
- #7 ... pursue the precautionary principle when dealing with **environmental problems**.
- #8 ... take initiatives to create a greater **awareness of the environment**.
- #9 ... help speed up the development and spread of **environmentally friendly technologies**.
- #10 ... should work against **corruption** in all its forms, including extortion and bribery.



WELDING IN THE HIGH-TECH SECTOR



Argon is an inert gas that does not react with other elements. It accounts for approx. 1 % of the air. Most of the argon is used as inert gas. Particularly in the case of welding procedures for metals that react with nitrogen at high temperatures, such as titanium or tantalum. Even in the case of metal inert-gas welding and Wolfram inert-gas welding, which are used for welding aluminium alloys or high-alloyed steels, argon serves as an inert gas.

Welding is a core competence of Witzenmann. This includes not only the actual welding process but also extends to process technology or material science. Here, the Witzenmann Group brings together experienced welding experts, technicians and engineers.

With the specially equipped welding laboratory Witzenmann has enhanced its testing and production capabilities. The welding laboratory is designed to process special materials such as titanium, tantalum or zirconium. These high-grade metals are particularly well suited for applications under extremely corrosive influences.

In the chemical industry, products made of titanium or tantalum ensure the lasting reliable and safe handling of highly aggressive and environmentally hazardous substances.

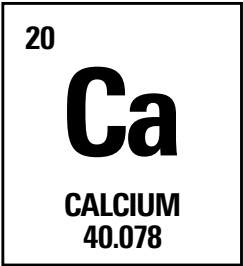
Argon is mainly used as an inert gas for welding these substances (titanium, tantalum or zirconium). This gas encompasses the actual welding process and shields the area of the liquid metal from the oxygen of the surrounding atmosphere.

The use of argon during fusion welding effectively prevents oxidation on the weld surface, such as annealing colours or scaling. This also prevents the formation of pores inside the weld, which can impair the homogeneity and strength of the weld.

Thus, a visual as well as anti-corrosive improvement of the weld quality is achieved. Any partially impermissible, additional reworking of the weld surfaces is completely eliminated.

Welding a titanium expansion joint under the vacuum bell jar





The metal strengthens bones and teeth. It is an ingredient of many healthy foods. Owing to its strong reactivity, it only occurs chemically bound as a component of minerals, for example in muscles, corals and marble.

We owe the saying "set in stone" to an author who obviously enjoyed playing on words. Nevertheless, it has remained to this day and still stands for "set in stone".

In 1840, Franz Chassot von Florencourt in his work "Political, ecclesiastic and literary conditions in Germany" wrote about the legislation of the well-known Baron vom Stein* (Stein = stone) "In the legislation of Stein there is not one wrong move; the themes emerge strongly and unambiguously as if set in stone, and indestructible for all eternity, as much as tinkering and seeking to blur the character at a later point in time." The content of the message is clear and stands for something unchangeable and immutable and is an irrevocable, incontrovertible assertion or definition to this very day.

IRREFUTABLE



The Witzenmann Group stands against any kind of corruption!
The compliance guiding principles have currently been published by the Executive Management and are mandatory for all employees of the Witzenmann Group.

All employees of the Witzenmann Group are obliged to discharge their duties in an objective manner. Since the acceptance of donations compromises this objectivity or can eliminate it completely, the acceptance of personal benefits is not tolerated.

In addition, it is made clear that corrupt behaviour is a punishable offence and is contrary to an employee's obligation to discharge his/her professional duties in an objective manner. The guideline defines the different types of benefits and specifies the criteria for benefits that either require or do not require approval. It also expresses anti-corruption codes of conduct.

The compliance guideline is published in the Intranet.

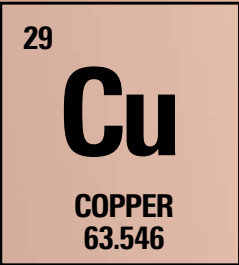
** Heinrich Friedrich Karl vom und zum Stein (1757 – 1831), a Prussian official, statesman and reformer.*

NORDIC GOLD



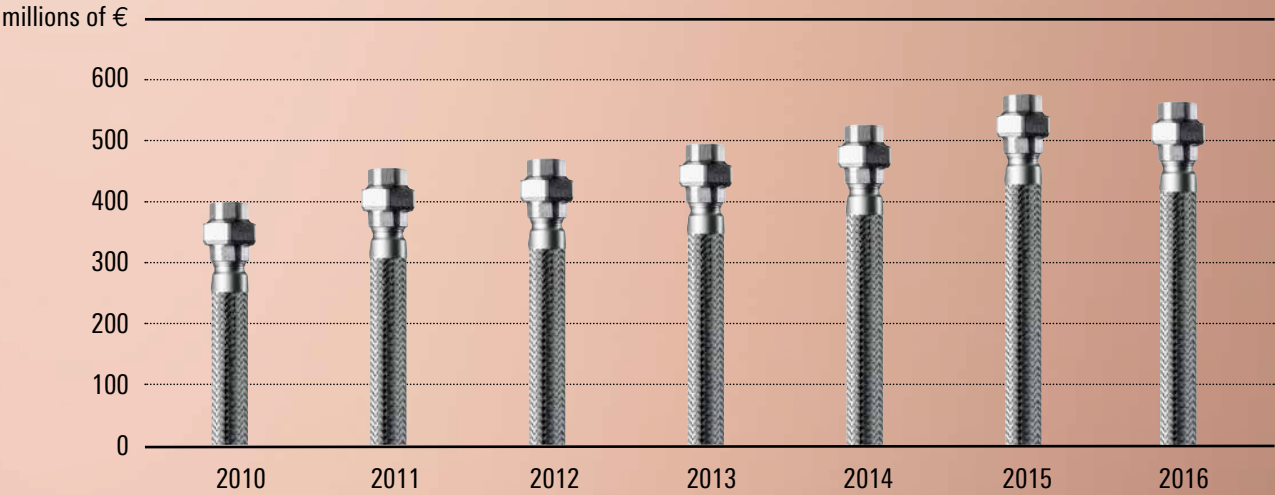
Our 10, 20 and 50 Euro cent coins used today are manufactured from a special alloy. It consists of 89% copper, 5% aluminium, 5% zinc and 1% tin. Even before the European Monetary Union, it was used as a coinage alloy

in several countries. Owing to its use for the Swedish 10 Krone coin, we refer to this alloy as Nordic Gold (Swedish nordiskt guld).



The Latin name cuprum is derived from "ore from the Greek island of Cyprus", where copper was extracted in ancient times. As a relatively soft metal, copper is easily malleable and particularly tough. It has a wide range of uses as a conductor of heat and electricity. Furthermore, copper belongs to the group of coinage metals. In alchemy, copper was associated with the planet Venus or femininity, and was regarded erroneously as a compound of sulphur and mercury.

Turnover trend of the Witzenmann-Group



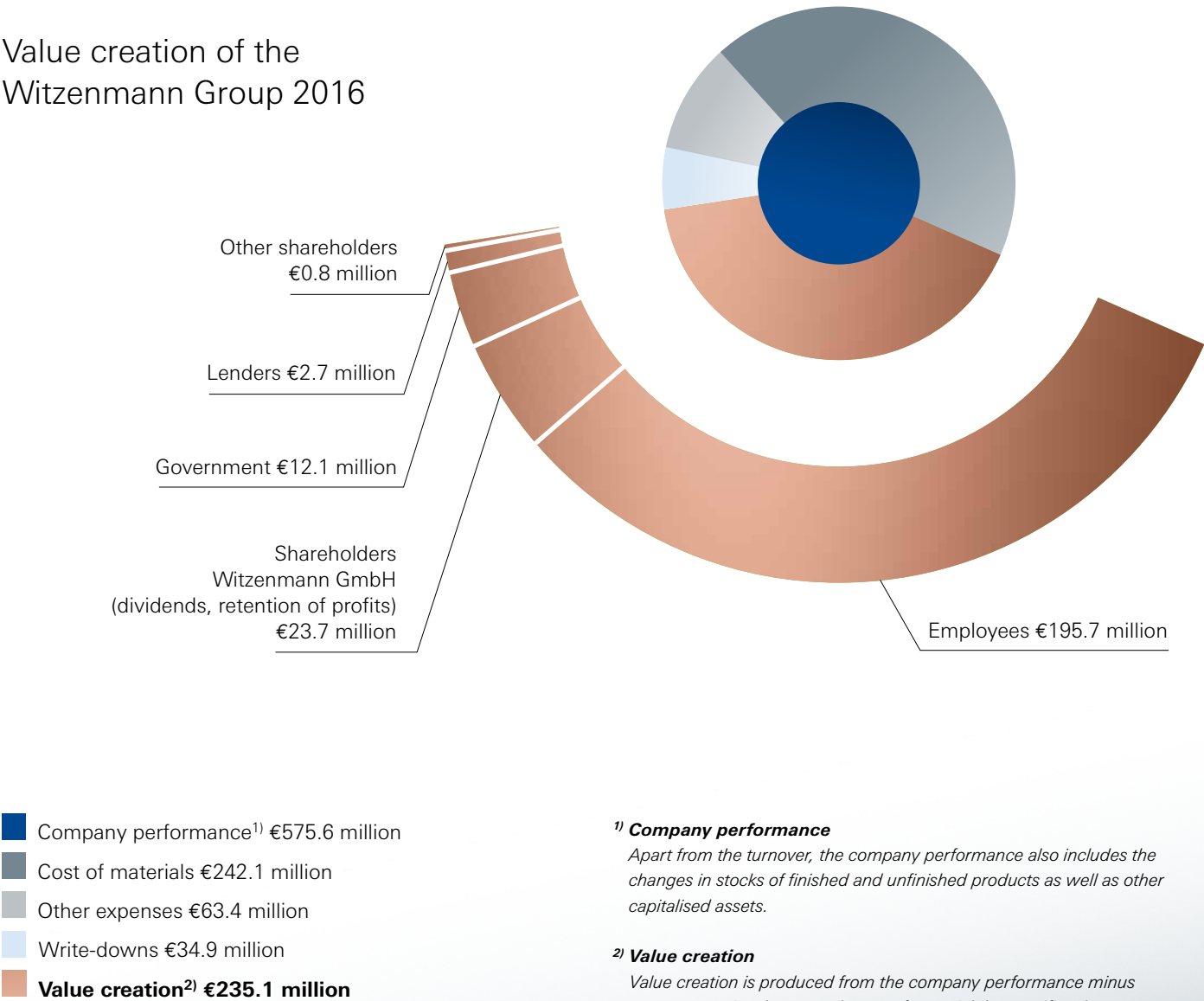
Financial data of the Witzenmann Group

Turnover		2014	2015	2016
in total	Millions of €	525.4	577.9	570.0
in Germany	%	33.4	30.4	31.9
in Europe (excl. Germany)	%	31.4	30.8	31.6
in America	%	19.8	21.5	19.1
in Asia	%	15.1	17.0	17.1
in Africa	%	0.3	0.3	0.3

Turnover by sector		2014	2015	2016
Automotive industry	%	56.7	62.7	63.4
Industry	%	35.8	30.0	29.3
Technical building equipment	%	6.5	6.3	6.1
Aerospace	%	1	1.0	1.2

Investment and equity		2014	2015	2016
Investments	Millions of €	41.6	37.5	36.3
Write-downs	Millions of €	29.7	34.5	34.2
Equity ratio	%	52.9	58.8	60.2

Value creation of the Witzenmann Group 2016



¹⁾ **Company performance**
Apart from the turnover, the company performance also includes the changes in stocks of finished and unfinished products as well as other capitalised assets.

²⁾ **Value creation**
Value creation is produced from the company performance minus expenses, write-downs and costs of material. It quantifies the Witzenmann Group's contribution to private and public income.

HONORARY, VOLUNTARY & SPONTANEOUS

"In line with a culture of commitment in favour of the community, our company is open to promoting and supporting social engagement."

Corporate mission statement of the Witzemann Group

Role model in matters concerning commitment & responsibility:
In 2016, Witzemann Mexico, among others, organised a football tournament, initiated a children's day and actively supported the renovation of a local school.



This principle applies unrestrictedly in the globally positioned Witzemann Group and to the same extent for all subsidiaries worldwide. With this internationalisation strategy the Witzemann Group is pursuing the goal of market and customer-orientated production. As the leading technological company and development partner of its customers, the company group installs extensive engineering expertise into the individual subsidiaries and frequently provides important economic impulses in the region concerned. Furthermore, the Witzemann Group also constantly endeavours to contribute towards the positive, social and societal development of the location.

An example of this is the Mexican subsidiary that was first founded in 2016. The Mexican Managing Director, Carlos Talamantes, initiated a voluntary committee, which advises on the possible social commitments of Witzemann Mexiko and makes proposals to the management. In this respect, the participation of all employees is important. In this process.

Impressive Commitment 2016

- The proceeds of self organised children's day made it possible to financially support a local nursery.
- With the aid of the employees from Witzemann Mexiko as well as pupils and parents of the school, the outdated "Vicente Guerrero" school in Obrajuelo, Apaseo El Grande was completely renovated.

- Measures such as cholesterol control or weight reduction intensify the health awareness of the staff.
- The organisation of a football tournament motivates participants to take part in sporting activities.
- Witzemann Mexiko takes care of a high proportion of employees in the company (currently 44 %).
- In the disposal of waste, Witzemann Mexiko separates it into steel, wood, paper and inorganic or organic waste.
- 70 % of wood and cardboard in the production process is recycled.
- Conservation of resources by the acquisition of recyclable cutlery and crockery for the lunch meal.
- A shuttle-bus for the staff helps to reduce the emission caused by motorised individual traffic.

104

Wi

WITZENMANN
4.139

Wi is a highly flexible element. It is found above all in the Witzemann Group Wi is very reactive and sustainable in its demand. It is used in a wide range of demanding, industrial applications. It is mostly the main component of innovative alloys or trendsetting compounds. In association with other elements, the WI element enhances the positive characteristics of the individual elements.



Brittle metalloid, used for semiconductors, transistors, rectifiers, diodes, photocells and lenses. The history of discovery of the element is closely linked to the development of the periodic table of elements used today. When the Russian chemist, Dmitri Mendelejev, worked independently of the German, Lothar Meyer, on a system of chemical elements at the end of the 19th century, he discovered a gap underneath the silicon. He made predictions concerning the characteristics and compounds of this, which he called Eka silicon. However, his theses received very little acknowledgement within the scientific community. In 1886, a chemist from Freiburg named Clemens Winkler discovered a hitherto unknown element, which he named Germanium in honour of his country. Since the Germanium was very similar to the described characteristics of the Eka silicon derived from the periodic table, the discovery contributed to the recognition of the periodic table.

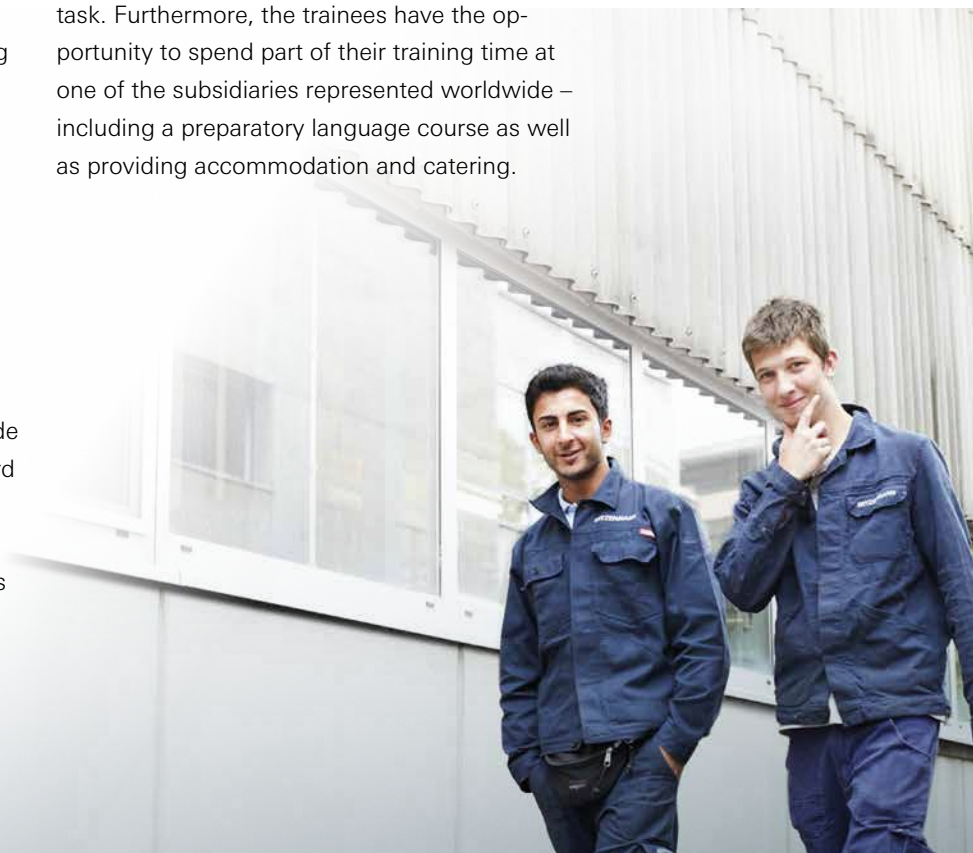


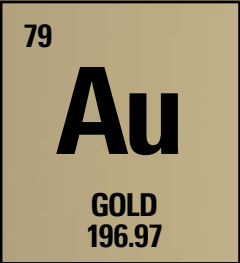
MADE IN GERMANY MADE GLOBALLY

The label "Made in Germany" still undoubtedly applies throughout the world. But traditions only help if they continue to exist in a relevant and timely manner. In today's globalised world, Witzenmann is pursuing a consistent strategy of internationalisation. Together with the Pforzheim headquarters, the subsidiaries in Germany, Europe, Asia and America form a strong network. The hubs are the production sites close to the market each with their own specific engineering skills. They are permanently linked to the other Witzenmann subsidiaries and the Headquarters in Pforzheim.

The Witzenmann TechCenter in Korea and the USA offer engineering with short response and processing times for customized requests directly onsite. Internal training courses and regular exchange forums additionally sharpen the group-wide core skills. All 24 sites worldwide are equipped to meet the most modern standard in terms of manufacturing technology and thus guarantee "Made in Germany" worldwide – and the sustainable success by means of awareness for tradition, a forward-looking approach and a cosmopolitan outlook.

An essential pillar of Witzenmann's successful internationalisation is the systematic and individually coordinated personnel development. This is rooted in a comprehensive education, extensive on-the-job training and targeted further training. All new employees pass through an induction training program individually tailored to the respective task. Furthermore, the trainees have the opportunity to spend part of their training time at one of the subsidiaries represented worldwide – including a preparatory language course as well as providing accommodation and catering.





Gold is the best malleable element. It is dense and non-tarnishing. Gold can very easily be processed mechanically and does not corrode. Owing to the permanence of its splendour, its rarity, apparent imperishability and striking heaviness it is mainly used for prominent ritual objects and jewellery in many cultures.



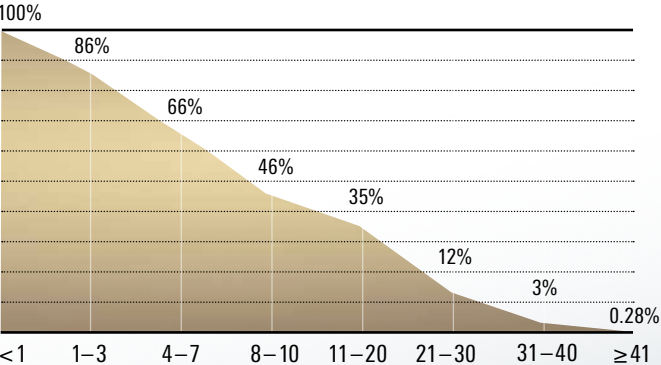
CONSISTENT & VALUABLE

THE EMPLOYEES
OF THE WITZENMANN GROUP

A sign of high satisfaction among the staff and management: Even in times of a dynamic labour market the average period of employment in the Witzemann Group remains stable and at a high level. The average length of time that employees work at Witzemann group-wide is 7 years and even more than 13 years at the Pforzheim headquarters.



Years of service at the Witzemann Group



13 YEARS
Average years of service
at Witzemann GmbH

42 (42,1 YEARS)
Average age of employees
at the headquarters

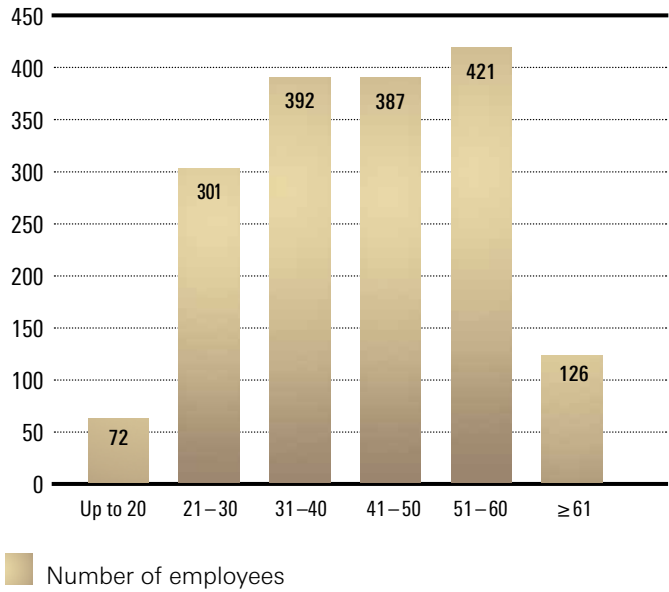
Workforce (as at 31.12.)

Witzenmann Group		2014	2015	2016
Total number of employees	People	3,756	3,941	4,139
in Germany	People	1,927	1,931	1,957
in Europe excl. Germany	People	1,103	1,200	1,300
in America/Asia	People	726	810	882

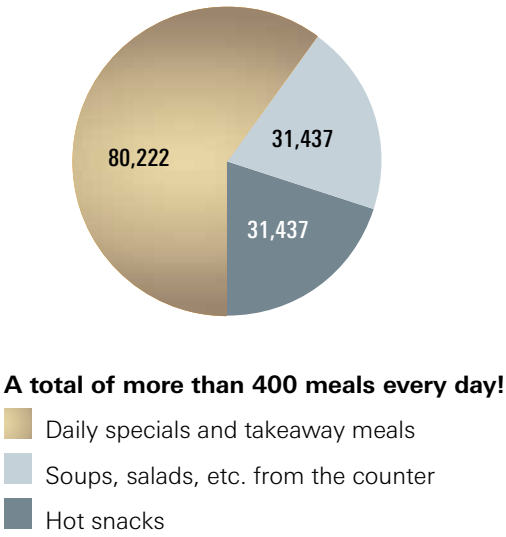
Witzenmann Academy		2014	2015	2016
Employees on the High Potential programme	People	11	11	14
External costs for training and professional development	€K	526	519	565
Number of seminars	Number	233	224	282
Participants in training and professional development seminars	Number	425	450	539
Traineeships/Apprentices	Number			50

Witzenmann GmbH		2014	2015	2016
Total number of employees	People	1,659	1,658	1660
Non-manual workers	People	657	658	663
Manual workers	People	925	926	926
Apprentices/trainees	People	77	74	71
Proportion of women	%	19.9	19.7	19
Proportion of men	%	80.1	80.3	81
Number of part-time employees	%	6.5	7.4	9.8
Severely disabled persons & persons regarded as such	People	71	80	80
Average age	In years	42	42	42.2
Average length of service	In years	13	13	13.4
Participants in employee activities	People	386	396	335

Age distribution
at Witzenmann GmbH 2016



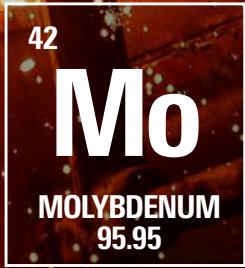
Meals sold
at Witzenmann GmbH 2016



Health management at Witzenmann GmbH

Witzenmann GmbH		2014	2015	2016
Occupational health checks	Number	555	612	589
Non-reportable accidents (1-3 days uw)	Number	19	11	14
Reportable accidents (> 3 days uw)	Number	39	29	33
Reportable accidents (per 1,000 employees)	Number	23.4	17.4	19.9

uw = unable to work



Molybdenum is an alloying element for increasing strength, corrosion and heat resistance of high-performance materials such as Hastelloy®, Incoloy® or Nicrofer®. These are also often used regularly at Witzenmann and have made many technical processes first possible and economically feasible. Molybdenum has made a substantial contribution towards occupational safety through the impregnation of materials in order to make them flame retardant.

SAFETY ACCORDING TO PLAN

The example of Witzenmann Russia shows the structured approach in the course of a hazard analysis.

As part of the internationalisation strategy of the Witzenmann Group, the extensive know-how in production processes is transferred to the respective sites. This also includes aspects of

occupational safety. These help to create safer working conditions and to prevent accidents and also reduce work-related absence of employees through illness.

WORKPLACE INSPECTION AND RISK ASSESSMENT



INTRODUCTION OF MEASURES

Example of lathe working area

Risks	Protective measures
Fallen out work-pieces	Protective equipment on the lathe
Flying chips	Safety goggles
Parts that have fallen down from the indoor crane	Education/training on securing loads and operating indoor cranes

DEFINING THE INSPECTION INTERVALS

- Hazard and risk analyses take place every 3 years
- Unscheduled analyses during modernisation and modification
- Changes in the production process
- Installation of new machines or creation of new workplaces after accidents and disruptions of operations



WORKGROUP AND SCHEDULE

- HR manager
- Quality manager
- Head of the Technical Department
- Specialist for occupational safety
- Mechanical engineer, chief engineer
- Production manager.
- Foreman

FORMULA FOR HAZARD IDENTIFICATION

Example of lathe working area

Workplace: Metal lathe
Responsible: Bogdanov
Hazards: Flying chips; sharp edges; rough surface of the raw material; falling off of the raw material; falling off of the workpiece
Risk reduction: upgrading of the lathe; personal protective clothing; safety frame for the lathes

MONITORING THE IMPLEMENTATION



It only occurs naturally on the earth in very small quantities – but in very large quantities in the stars. Technetium is the first artificially manufactured element. The name is derived from the ancient Greek word technētós for "artificial". Technetium is used as a diagnostic tracer in medicine.

FUTURE AS RESPONSIBILITY

Technical developments have consistently marked a turning point in human history. Today, in light of global networking and worldwide structures, technical progress is always associated with the question of global consequences as well. It seems as if mankind today is more able to trigger an irreversible negative development for the entire world than ever before. With these possibilities the responsibility to prevent this is growing.

As a leading company in the industry of flexible metallic elements, the Witzenmann Group feels a particular degree of responsibility to stand up for the protection and conservation of natural resources. Early on, Witzenmann committed itself to corporate management based on the careful use of resources. Continuously striving to avoid or reduce damage and stress on the environment to a minimum through the production and use of manufactured products. Compliance with all relevant legal standards and other requirements is a matter of course.

The Witzenmann environmental guidelines

- We consider the conservation of natural resources for future generations to be an important part of our social responsibility.
- We regard environmental protection as an important component of corporate governance and formulate concrete goals and rules of conduct for its implementation.

- We recognise the importance of each employee in the implementation of environmental protection measures and in providing training opportunities and decent working conditions.
- We identify and assess the environmental impacts of our business processes through continuous analysis. New processes and materials were examined for their environmental compatibility before use.
- We are committed to continually improving our environmental performance and take all necessary measures to prevent, eliminate or at least reduce our environmental impacts to a minimum.
- We publish a regular sustainability report to keep our customers, the general public and the relevant authorities informed about our social and ecological engagement.

ENVIRONMENTALLY RELEVANT DATA

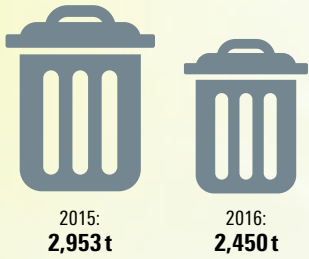
Witzenmann GmbH		2014	2015	2016
Procurement turnover	Millions of €	98.2	102.4	110.5
Plates/tubes/wire	%	15	15	14
Parts/components	%	75	77	78
Energy/auxiliary materials	%	10	8	8
Waste management				
Total volume of waste	t	2,514	2,953	2,450
Recycling rate	%	99.2	99.5*	99.5*
Water consumption	1,000 cbm	22.6	23.9	24.3
HCl solvent balance				
Disposal	t	0.79	2.89	2.32
Emissions	t	0.54	0.53	0.28
Space utilisation	%	148	148	145
Energy				
Electricity draw	MWh	16,450	15,417	16,013
Electricity draw/1 million € of turnover	MWh / €	56.3	50.5	55.2
Building heating				
District heating	MWh	7,240	8,886	9,619
Natural gas	MWh	1,856	1,985	840
Energy requirement/1000 employees	MWh	5.4	6.6	6.3

*adjusted by new building leased land and parking spaces

Environmentally relevant incidents

No environmentally relevant incident occurred in 2016.

Total volume of waste



Waste management

For many years, we have been achieving a high recycling rate. Only 0.5% of our waste requires disposal.

99.5%

Recycling rate*

* based on the Witzenmann GmbH

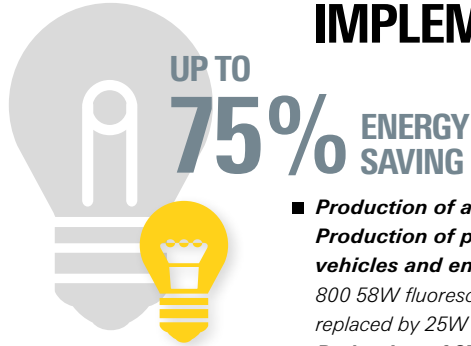
ENVIRONMENTAL TARGETS ...

Environmental targets are part of the company target system.

They should:

- prevent pollution of the environment,
- reduce emissions,
- save resources
- and minimise risks.

...2016 IMPLEMENTED:



■ **Production of annular shafts, Production of parts for commercial vehicles and engines:**
800 58W fluorescent lamps replaced by 25W LED tubes.
Reduction of 270 MWh/a to 96 MWh/a

■ **Expansion joint production:**
22 2 x 400W halogen metal vapour lamps replaced by LED spotlights.
Reduction from 70.4 MWh/a to 17.6 MWh/a

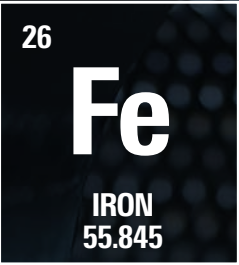
■ **Warehouse:**
Replacement of 600 fluorescent lamps in exchange for LED tubes.
Reduction of 196 MWh/a to 54 MWh/a

■ **Production site:**
Preparation of **guidelines for system shutdown (breaks, night and weekend)**

■ **Endurance tests performed for the substitution** of environmentally hazardous process lubricant **Platinol V1379/895**

■ **Existing X-ray unit replaced by a modern, digital X-ray unit** (see also page 44)

100%
SUBSTITUTE FOR ENVIRONMENTALLY HAZARDOUS SUBSTANCES



Iron is a medium hard metal, magnetic and a main component of the earth's core (80 %). Steel alloys mainly consist of iron. Iron is an essential component in most different alloys of the procurement turnover of the Witzenmann Group. The efforts to decrease the scrapping quota follow the ecological as well as economic targets of the company.

...PLANNED FOR 2017:

Waste

- Reduction of scrap costs at the selected production sites by 1 % p.a. based on the number of produced parts
- Determining the scrap volume of special materials and defining possible measures for reducing this
- Reduction of scrap/material usage per bellows by 39 gram for selected material number

Emissions

- Reduction of exhaust emissions and energy consumption
- Reduction of transport-related fuel consumption and CO²-emission per transported component for production in the subsidiary plant Nord

Environmentally hazardous substances/ mixtures

- Reducing developer concentrate (lye) and fixer concentrate (acid)
- Reducing water consumption

CLIMATE PROTECTION

CliCCC – Climate & Carbon Calculator for Companies

This report shows the results from the Corporate Carbon Footprint calculation of the Witzenmann GmbH for the year 2016 according to the CliCCC method.

In addition to the physical CO₂ emissions (Scope 1) and indirect emissions caused by the energy supply (Scope 2), the CliCCC method takes the climate impact into account due to the purchase of preliminary work and fixed assets (Scope 3), estimated on the basis of purchasing data. The estimation of emissions from the costs of the individual goods categories is determined by infinite upstream chains with the aid of national accounts. The ifu Hamburg GmbH has traced, reproduced and validated all calculations and has thus carried forward the calculations for the year

2016 on this basis. Furthermore, the values for the comparison years (2010, 2012, 2013, 2014 and 2015) were calculated as comparative values and corrections were made where necessary.

The results are printed in the summary based on three indicators:

- total emissions
- cumulative emission intensity (CEI) and
- population equivalent

The total emissions reveal the sum of all emissions from the individual categories.

The cumulative emission intensity (CEI) is the ratio of total emissions to company turnover. The sales of the comparison years is adjusted for price in order to represent a timeline.

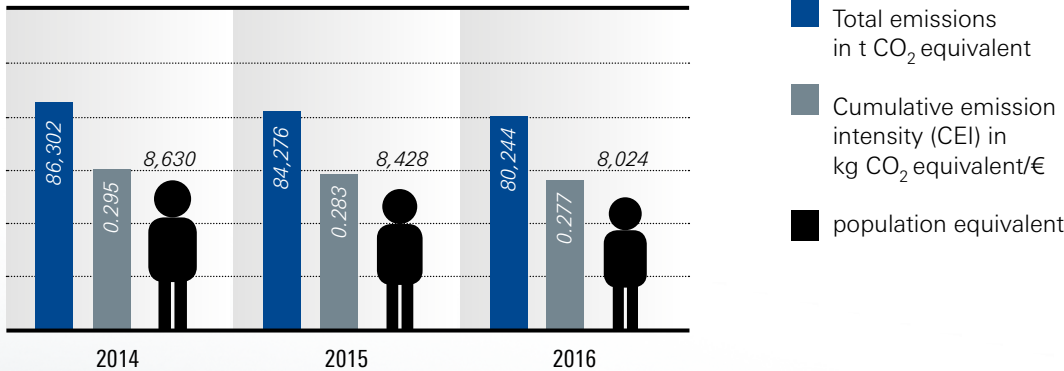
From the composition of the results for the 2016 reporting year, it is clear that most of the 86.8% of the emissions come from scope 3. Most of the emissions are in the goods category comprising pig iron, steel and semi-finished iron and steel products, which makes up 35.0% of all recognised emissions with 28,049 t CO₂ equivalent. This is followed by the metal products commodity group, which with 17,796 t of CO₂ equivalents, constitutes 22.2% of all emissions considered. It would therefore be wise to offer incentives to suppliers in this goods category in order to encourage them to disclose their specific emissions in order to make alternative decisions for low climatic impacts. The present KEI in these sectors is at 1.78 kg CO₂-eq/€ or 0.48 kg CO₂-eq/€.

Below, the commodity group of foundry products that causes climate-impacting emissions of 9,155 t CO₂-equivalents should be mentioned and is therefore already below the emissions from scope 2.

When investing in fixed assets in the future, and for machines, it would be wise to obtain information about the specific emissions. The present CEI in this sector is at 0.33 kg CO₂-eq/€. The presentation on the composition of the scope 3 emissions considered concerns a hotspot



analysis on the largest contribution from states and sectors. This can suggest which areas should be prioritised with regard to incentive systems to encourage the disclosure of specific supplier emissions. The accumulated emission intensities of the suppliers can be requested and considered for this purpose. Supplier specifications (e.g. according to the CliCCC methodology or as a product carbon footprint) can also be considered directly in the analysis thereby resulting

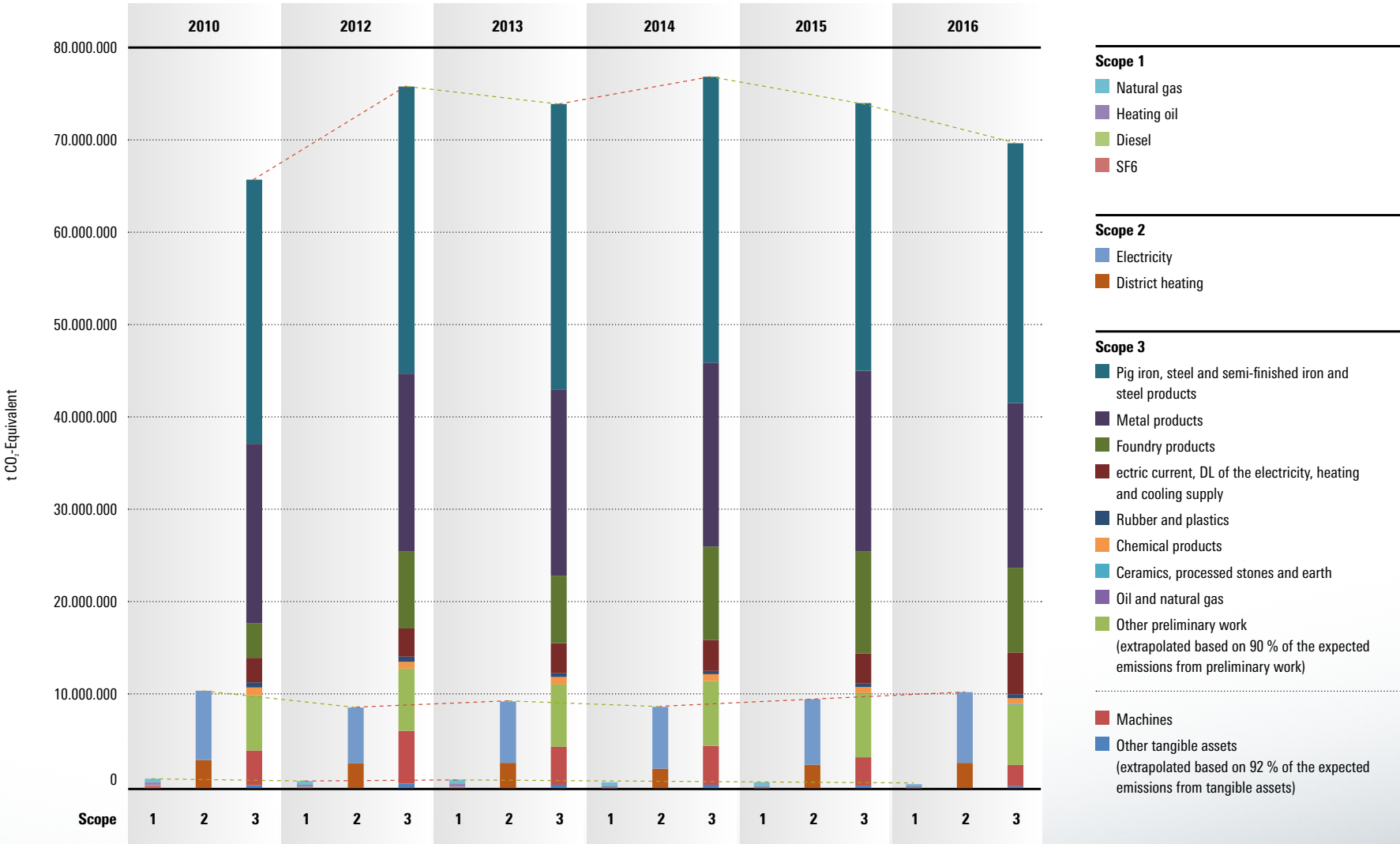


Source: Result report of Corporate Carbon Footprint according to CliCCC methodology for Witzenmann, report year 2016, ifu Institute for Environmental Informatics Hamburg GmbH

in increased accuracy of future emission calculations. Within scope 2, electricity dominates with 7,622 t CO² equivalent. We recommend checking to see whether emissions can be reduced in this area by using an electricity product with lower emissions. It should be quicker and easier to implement a measure of this sort than measures in scope 3. Thus, at a tariff with 50% lower climate impact, a reduction of the total emission volume of approx. 5% could be achieved. With 447 t CO² equivalent, scope 1 with 0.6% carries little weight. Through the direct connection to the company, however, there may be potential here to implement measures to reduce emissions more quickly and easily. It should be emphasised here that the natural gas consumption from 2015 to 2016 could be reduced by 58%.

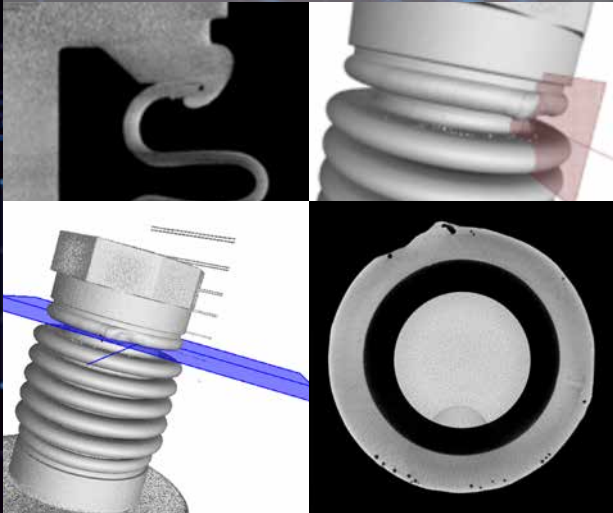
Compared to the results from 2015 improvements have been made in scope 1 as well as in scope 3. The improvements amount to 30 % in Scope 1 and 6 % in Scope 3 whilst in Scope 2 an increase of 5% was recorded, which brings about an overall reduction of 5% of the total emissions. Since the turnover also fell by 5% during the emission reduction, a slight increase of 0.3% resulted in the CEI. It would therefore be desirable for the climate-changing emissions to be reduced more than the turnover by greater decoupling of added value and resource consumption. This development can be followed further by additionally checking whether the material intensity of the production processes can be reduced in addition to the recommendation for considering supplier values previously mentioned. In relation to the comparison factor of 0.512 kg CO₂-eq/€ for the metal products sector the accumulated emission intensities of the Witzenmann GmbH at 0.275 kg CO₂-eq/€ represents a relatively climate-friendly production and are thus a reflection of the ongoing environmental efforts.

CLICCC – COMPOSITION OF THE RESULTS



FASTER, BETTER & MORE ENVIRONMENTALLY FRIENDLY

Whereas the x-ray image only provides a two-dimensional projection, computer tomography provides a 3-D reconstructed component

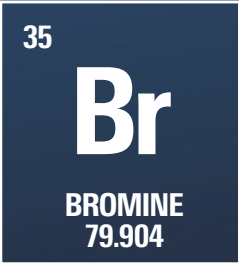


In contrast to the conventional x-ray method, the CT system can create any number of steps using the component – in a resolution of up to 25 µm.

This means that the CT system makes a significant contribution towards ensuring the high technological standard at the site in Pforzheim and creates a basic requirement for increasing the commitment in astronautics.

Much faster digital results
The CT system displays the X-ray images within a few seconds without any prior time-consuming and environmentally harmful film development. Thanks to the simple programmable 8-axis handling system, all weld seams on a pipeline can be x-rayed automatically from any perspective. The costs for expensive films can be dispensed with as well as the environmentally harmful and film developer chemicals that are subject to special disposal requirements.

A major step forward for the environment
The savings in this area are impressive. In 2016, 22,000 x-ray films coated with silver bromide were used. Lead foil that must be handled as hazardous waste remains from practically all films. In the same year, 690 litres of waste chemicals from the development process were also specially disposed of. This includes developer and fixer that contains silver bromid.



Dark, heavy, reddish brown liquid with chlorine odorous vapours that are more toxic than chorine. Used as disinfectant, in film material and leaded petrol.

CONTACTS



Philip Paschen
As a managing director, Philip Paschen is responsible for the business process management, logistics and production as well as sustainability division. His areas of responsibility include, among other things, industrial engineering (including productivity management, lean production, lean administration and six sigma), plant design, building management, logistics, sustainability, compliance and digitisation. Furthermore, he is responsible for production in the business divisions industry, commercial vehicles and engines as well as automotive components.



René Pflittner
In his role as the Environmental Protection Officer, he is the person to contact with regard to all internal and external questions relating to the environment and Witzenmann GmbH.



Jochen Geiger
Director of the Marketing and Public Relations department at Witzenmann GmbH is responsible for editing the sustainability report.

IMPRINT

Publisher:
Management Board Witzenmann GmbH, Postfach 101280, 75112 Pforzheim, Germany, www.witzenmann.de

V.i.S.d.P.:
Jochen Geiger, Director Marketing and Public Relations

Author of the environmental report:
René Pflittner, Environmental Protection Officer

Editor:
Marketing Witzenmann GmbH, Phone: +49 7231 581-208

Concept & Design:
Schindler Parent Industry GmbH, Eutingen Str. 2, 75175 Pforzheim, Germany, www.schindlerparent.de

Photo credits:
Page 3: © Tomasz Zajda/fotolia.com; Page 6: © muhamad mizan bin ngateni/shutterstock.com;
Page 8: © Paulo Resende/shutterstock.com; Page 10: © chalabala/fotolia.com;
Page 13: © fuyu liu/shutterstock.com; Page 14: © psdesign1/fotolia.com; Page 16: © angelo.gi/fotolia.com;
Page 18: © Raimond Spekking / CC BY-SA 4.0 (via Wikimedia Commons),
(https://commons.wikimedia.org/wiki/File:Standbild_Heumarkt_Köln_-_Heinrich_Friedrich_Karl_vom_Stein.jpg),
exempted, <https://creativecommons.org/licenses/by-sa/4.0/legalcode>;
Page 19: © zhu difeng/fotolia.com; Page 24: © sdecoret/fotolia.com; Page 26: © kartoxjm/fotolia.com
Page 32: © sondem/fotolia.com; Page 34: © James Thew/fotolia.com; Page 36: © Laura Pashkevich/fotolia.com

Publication: December 2017

