

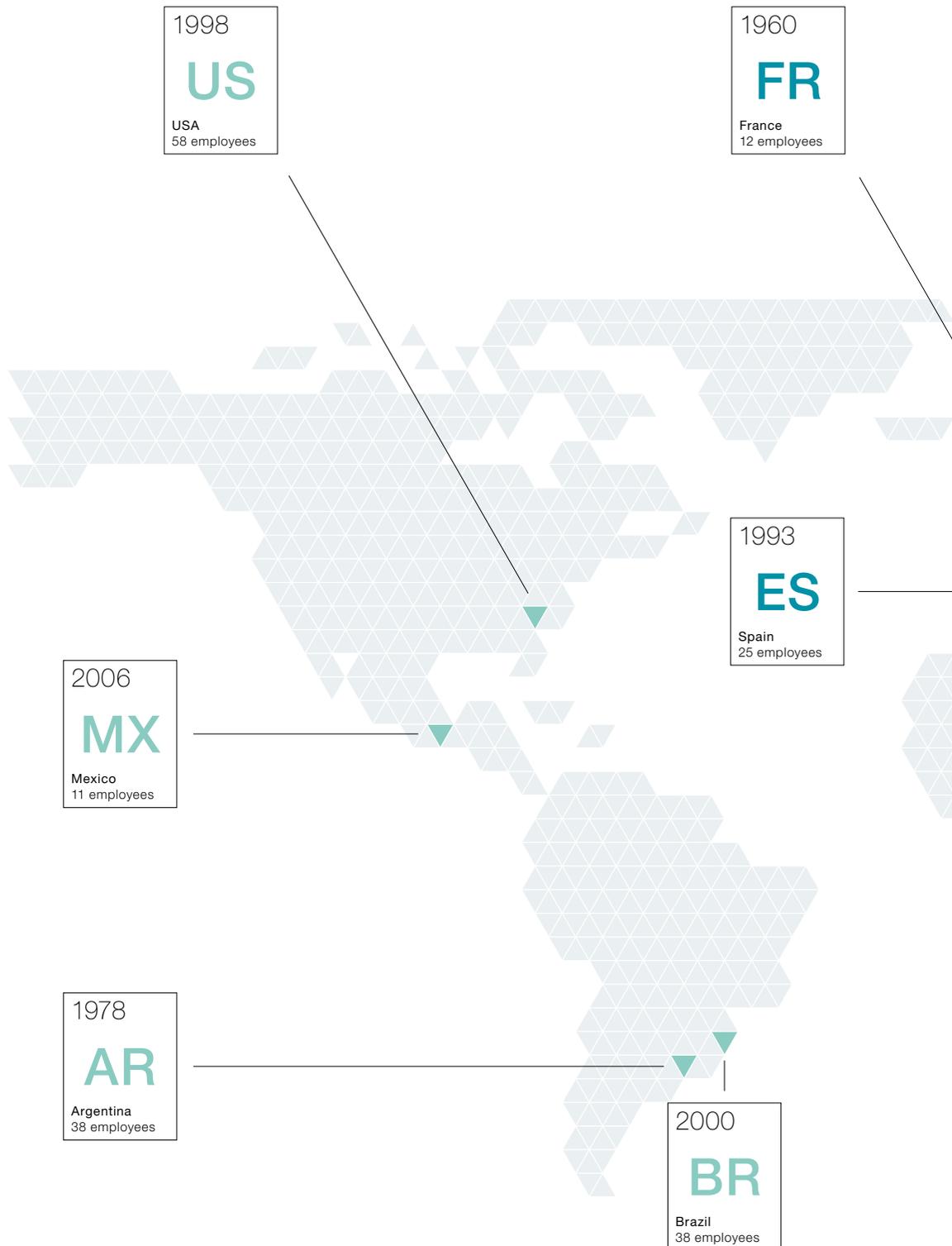
Chemistry tailor-made

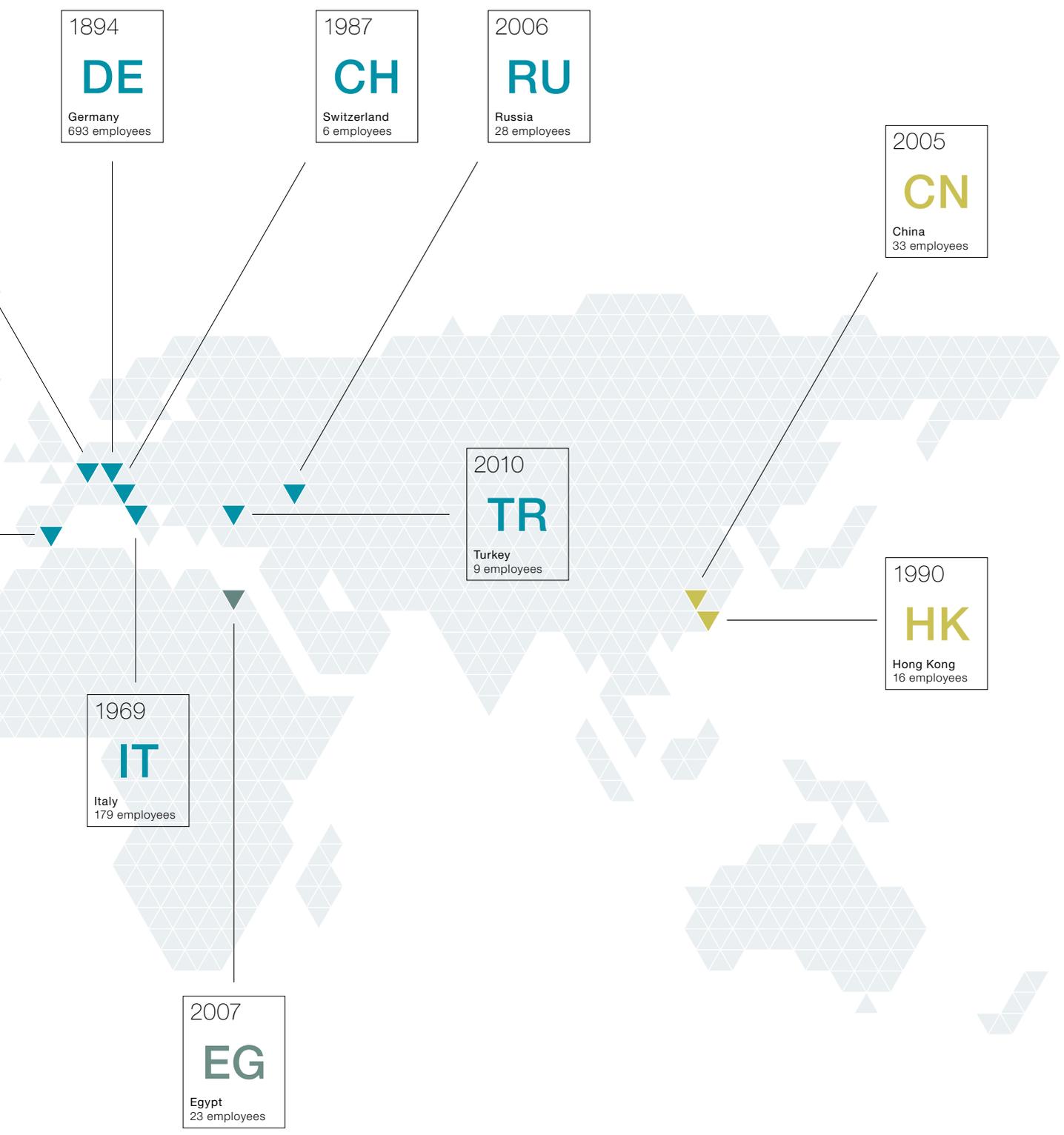


ZSCHIMMER & SCHWARZ

Year of establishment of our companies worldwide

AS OF: 31 DECEMBER 2013





1894
DE
Germany
693 employees

1987
CH
Switzerland
6 employees

2006
RU
Russia
28 employees

2005
CN
China
33 employees

2010
TR
Turkey
9 employees

1990
HK
Hong Kong
16 employees

1969
IT
Italy
179 employees

2007
EG
Egypt
23 employees

Shareholders

Zschimmer & Schwarz HOLDING GmbH & Co KG

Zschimmer & Schwarz CHEMIE GmbH

Z&S GmbH & Co KG
Germany, Lahnstein

Z&S, Inc.
USA, Milledgeville/GA

Z&S Mohsdorf GmbH & Co. KG
Germany, Burgstädt

USA Fibre Solutions LLC
USA, Greenville/SC

Ursa Chemie GmbH
Germany, Montabaur

Salvona Technologies LLC
USA, Dayton/NJ

Lefatex Chemie GmbH
Germany, Brüggen

Z&S Mexico S.A. de CV
Mexico, El Marques-Querétaro

Z&S Handel AG
Switzerland, Kloten

Z&S Argentina S.A.
Argentina, Buenos Aires

Z&S France S.A.S.
France, Paris

Z&S do Brasil Ltda
Brazil, São Leopoldo/RS

Z&S Italiana S.p.A.
Italy, Tricerro/VC

Z&S Russia O.O.O.
Russia, Shakhty

Ceramco S.p.A.
Italy, Sassuolo/MO

Euro Kimya
San. Ve Ticaret Anonim Sirketi
Turkey, Istanbul

Zeta Esse Ti S.r.l.
Italy, Tricerro/VC

Z&S Chemical HK Ltd.
China, Hong Kong

Bregaglio S.r.l.
Italy, Milano/MI

Z&S Chemical (Foshan) Co. Ltd.
China, Foshan/Guangdong

Z&S España S.A.
Spain, Villarreal

Z&S Egypt Chemicals Industry S.A.E.
Egypt, Sharquia



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Dear Readers,

120 years ago entrepreneurs Otto Zschimmer and Max Schwarz had their newly established company entered in the Chemnitz commercial register. From its origins as a wholesaler of drugs, dyes and chemicals, the company has developed into a global group, which now has 22 branches in 15 countries and more than 1,100 employees. Group revenue has risen continuously to reach more than €465 million in 2013.

Rapid international expansion and our growth in recent years resulted in a decision to steer our corporate communications in a new direction. The annual report you have before you unites the perspectives of our different stakeholders on Zschimmer & Schwarz for the first time. Take a look behind the scenes and get an impression of the many facets of our company: whether as a customer or a business partner, a potential employee or a member of the general public. We hope you have an enjoyable read.

Looking back, the last five years have shown faster growth than at almost any time in the company's history. We have increased revenue substantially by means of focused acquisitions, additional capacity and organic growth. This strong performance by the Zschimmer & Schwarz Group stands out in a pan-European environment of sluggish growth. It applies to all six divisions and confirms two of our corporate policy goals: to position ourselves as a specialised manufacturer with profound knowledge of our markets and products, and at the same time to maintain a balanced, broad-based portfolio that makes us less susceptible to the cyclical market trends of individual industries.

One of the drivers of our growth is innovation generated by our divisions. Let us mention just two of them here on behalf of all the others. On the basis of their high quality and service focus, the Leather Auxiliaries Division has recently been able to decouple themselves from generally slow market growth. By focusing specifically on the manufacture of fatliquors, the division has advanced to become a leading global partner for the makers of automotive leathers. In the Ceramic Auxiliaries Division, by contrast, the achievement was to adapt successfully to customers' changing technological requirements. We broke new ground by developing inks for digital printing in the ceramic tile industry. Since then strong demand has prompted us to invest in additional production facilities in China as well as expanding capacities at our production site in Spain. In Spain, one of the world's biggest markets for ceramic tiles, we received the »Alfa de Oro« innovation award in 2013 for our technology. You will find a full description of all our divisions' international activities starting on page 22.

Our international subsidiary Zschimmer & Schwarz Russia received a special award. As part of a nationwide ranking the company was voted one of »Russia's Leading Companies of 2013«. We are delighted by this strong performance at the national level and see it as a confirmation of our throughout expansion strategy. Zschimmer & Schwarz Russia was only established in 2006 and has successively expanded its portfolio to include the distribution and production of articles from five of our divisions (more information from page 12).

Other new firms joined our Group as the result of acquisitions. We strengthened the Textile Auxiliaries Division with the takeover of Lefatex Chemie GmbH, the most recent member of the Zschimmer & Schwarz Group. The German company has been providing specialised products and innovative solutions to the textile, carpet and nonwoven industries for many years. Two of the many areas of application are for Lefatex products geotextiles and soil retainers.



The Board of Directors, Zschimmer & Schwarz GmbH & Co KG

- 1 Erhardt Fiebiger
- 2 Dr Martin Haberl
- 3 Dietmar Clausen

Our strong business performance confirms two of our corporate objectives: to position ourselves as a specialised manufacturer and at the same time to maintain a balanced, broad-based portfolio.

In 2008 and 2009 we made use of acquisition opportunities to expand our market coverage in the Leather Auxiliaries, Fibre Auxiliaries and Care Specialities Divisions. By acquiring the entire leather auxiliaries business of Münzing Chemie GmbH we were able to consolidate our global market position, especially in leather for shoe uppers and automotive leathers. We boosted the market presence of our fibre auxiliaries in North America by acquiring a significant stake in USA Fibre Solutions LLC, a well-known manufacturer of spin finishes for the American synthetic fibre industry. Milan-based Bregaglio S.r.l., a distributor of cosmetic specialities and agents, has been accompanying the expansion of our Care Specialities Division in this sector since 2008.

We have expanded our capacities at almost all sites to cope with steady growth. Strong demand for phosphonates, for instance, formed the basis for adding new production capacities at our German site in Mohsdorf. In the USA the systematic expansion of our esterification facilities was a reflection of our intention to scale our presence in the broad application of ester oils. In 2010 the production plant in Pilar, Argentina, replaced local contract manufacturing and just two years later was expanded with the addition of a plant for synthesising retanning agents. Tricerro in Italy, the second-largest plant in the Zschimmer & Schwarz Group, has also seen continuous expansion recently, and now has a second cutting-edge sulphonation plant in addition to its existing facilities. This enabled a further sharp increase in production volumes of the anionic surfactants used as a feedstock in the cosmetics industry. Although its customers scaled back capacities sharply, our Spanish company reported rapid growth in tile decoration by switching to an innovative new technology.

Despite its recent growth, Zschimmer & Schwarz remains true to its origins as a member of Germany's Mittelstand, its backbone of medium-sized companies. At its heart it is about keeping ownership in family hands, in the sure knowledge that independence from third-party financial interests is to the benefit of qualitative, sustainable company growth. Well away from market-driven quarterly figures, we can continue to dedicate ourselves to what is most important for us: a high level of service for our customers. By focusing our development efforts sharply on technical applications and working closely with our customers we generate joint know-how that is both diverse and highly specialised and which our customers can deploy to their advantage in their own competitive environments. From an employee's perspective, the benefits of our medium size includes a comparatively flat hierarchy, great latitude to take decisions and find creative solutions to problems, and jobs with plenty of variety. Job satisfaction at Zschimmer & Schwarz, and the fact that our staff has been with us for a long time as a result, ensure a continuity in which our business partners work with the same specialists over a long period.

Despite its recent growth, Zschimmer & Schwarz remains true to its origins as a member of Germany's Mittelstand, its backbone of medium-sized companies.

»Chemistry tailor-made« expresses our way of doing business across several levels: customised products and a strong service focus, flexibility in logistics and a responsible approach to the environment.

»Chemistry tailor-made« expresses our way of doing business across several levels. It includes customised products and a strong service focus, individual product solutions and our own flexibility in logistics: we are able to meet a wide range of customer requests, from a small container to a tanker truck. Today more than ever, »Chemistry tailor-made« also expresses the responsible attitude to the environment that we adopt as a chemical company. Our corporate goals include the high operating safety of our plants, the avoidance of pollutants that damage our environment and the responsible use of resources. Sustainability is therefore also reflected in our development of innovative products that conserve resources.

Our sincere thanks go to our customers for the trust they have shown us over many years and for all the good working relationships. We are looking forward to completing more successful projects together. We also thank all our staff for their great commitment with regard to achieving our company's goals as a part of the global Zschimmer & Schwarz family.

Our company can look back on an eventful past and forward to a promising future. In 120 years it has grown and changed considerably. But the bottom third of its logo still includes the first letters of the town of Chemnitz, where it was first established. They remind us to act both with the foresight born of a long tradition and the agility required for further growth. We will continue to do everything to pursue our defined course. Our thanks are also due to the shareholders for all their enthusiasm and interest in developing the company.

Yours sincerely,

Erhardt Fiebiger

Dr Martin Haberl

Dietmar Clausen

Safe in family hands

Zschimmer & Schwarz has been owned by its shareholder families since it was established in 1894. Dr Eberhard Schwarz, grandson of one of the founders, and Alexander Kraft, a fifth-generation shareholder from the Zschimmer family, look back on the company's history and discuss why some things will never change.

Alexander Kraft ► Eberhard, you worked at our company from 1962 to 1996, and from 1971 onwards you were both shareholder and managing director. I imagine that before then your life was already closely linked to the company as a result of living with your parents. What is your earliest memory of the company?

In 1939 my father went to war again, which ended for him as a prisoner of war, first of the Americans, and then of the French. In 1945 the Red Army invaded Thuringia. The Soviet Military Administration and the communist governments they installed in Saxony and Thuringia initially sequestered the company and finally expropriated us in 1948. But you know about that part of our history already.

Dr Eberhard Schwarz ► Your great-grandfather Otto Zschimmer and my grandfather Max Schwarz founded our firm in Chemnitz in 1894, initially as a straightforward wholesaler. In 1909 they started manufacturing some chemicals for the textile and leather industries in Greiz-Dörlau. So then they had a small chemical factory and for that reason they wanted one of their children to study chemistry. That fell to my father Rudolf, who had returned from the First World War as a lieutenant in 1918 and then went to Stuttgart and Dresden to complete a degree in chemistry. By around 1921 Otto Zschimmer and Max Schwarz had made their sons shareholders in the company and my father was the only chemist among them. In 1921 he became manager of the factory and continued his studies to obtain his doctorate, a Dr-Ing. from Dresden, in 1923. So our family lived in Greiz, which is an hour's drive from Chemnitz now, but in those days the trip must have taken half a day. I remember my father taking me to the factory sometimes and being particularly fascinated by the industrial railway, which had two steam locomotives. When I was five or six years old I was allowed to ride on the footplate – it was a great experience, I can remember it to this day.

The company still had a small site in Oberlahnstein, which it had bought in 1939 and was the starting point for rebuilding after the Second World War.

What do you think have been the most far-reaching changes in the company's history?

When I joined as a chemistry graduate in 1962 there were four shareholders: the two sons of Max Schwarz and the two of Otto Zschimmer. Today there are 25. In the third generation there are my cousins, my sister-in-law and me, in the fourth there are our children, your father, and Christel's children, and now there is also the fifth generation, to which you belong.

So a great deal has changed – and not only the number of shareholders. Today we are a small family company with global operations, which is involved in tough international competition and needs professional management. And it needs the backing of

* Christine Rochow, daughter of Fritz Zschimmer



△
Alexander Kraft and Dr Eberhard Schwarz

the family shareholders. Fortunately it can count on that – all the shareholders without exception agree with our philosophy of a family company that doesn't just look at short-term quarterly profits but thinks in generations and is prepared to put the interests of the company before their own, even when times are difficult. I am very pleased that the fourth- and fifth-generation shareholders have the same attitude towards the company and that you have drawn up a family charter to define these points.

That's right. We spent a long time looking closely at the company and thinking about the reasons for its success. One of the most important aspects we identified is the value code of the shareholder families, which was and is shared by the employees. We decided to put these principles down in writing for the first time in a new form of communication, the family charter, in order to hardwire

them into the company culture. It expresses our understanding of values such as reliability, trust, commitment and responsibility, to name but a few.

A few years ago the company published a code of conduct for its staff. To what extent was that incorporated into the family charter?

The family charter includes the values mentioned in the code. The code of conduct deals with the mission statement and standards that the staff should uphold when dealing with different stakeholders. In the family charter we retain these and other values and undertake to respect a concerted way of behaving towards the company. There are many very different examples of this. Our joint work on the family charter in 2011 and 2012 really united the shareholders. Our desire to ensure the long-term good of the company became very clear.



△ Shareholders from the Zschimmer and Schwarz families

»Financial independence is
the key to sustainable growth.«

ALEXANDER KRAFT

»A large number of shareholders
will certainly maintain close
ties to the company in future.«

DR EBERHARD SCHWARZ

I think it is very good that our family charter gives such a prominent place to keeping the company unreservedly in the family over the long-term.

All the shareholders agree on that. They all consider the company's financial independence to be very important, because that will continue to be the key to sustainable growth. We, the shareholders in the fourth and fifth generations, are well aware of our responsibilities and the fact that this company has good prospects at many levels but must also make sure it offers prospects. Business is becoming more and more complex. Stable ownership provides a framework for concentrating on the essentials.

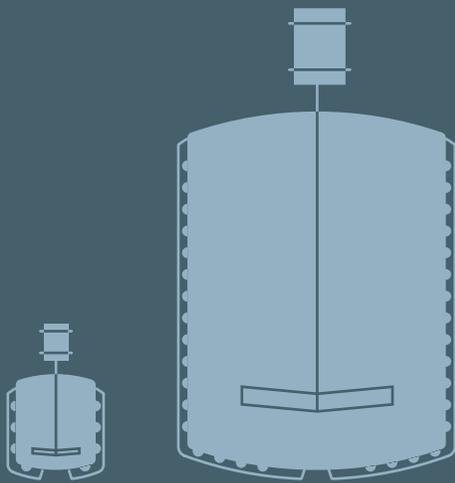
A large number of shareholders will certainly maintain close ties to the company in future. This is reflected in the presence of family members in the Advisory Board and other boards. It is less important whether the company Zschimmer & Schwarz is led by managers from outside the family or by family members themselves. The main thing is that senior management is made up of individuals who share our values, as well as having outstanding qualifications and great professionalism.

Dr Eberhard Schwarz started working at Zschimmer & Schwarz in November 1962 after completing his chemistry studies with a PhD. In 1971 he took over the position of managing director from his father. He was responsible for production and technology until he retired from the company in 1996.

Alexander Kraft and seven other descendants of the company founders constitute the fifth generation of shareholders. Altogether there are 25 shareholders. Alexander Kraft has close ties with Zschimmer & Schwarz as a result of his Board work. The focus of his career is as a freelance professional in another industry.

From the company

Zschimmer & Schwarz is a manufacturer of special chemicals with a profound knowledge of its markets and products. On the next few pages – especially on the inside flap – you can find out more about us and about where our products are used.



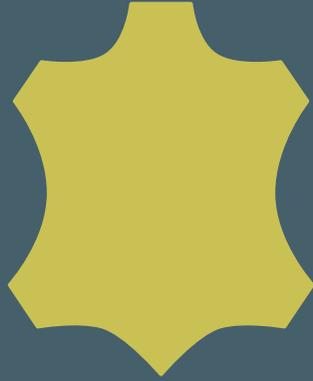
0.05–25 m³

Big or small: Zschimmer & Schwarz has a wide range of production options at its disposal for providing its customers with tailor-made products, in terms of both quality and quantity. The batch sizes of production containers vary from 0.05 m³ for a pilot plant up to 25 m³ in the production facilities.



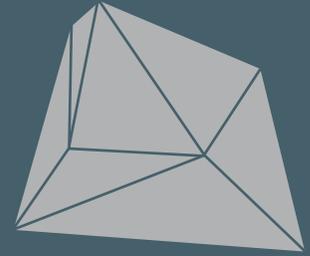
6,500 m/min

Large-scale production of polyester thread at up to 390 km/h or 6,500 m/min is possible with the help of our fibre auxiliaries. These threads are used for tyre body plies, which are coated with rubber to make car tyres. The body plies stabilise the tyre. Our auxiliaries make the rubber stick to the plies better and fulfil an important quality requirement.



162 million m²

of car leather was processed in 2013. In 2004 the figure was just 113 million m². Driving this trend is high demand for luxurious automotive interiors, where the proportion of a hide that can be used is low. In this market Zschimmer & Schwarz has a share of 25%.



x 10

One gram of the silver powder particles used to make the new textile auxiliary ZS-Microsilver has a surface area of between 3 and 5 m², which is 10 times more than a gram of conventional silver particles of the same size. The additional surface area has a positive impact on the material's antibacterial properties.



0.000000000000084 litres
(84 picolitres)

is the amount of ink applied to a ceramic surface in one drop as part of the digital tile printing process. For an area of 100 × 100 cm and a resolution of 360 dpi (dots per inch) 200,880,401.76 drops are required to completely cover the surface with ink. At an ink density of 1,350 grams per litre the amount of ink applied weighs 22.78 grams. The inks for this digital printing technology are a successful portfolio addition courtesy of our Ceramic Auxiliaries Division.

Your world with Zschimmer & Schwarz

Welcome home – we're already there! Our invisible helpers give vital properties to materials that surround you every day. Sometimes they form part of the final product, sometimes they don't. Without our products automotive leather would be uncomfortable, shampoo wouldn't lather and car seat belts would tear. Tiles would have no decoration and designer prints on textiles would look blurred. Oh yes, and the fact that you get home safely is also due to our additives in road markings. Just look around you!

CARE SPECIALITIES

Surfactants as surface active agents create a miscibility between components that are not miscible by nature. They allow to incorporate caring oils in water-based shampoo or shower formulations, for example. In household cleaners they are the main component with different functionalities.

LEATHER AUXILIARIES

In the manufacturing process of leather our auxiliaries are used to give it important properties such as a unique softness, fullness and structure. They mainly consist of natural, synthetic and special fatliquors.

CERAMIC AUXILIARIES

Our auxiliaries are used in production processes in all segments of the ceramics industry. They affect the physical, chemical and other properties of materials, as well as their design and functionality.

TEXTILE AUXILIARIES

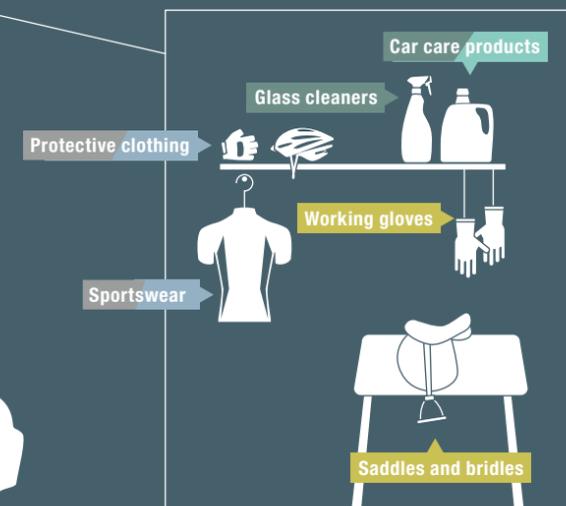
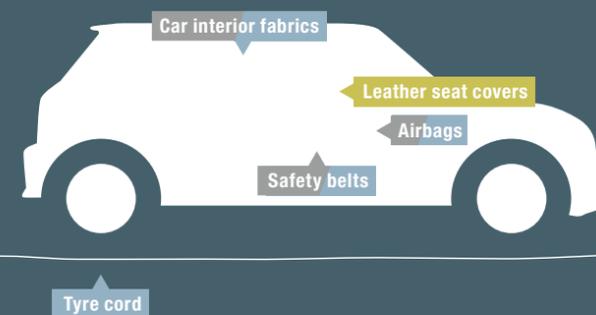
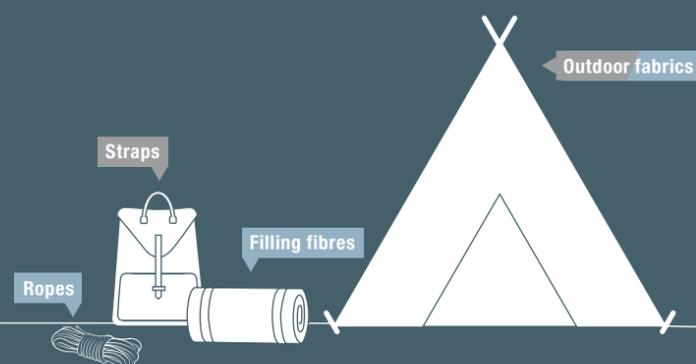
Zschimmer & Schwarz gives clothing brilliant colours that are wash-resistant. Home textiles made with our products banish odours in the home and reduce costs in the production process.

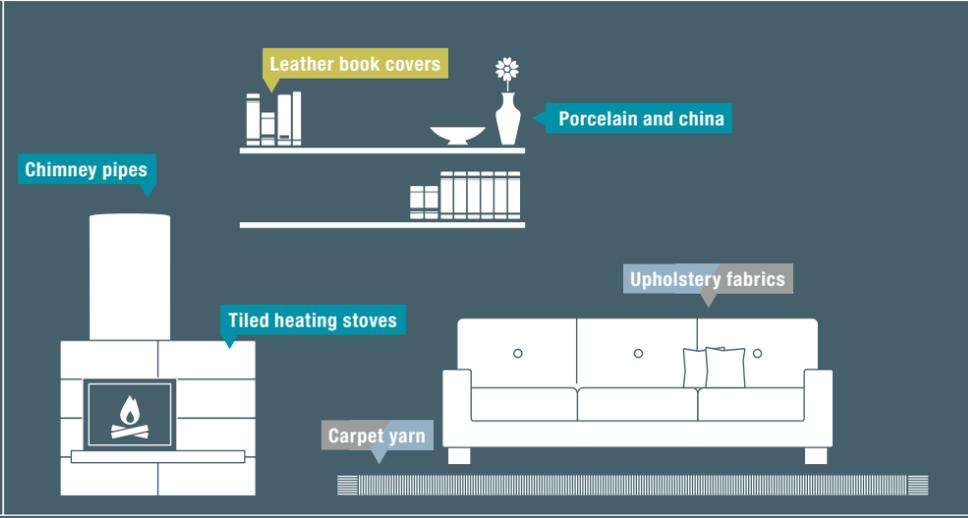
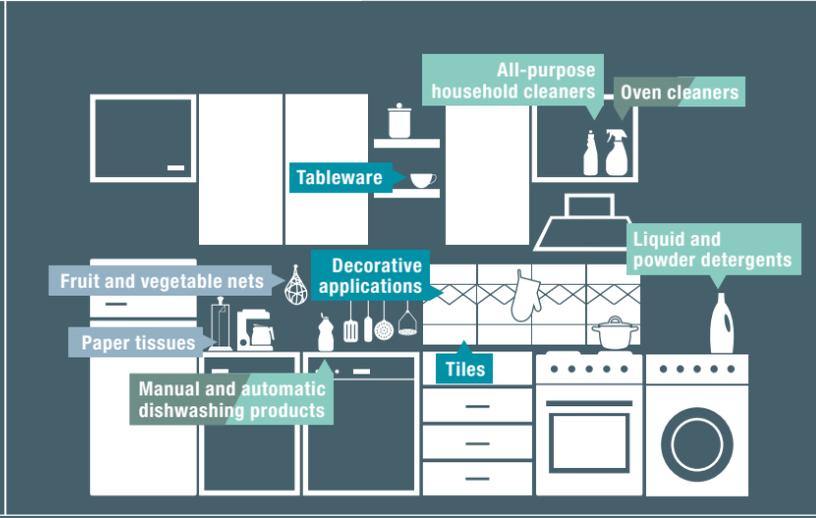
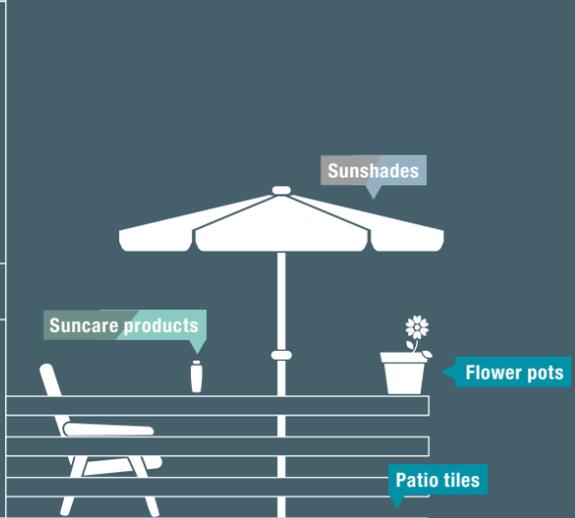
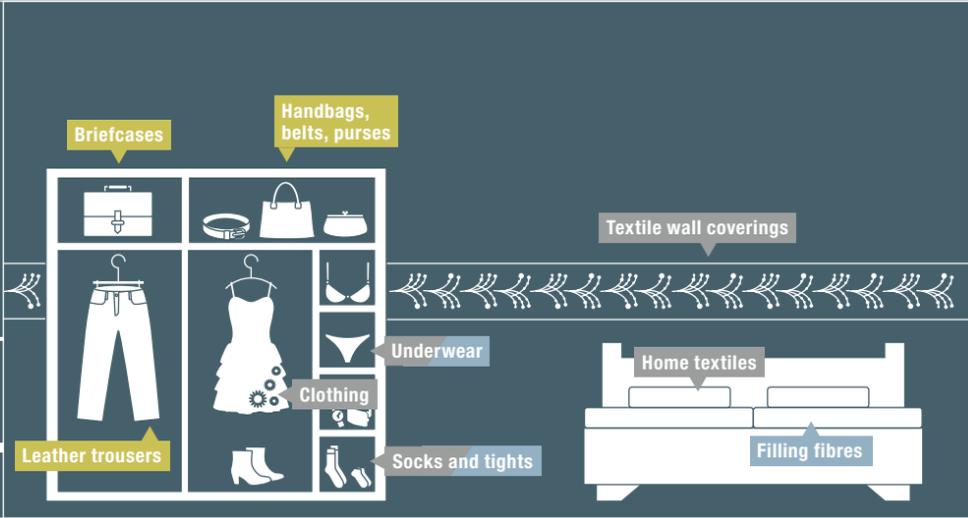
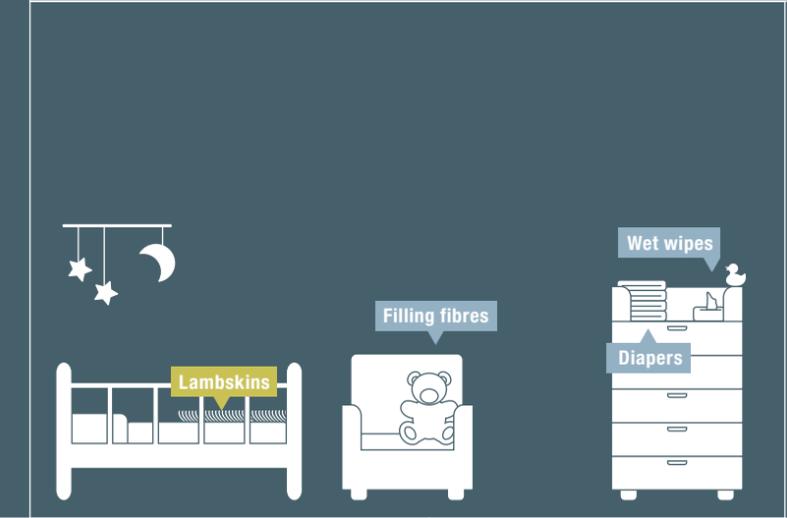
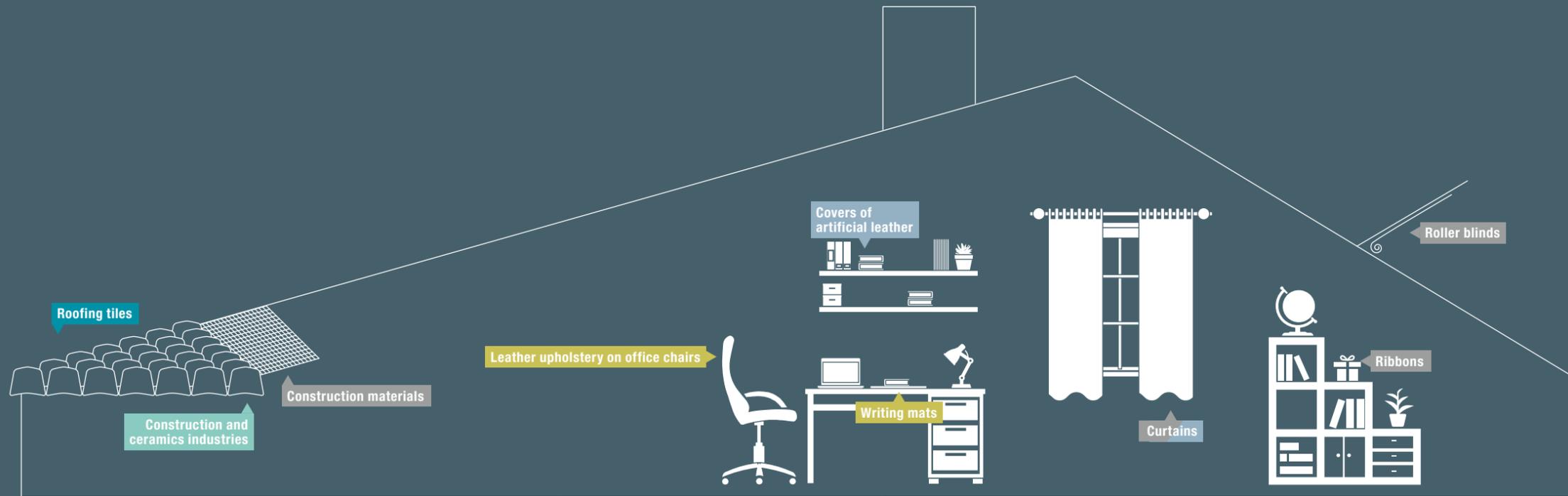
PHOSPHONATES

Most of our phosphonates go to the laundry and household detergent industries and to products for industrial water treatment. They protect surfaces from limescale and rust, remove stains and stabilise bleaching agents.

FIBRE AUXILIARIES

Fibre auxiliaries are used at the beginning of the yarn and non-woven production process. They facilitate the process itself and allow the following steps in the value chain by reducing down-times and by saving costs.







Light and shade

The modernisation of Russian industry is progressing slowly, which is why the economy grows in fits and starts. There are nonetheless good business opportunities in the right sectors, as shown by the prospering branch of Zschimmer&Schwarz Russia.

Plastics, paints and fertilisers are its bestsellers – the chemical industry is one of the engines of the Russian economy. In 2013 the country's entire manufacturing sector grew by a mere 0.4%. Chemical companies increased their production by 4.9%, however. Everything points to further growth in 2014.

The industry is in a stronger economic position than the economy as a whole, which has put in an erratic performance in recent years. The end of the Soviet Union was followed by the collapse of the economy, but it recovered thereafter with growth rates of up to 10% a year. Income from the oil and gas industry helped, as it went largely to state coffers. Many companies were hesitant about renewing their machinery and plants, however. The result is that large sections of Russian industry are barely able to compete in international markets. At the same time political influence is felt clearly in the Russian business community, which in turn deters private investors.

2006: Zschimmer&Schwarz in Russia

Despite this, Zschimmer&Schwarz decided to start some exploratory ventures into the Russian growth market. Sales of ceramic auxiliaries for the tile industry via a commercial agency developed very well, so approval was given to set up a joint venture: Zschimmer&Schwarz Russia O.O.O. was established in 2006 in southern Russia, near to the city of Rostov-on-Don. The choice of the site in Shakhty was partly motivated by the large tile producers in the area and partly by its good strategic position on the Don river and the Sea of Azov,

as well as its proximity to Ukraine and Kazakhstan. Russian customers appreciate a local presence from their business partners. They are looking for service in the local language from account managers who are available in person and they want to enjoy the benefits of dependable deliveries at short notice. They also want their trading partners to take responsibility for the logistical and administrative challenges of importing the products, which often requires extensive documentation. Invoicing in roubles is another welcome advantage.

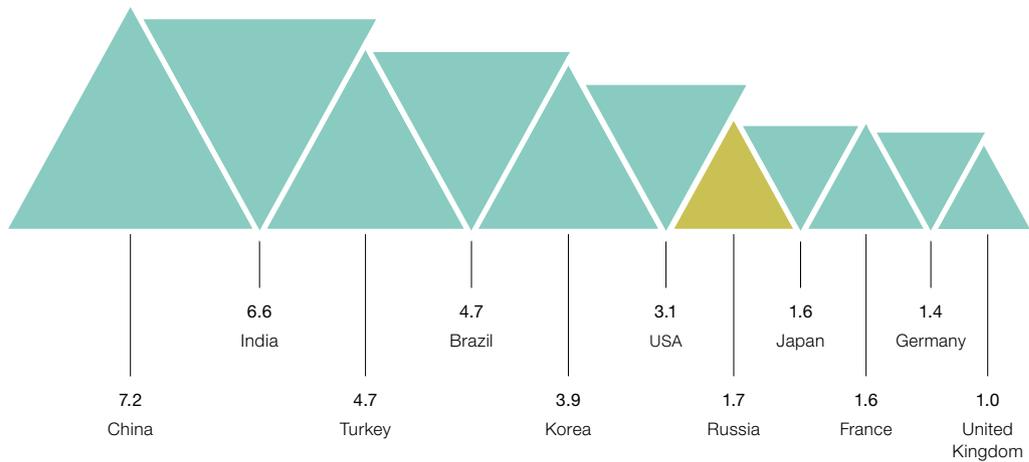
After purchasing and refurbishing a factory building in Shakhty the company's own production capacities for ceramic printing media and deflocculants were ready for use by November 2007. Zschimmer & Schwarz gradually expanded its business activities to other areas. Now, auxiliaries for leather, textiles and fibres and some care specialities are sold alongside the ceramic auxiliaries.

Customers include subsidiaries of well-known global brands, major national players and niche producers. In regional terms they are concentrated in the European area west of the Urals, i.e. on just 25% of Russia's total surface area. This can change, because the industrial culture that has been established over many years in the west and south of the country is now spreading across the Urals to Asia. Russia joining the World Trade Organisation WTO in 2012 still promises additional momentum. Another important pillar is the traditional consumerism of the 143 million inhabitants of this enormous country, even though the weak rouble has sapped their purchasing power.



INDUSTRY AS AN ECONOMIC FACTOR

Forecast manufacturing growth in % p. a. (2011–2030)



Source: VCI/Prognos

Clear growth opportunities

Experts forecast clear long-term growth opportunities in Russia. PWC, a consultancy, predicts in one paper that Russia could overtake Germany as Europe's biggest economy by 2020. The International Monetary Fund (IMF) is also confident. It assumes that annual growth rates in Russia could reach up to 4.6% by 2019. In 2013 the World Bank came to the conclusion that business confidence in Russia had improved sharply compared with other countries. It is still too early to forecast the effects of the current crisis, but the geopolitical tension caused by Russia's annexation of Crimea and intervention in Ukraine will weigh heavily on economic development throughout the region.

For Zschimmer & Schwarz nationwide economic growth in recent years is reflected in a strong business performance, which has also been officially acknowledged. As part of a national ranking of financial indicators our subsidiary was voted one of »Russia's Leading Companies in 2013«. This was accompanied by a personal award for the managing director and two of her staff. They are now assisted by another 25 colleagues, and with the support of the Zschimmer & Schwarz Group they have managed to turn the expansion strategy into an economic success. Their marketing approach

is defined by a clear service focus – also due to the local presence – as well as fast delivery capacities and high product quality.

Exposure of the chemical industry

The Ukraine crisis in 2014 and the resulting sanctions will have an adverse effect on Russia's economy and relations with Germany, its main trading partner, but also on Zschimmer & Schwarz Russia. Economists are hoping that the problems can be solved in the medium term and that there is no further escalation, because Russia and its trading partners are dependent on one another.

Looking at the chemical industry this dependence is clear. According to the trade magazine »Speciality Chemicals«, 80% of the products manufactured there are base chemicals, in other words commodities. The speciality chemicals required to produce construction materials, textiles, leather goods and care products have to be imported at great cost.

This is something the Russian government wants to change. It is encouraging companies to produce more high-quality speciality chemicals in the country. The Russian market for these products is intended to grow by an average of 5% p. a. between 2013 and 2018. The government promises political



1



2

- 1 Russian customers appreciate service in the local language from account managers who are available in person and they want to enjoy the benefits of dependable deliveries at short notice.
- 2 Syndet bars are still a very popular alternative to liquid soap in Russia.

backing for suppliers of speciality chemicals planning to build new manufacturing capacities in Russia.

Industry needs speciality chemicals

As yet Russia cannot cover its need for speciality chemicals alone. These products are required in all the country's industrial sectors – above all in the automotive industry. Every year around three million new vehicles are registered in Russia. The big western carmakers and Russian companies operate factories that permanently need fresh supplies of additives. Today the materials for dashboards, seats and interior panels already contain leather, textile and fibre auxiliaries from Zschimmer & Schwarz.

Technical textiles are seen as having the potential to expand, because they are a niche market in which Russian manufacturers intend to grow in the future. Several factories are being planned at

the moment. Suppliers of technical textiles will find customers in the energy and healthcare sectors, but also in the domestic construction industry, which needs high-quality materials.

Housing construction is developing quickly. Research company GTAI (Gesellschaft für Außenwirtschaft und Standortmarketing / Germany Trade and Invest) estimated that nearly one million flats with a total surface area of 70 million square metres were handed over to their new owners in 2013. This represents a growth rate of 5.6%. Insulating buildings in cold regions in particular requires additional, high-performance construction materials.

A regulation on the insulation of old housing blocks is currently under discussion. This in turn could drive explosive demand for technical textiles and generate further growth for the Russian chemical industry.

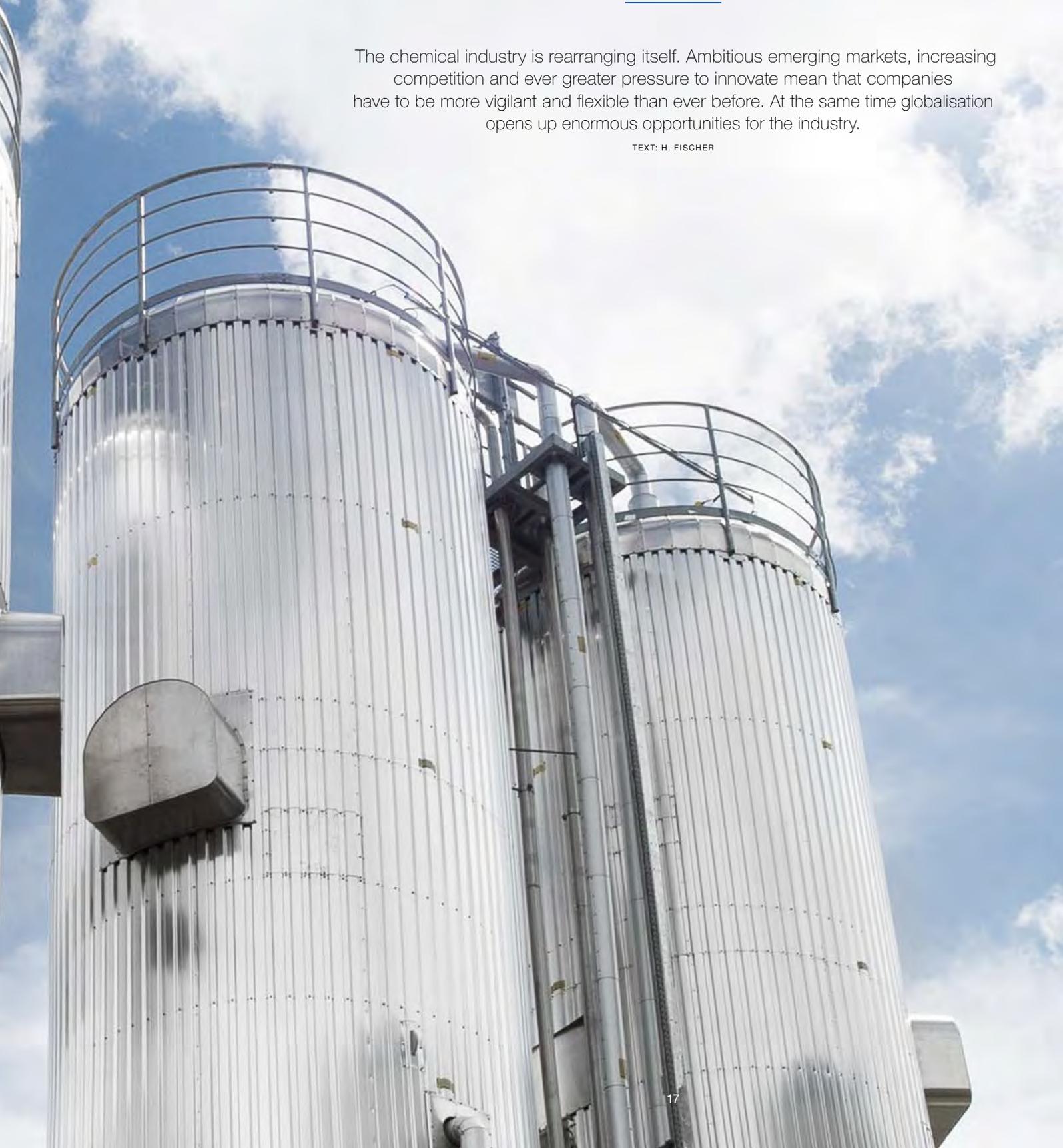


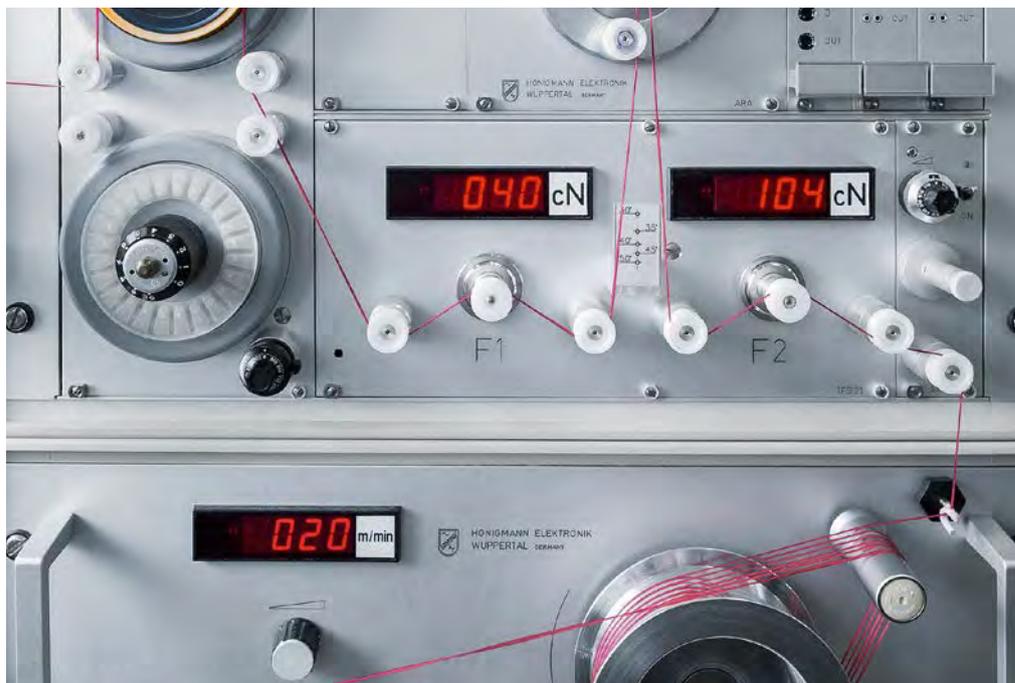


Turbulent times

The chemical industry is rearranging itself. Ambitious emerging markets, increasing competition and ever greater pressure to innovate mean that companies have to be more vigilant and flexible than ever before. At the same time globalisation opens up enormous opportunities for the industry.

TEXT: H. FISCHER





Germany is in third place worldwide for research and development spending, coming in behind the USA and Japan.

Speciality chemicals, an export success

Exports, imports and trade balance of European chemicals industry (not including pharma) in € billion

Basic chemicals	2011
Exports	40.5
Imports	49.9
Trade balance	-9.4
Basic chemicals	2030
Exports	53.8
Imports	77.1
Trade balance	-23.4
Speciality chemicals	2011
Exports	49.4
Imports	29.8
Trade balance	+19.6
Speciality chemicals	2030
Exports	78.3
Imports	43.1
Trade balance	+35.2

Source: VCI/Prognos (Rounding differences possible)

Chemistry is everywhere. Without it, detergents would be useless, cement would stay runny and shirts would be rough and stiff. Its extensive product range makes the industry both supplier and customer to large sections of the manufacturing sector. The two are mutually dependent. When industry and consumers do well, then revenues rise for the chemical companies. Conversely, economic downturns and increasing competition quickly squeeze profit margins.

The chemical industry has begun to pool its strengths to repel this threat. Several global players are currently divesting their more cyclical divisions and withdrawing from product lines that others can manufacture more cheaply. At the same time the sector is looking for strategic partners in order to reduce its exposure to economic fluctuations. »There are turbulent times ahead for chemical companies«, is the assessment of AT Kearney, a consultancy. In a survey carried out in late 2013 a majority expected the number of mergers and acquisitions to increase.

It is mainly the young, fast-growing companies from Asia and the Middle East which are looking for acquisition targets in Western countries in order to attack the incumbents in their home markets. European and US chemical firms, on the other hand, have overcome the crisis that dominated 2008 and 2009. Now they want to invest in countries like China, which are becoming more prosperous and where demand for industrial and consumer goods is rising.

China already has the world's largest chemical industry by sales and will continue to build on its position. The centre of gravity is shifting. Although demand for chemical products is going up in almost all regions of the globe, most new production capacities are being built in emerging markets. In 2011 the European Union was home to a quarter of worldwide chemical production. By 2030 this share is set to fall to 15.5%, according to a study by the German trade association VCI, and Prognos, a consultancy. Emerging markets will see their share rise from 39% to 56.3% in the same period.

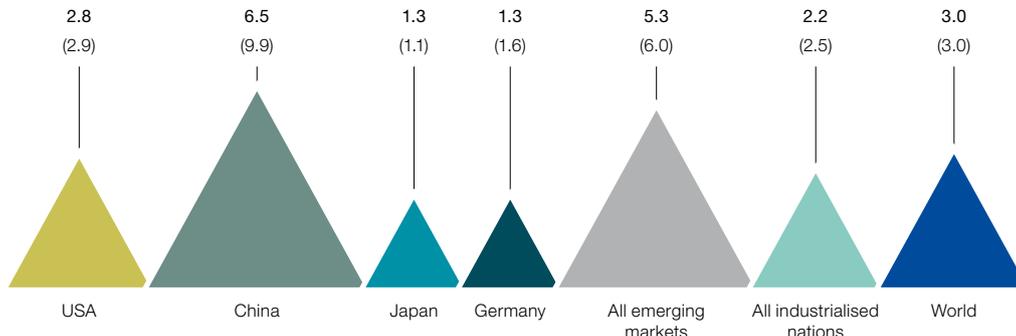
Big opportunities for small companies

It is mostly the production of base chemicals like fertilisers and dyes that is shifting to the world's growth regions. They can be produced cheaply in large volumes and without great development expense. By contrast, Europe's high feedstock and energy prices will cause it to become less competitive over the long term, according to industry observers.

High-quality speciality chemicals will remain a good source of business potential for European manufacturers, however. Margins for these products are higher than for base chemicals for one thing, and great expertise is required to develop them, which the European industry has accumulated over decades and cannot simply be replicated abroad. That is why Europe's higher energy and labour costs are less decisive for the often small and medium-sized manufacturers of speciality chemicals.

DYNAMISM OF EMERGING MARKETS MAKES UP FOR SLOWER GROWTH

Average increase in gross domestic product in % p. a.

2011—2030
(1995—2008)

Source: VCI/Prognos

Prognos forecasts that the trade surplus for European speciality chemicals will go up to €35 billion by 2030. In 2011 the figure was €20 billion. The opposite trend can be seen for base chemicals. There, the trade deficit is projected to increase from €9.4 to €23.4 billion over the same period.

In addition to competition from emerging markets, European chemicals are coming under pressure from an ever tighter regulatory framework. The REACH regulation, for example, requires all manufacturers in the EU and importers to complete a detailed registration procedure for every single chemical substance. For smaller quantities this means that the costs of the necessary data collection are disproportionately high in relation to revenues.

Energy costs: a vulnerability

Rising energy prices are also causing German manufacturers a headache, because they are so important for the chemical industry. For this reason some in the industry are highly critical of the »Renewable Energies Act« (EEG), since the surcharge it imposes on electricity prices is now much higher than the cost of generation. This puts the export-dependent German industry at a disadvantage compared to its competitors inside and outside the EU, like those in the USA for instance, which has also become more independent of global energy prices thanks to its production of shale gas. Electricity and gas also cost much less in most emerging markets. Chemical companies therefore prefer to locate new plants in these countries, with dramatic consequences for German industry. Vital chemicals are then often manufactured far away, value chains are shattered and transport costs are higher.

The German chemical industry believes that governments are responsible for creating a level playing field. To date, only individual energy-intensive companies are exempt from the EEG levy. This results in windfall profits for production facilities which, on their own, would not have enjoyed any exemption. It would be fairer to exempt energy-intensive processes from the levy, rather than to allocate subsidies at the company level. This would mitigate the unfair competition for small and medium-sized companies. The expansion of renewable energies also represents an opportunity for the chemical industry, however. Building solar cells requires silicon wafers, which are supplied by chemical companies. Wind turbines have rotor blades made of complex composite materials. Demand for products of this kind should rise. In Germany a quarter of all the electricity generated comes from renewable sources. By 2020 its share of final consumption is due to rise to 35 %, according to the federal government target.

Another requirement for long-term success is innovation. By international comparison the European chemical industry still has enough specialists to develop new products. The population is declining in Europe, however, which in the long run will impact the availability of employees. Companies are preparing by training their own specialists, particularly for niche occupations.

The chemical industry remains one of the most inventive sectors of the German economy. Research and development spending came to €8.8 billion in 2011. In a global ranking, this puts Germany in third place, behind the USA and Japan.



1



3



4



2

1–4 Globalisation offers enormous opportunities for chemical companies, including suppliers to the ceramic tile (2), leather (3) and fibre (4) industries.

Prognos is predicting that the research budgets of German chemical companies will rise by 4 % p. a., doubling to nearly €19 billion by 2030.

Joint research to cut costs

This will not necessarily benefit research and development departments on German soil, however. The expectation is rather that a large proportion of domestic companies' laboratory capacities will migrate to India or China, where the number of highly qualified experts is increasing. The USA is also a popular research location for the chemical industry. Scientists have long been attracted to the United States by the better working conditions they find there. So German companies are packing their bags: based in Ludwigshafen, BASF, the world's largest chemical company, intends to conduct half its research and development outside Europe by 2020.

SMEs in Europe are concerned by the departure of highly qualified experts. For cost reasons, smaller companies are scarcely in a position to relocate their development departments. One solution is to pool resources in a research alliance. Chemical parks have also been set up in Germany in the past few years.

It is worth the effort involved. The chemical industry is the most important in Germany after the auto-

otive, electrical and mechanical engineering sectors and is expected to maintain this ranking. More than 410,000 employees generated revenue of € 178 billion in 2012, according to the Federal Statistical Office. Around one-third of sales come from small and medium-sized companies.

Nine out of ten chemical companies in Germany are part of this Mittelstand. These roughly 2,000 firms have a workforce of 160,000, accounting for more than a third of all employees. Often they are little-known global market leaders, supplying large and small companies with highly specialised chemicals. However, broad swathes of the German Mittelstand are investing too little in modern new production facilities. An investigation by the German Savings Banks Association (DSGV) found uncertainty about the outcome of the European debt crisis to be the main obstacle. The authors nonetheless believe the trend will have bottomed out in 2013.

Megatrends favour chemicals market

Global megatrends make the chemical industry a very promising long-term business to be in – as long as the economic environment remains stable. If the debt crisis should worsen, however, or free trade be curtailed, this would have an adverse effect on demand and revenues.

One key driver of growth is the growing global population. DSW, a German development and advocacy organisation, forecasts that the world population will go up from 7.2 billion people today to 8 billion in 2025. As Asia, Latin America and some African regions are becoming more prosperous, demand for consumer goods is growing – from body care products to clothes and cars.

Global car production alone will increase from 70 million vehicles today to 90 million in 2017, according to Oliver Wyman, a consultancy. Suppliers from the chemical industry are needed to make interiors, upholstery, tyres, paint and consumables. In regional terms, much of the growth will take place in Asia and partly in America, too. In most European countries the automotive market will be stable at best, even if the sovereign debt crisis has indeed been overcome.

Similar geographic differences are prevalent in the construction industry. Whereas the debt crisis has depressed building activity in Europe, millions of new flats are still being built in China, which is good news for the manufacturers of construction chemicals. Deloitte, a consultancy, quotes the American Chemistry Council's estimate that plastics and chemicals account for around 17.4 % of the cost of building a house. Huge infrastructure projects in Asia, the Middle East and Latin America are giving the construction industry a further boost. Suppliers of construction chemicals are also benefiting from the trend towards greater energy efficiency and refurbishing buildings.

Increasing demand for steel comes mainly from emerging markets and so benefits regional manufacturers. With a share of 63 %, Asia was already

the biggest market for finished steel goods in 2010, and the upward trend is unbroken, according to a study by KPMG, a consultancy. Demand for special steels will also increase, which makes development even more vital and so heightens the importance of innovative chemical companies in Europe.

Fibres, a growth market

At the same time other industrial sectors – aerospace, sports equipment and automotive, for instance – are replacing steel with lighter composite materials. Luxinvest, a strategy consultancy, predicts that the market for carbon-fibre-reinforced plastics will grow from US\$ 15 billion in 2012 to US\$36 billion by 2020.

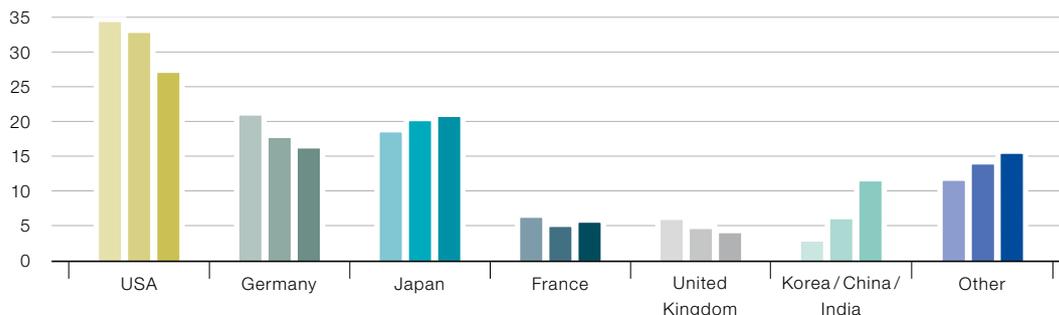
A similar development can be seen in the textile sector, whose main supplier is the chemical industry. Synthetic fibres have long moved beyond their established role in clothing. Vehicle and furniture manufacturers as well as the metalworking and electrical engineering industries are using more and more fibres. The German textile industry generates around 40 % of its sales in sectors like these.

But classical clothing is also getting an overhaul. Developers are working on »intelligent« textiles, for instance, which eliminate the smell of sweat, or on romper suits containing special creams for babies with allergies.

Whatever the sector and whatever the product, almost all these innovations include vital ingredients from the chemical industry. Chemistry really is everywhere.

EUROPE STILL STRONG – BUT ASIA CATCHING UP

Share of chemical patent applications (not including pharma) in % 2000/2005/2010



Sources: NIW, ZEW, VCI

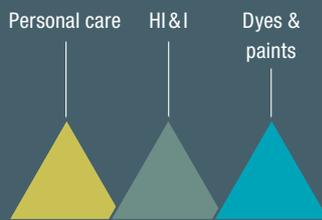
Our divisions at a glance

CARE SPECIALITIES

An application technology on the level of our customers, customised developments and a particular expertise in finding solutions: in the highly competitive surfactants market the range of services offered by Care Specialities represents a unique selling proposition.

Main production sites:
Lahnstein, Germany
Tricerro, Italy
Milledgeville, USA

Main areas of application:



LEATHER AUXILIARIES

Product quality and the services on offer have made the Leather Auxiliaries Division a major source of revenue for the Group. Its level of market penetration is typified by Provol BA, which has become a generic name of fatliquoring agents for very soft leathers.

In-house production since **1909**



CERAMIC AUXILIARIES

The system solutions from the Ceramic Auxiliaries Division are an indispensable manufacturing component in all areas of the ceramics industry. Its portfolio of chemical auxiliaries currently comprises some 600 products, making it the largest in the world.

Sold in **70** countries

Business units in the division:



TEXTILE AUXILIARIES

The Textile Auxiliaries Division is the wellspring of the company and well positioned for the future. For polyamide finishing, anti-yellowing agents, technical textiles and digital printing: the division combines globally recognised premium products with outstanding technical services.

Operating with 8 production sites on all the main global textile markets

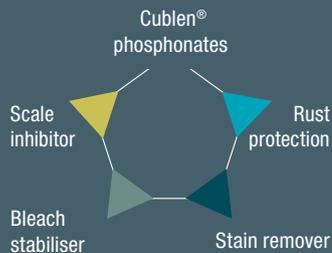


PHOSPHONATES

The Phosphonates Division sells customised products for industrial and domestic water treatment under the brand name Cublen®. The division's particular strength is a special process for manufacturing phosphonate granules.

Established in 1993

Functions of Cublen® phosphonates in laundry products:



FIBRE AUXILIARIES

The Fibre Auxiliaries Division operates in a complex environment in rapidly changing markets. With a wide range of products for manufacturing man-made fibres and nonwovens the division became a recognised international supplier of speciality chemicals.

Production sites:
Germany, Italy, USA,
South America, China





Surfactants for beauty, hygiene and cleanliness

An application technology on the level of our customers, customised developments and a particular expertise in finding solutions: in the highly competitive surfactants market the range of services offered by Care Specialities represents a unique selling proposition.

Wherever beauty, hygiene and cleanliness are important, the surfactants from the Care Specialities Division deliver invisible everyday benefits and are indispensable for enhancing the functionality and the value proposition of modern products. Zschimmer & Schwarz's surface active agents, to give them their full name, make it possible to combine phases that are normally immiscible, such as water and oil. Our surface active agents are found in shampoo, shower gel and nail varnish. They improve the cleaning properties of household and industrial detergents and enable a wealth of technical applications.

Tailor-made products with extra value

The product portfolio is based on nonionic, anionic and amphoteric surfactants, as well as other feedstocks that are developed, manufactured and distributed for numerous application areas. Our customised surfactant mixtures give our customers added value for their formulations and products: from »ready-to-use« emulsifiers to extra features in final products. The surfactants are supplemented by specialities such as amino acid esters. Bases for soap-free, solid syndets, especially used in dermatological applications, complete the portfolio.

Successful both as a specialist and a generalist

The product portfolio consists mainly of customised special surfactants and is supplemented by many basic products. Our role as a highly flexible surfactant manufacturer with great application know-how has proven to be a real competitive advantage. The customers of our innovative raw materials and concepts are mostly manufacturers of body cleansing and care products, as well as providers of technical

products for household, industrial and institutional cleaning (HI&I). In addition, we are also the main supplier to other Zschimmer & Schwarz divisions: as an internal services provider we develop and manufacture individual products for the Textile, Ceramic, Fibre and Leather Auxiliaries Divisions, which they use as components for their own product ranges.

Production centred in Europe

The main production sites are Lahnstein in Germany and Tricerro in Italy, as well as Milledgeville in the USA for special esters. Most revenue in Italy is generated with commodities, whereby the share of specialities is growing. Since it was established in 1969 the Italian site has reported constant growth, which is safeguarded by continuous investment. Germany and Italy thus cover the entire spectrum of customer and market requirements: speciality chemicals produced, and also distributed in small volumes from Lahnstein, and the mass production of base products in Italy. The Care Specialities Division is supplemented by Bregaglio S.r.l. in Milan, a wholesaler of ingredients for personal care products. It has a full range of instruments to characterise the effects of formulations on the skin.

Differentiated added value for the customer

The relevant manufacturers in the two segments – cosmetics and technical cleaning and care products – are part of the customer base established by Care Specialities. Our business relationships are structured with the aim of reducing dependence on individual companies and serving a broad customer base in a variety of application areas. Our customers are correspondingly diverse. Key accounts see our

◀
Key accounts see our knowledge and experience as an extension of their own competences; for smaller companies this support is even more meaningful.



▷ An array of complex analytical instruments enable a high level of service; here, preparing the manufacture of a cosmetic formulation.

knowledge and experience as an extension of their own competences. For smaller companies the support is even more meaningful as they save own development resources. The loyalty of our customers is truly outstanding: more than half our established customers have entrusted their business to us for over 25 years.

Continuous improvement is our goal

Independently of the continuous improvement process defined by the ISO standard, we are always working to optimise our manufacturing processes and products. In the fast-moving market of cosmetics and skin care products we help our customers to respond quickly and adequately to new developments and trends. From exotic wellness at home products to new systems for rinse-off and leave-on products we offer a wide range of guide formulations.

Process optimisation in the spirit of sustainability

We attach great importance to protecting the environment and using natural resources. So we always try to optimise our development processes in the spirit of sustainability. By developing improved wet-

ting agents, for example, we ensure that dispersion processes use less energy. This helps our customers to save energy, time and costs by means of sustainable production processes.

Service; our extra mile

As well as developing solutions for our customers, our particular expertise lies in providing end-to-end services around the product itself. In essence, these are proactive suggestions, new ideas for formulations and guide formulations. Our customers also receive detailed results of physical and chemical measurements made using state-of-the-art equipment in our own laboratory.

Promoting next-generation talent

In order to ensure that product and service quality stay high, Care Specialities and TEGEWA, an association of chemical producers, are deeply involved in fostering the next generation of academic specialists. Partnerships with universities and independent research institutes will play an even bigger role in future. Bachelor's and master's degrees are offered at Bregaglio in Milan and at Zschimmer &

»Farmaceutici Dottor Ciccarelli is a family-owned company founded in 1821 which operates on the Italian healthcare market with leading brands. We make natural products of the highest quality with highly qualified staff and the latest technological production processes and facilities. They represent a blend of innovation and pharmaceutical traditions. We and Z&S share principles like precision, respect and transparency, which have led to a professional, productive and very valuable partnership. I look forward to continuing our business in the future.«



Monica Pasetti
CEO
Farmaceutici Dottor Ciccarelli, Milan

Schwarz in Lahnstein in cooperation with local universities. In Italy we have been developing our partnerships with universities for a long time. The new research results will also be shared more widely within the Group.

New focus for marketing

How we address our customers has also changed over the years: we have moved away from a purely objective approach to a more emotional one. Care Specialities recently presented at the major global trade fairs (in-cosmetics in Europe and Asia, SEPAWA Congress) the redesigned exhibition stand. Its airy, open structure encourages trade visitors to stop by. The new concept behind the stand also provides the opportunity to test all the guide formulations for rinse-off and leave-on applications on the spot. Our marketing tools have been supplemented by online product information, which provides a useful addition to personal on-site service by our technical sales representatives and service technicians.

Broad-based growth

The Care Specialities Division operates in saturated, stable markets which have an average growth rate of up to 2% and are barely affected by the economic cycle. Growth prospects are therefore limited and in the years ahead will come primarily from innovation. The plan is also to move into new market segments with products based on existing core competences. Potential customers in the dyes and paints

industry are currently one area of focus. The division's main sales area is at present Europe plus western Russia, so geographic expansion also offers growth potential.

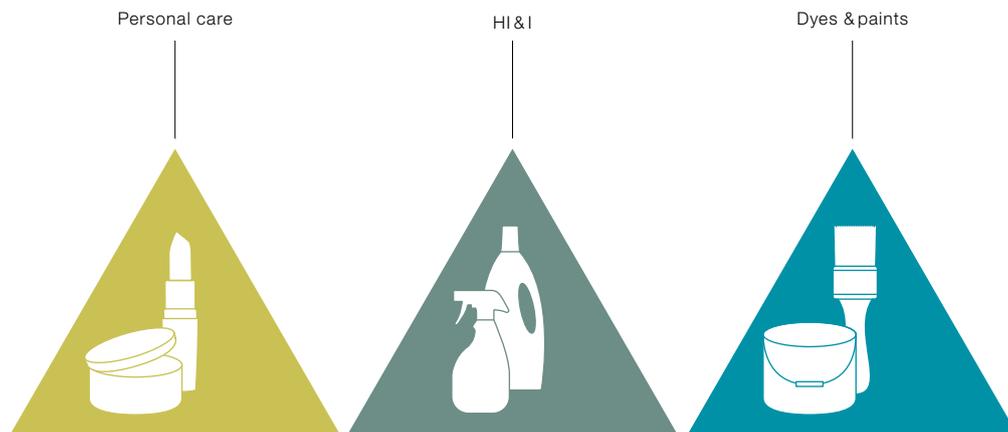
Prepared to cope with risks

Regulatory intervention represents a particular risk in the years ahead. We also monitor our sourcing markets permanently in order to counter any adverse developments quickly. This includes regular testing of alternative suppliers and feedstocks, so that we are able to make good on any supplier loss without delay.

Intensify customer support

Responsibilities in the Care Specialities Division have been reorganised to make more resources available for developing new products and applications. Major new investments have also been made in laboratory equipment. The target is to improve automation and reproducibility of standard processes and measurements. Both these steps reinforce our capacity for innovation and help to generate growth.

CARE SPECIALITIES: THE MAIN APPLICATION AREAS





△
A global team of specialists – from tanners and leather technicians to scientists with a doctorate in chemistry – is committed to delivering outstanding quality and service on behalf of the Leather Auxiliaries Division.

A strong partner for the leather industry

Product quality and the services on offer have made the Leather Auxiliaries Division a major source of revenue for the Group. Its level of market penetration is typified by Provol BA, which has become a generic name of fatliquoring agents for very soft leathers.

Growth rates in the leather industry have been low for years, because the availability of hides has remained more or less flat. The Leather Auxiliaries Division has been able to decouple itself successfully from this trend. Acquiring the leather auxiliaries business of Münzing helped to expand its market position in the shoe upper leather segment. Fatliquors for automotive leather are also key drivers of growth. Zschimmer&Schwarz has established itself as the number one worldwide in fatliquors, both in the automotive industry and in terms of the leather market as a whole. Around half the leather produced globally is traditionally used to make shoes, about 20% goes into car interiors and the rest is used for furniture, clothing and bags.

Successful with specialised services

In addition to customers from the automotive leather and shoe upper leather markets, the division serves tanners around the world who make leather for the clothing, bag, furniture and fur industries. It makes use of modern research and development laboratories, a fully equipped test tannery and several production sites to provide specific solutions for our customers' requirements, which vary considerably depending on fashions and trends. Highly specialised leather technicians, who are in touch with existing and potential customers worldwide, offer a first-class technical service to supplement the high-performance product range.

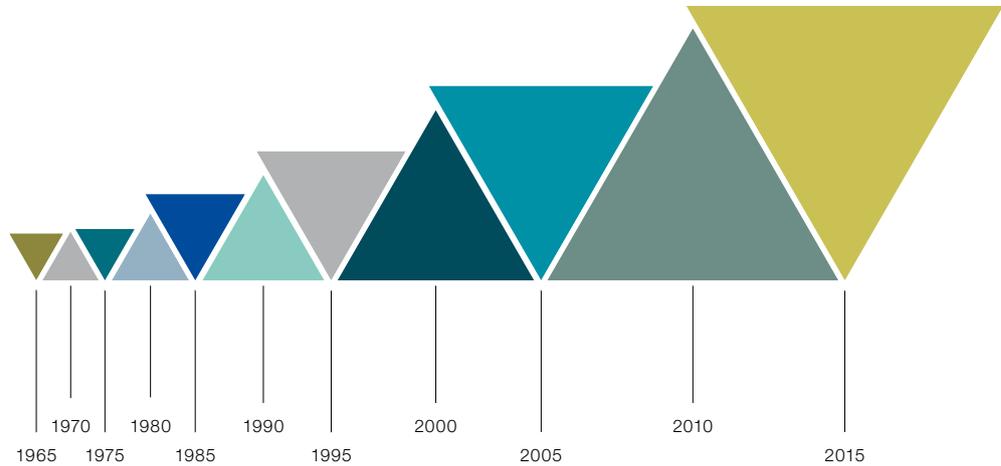
Focus on wet-end; beamhouse operations a growth sector

The heart of our product range is focused on the re-tanning process. Manufacturing natural, synthetic and special fatliquors accounts for the bulk of our production. They allow our customers to create the optimal leather qualities for their needs, such as softness, volume and structure. Provol BA, which was developed back in the 1980s, has long been and still is synonymous with softening fatliquors. Its outstanding performance delivers an even softness throughout the entire cross-section of the leather. At the other end of the product portfolio are our latest speciality chemicals, with which we entered the market for beamhouse operations in 2012. They now make us a dependable partner for our customers throughout the entire leather production process – save for finishing – that ranges from beamhouse operations to wet-end.

Meat industry determines main markets

Our business operations take place in a global industry, but one which is nevertheless so straightforward that we know all the key players. The main markets are situated in areas with lots of cattle and therefore abattoirs. For decades they have been moving to developing and emerging markets in the fast-growing economies of Asia and Latin America. One of our largest customer groups are the big tanneries that have set up plants in meat-producing countries to be near to the meat industry. We also serve global customers who outsource their leather production to contract tanneries.

GROWTH OF THE LEATHER AUXILIARIES DIVISION OVER THE PAST 50 YEARS
1965 = 100 %



»The fact that Heller-Leder is used at the high end of the furniture and automotive sectors is also due to our choice of suppliers. We expect the same qualitative perfection from them that our customers expect from us. What counts for us are a consistent business relationship over many years, as well as proximity, fast decisions, innovative R&D and a high level of service. In Zschimmer & Schwarz we also have a business partner that treats Europe as an important market and supports our commitment to Germany as a place to do business.«



Thomas Strebost
Managing Director
Heller-Leder GmbH & Co. KG, Hehlen
Tannery of the Year 2011
Winner of sustainability award
»The Blue Angel« in 2013

Complementary, not in competition

Most of our products are made in Lahnstein – this includes 100 % of the fatliquors for automotive leather. Production for differently structured markets takes place partly in our international subsidiaries, and mostly using regional feedstocks, with formulas adjusted accordingly. »Complementary, not in competition« is the principle behind these production sites. Products are manufactured at our companies in Brazil, Argentina and Italy. »Made in Germany« is a highly respected stamp of quality in China also, and gives us additional competitive advantages. We have been producing some re-tanning agents at Z&S Argentina and Z&S do Brasil since 2012.

Country-specific logistics concepts

Our distribution structures have been adapted to the sometimes very different national conditions in order to ensure a local presence for our existing and potential customers. In fragmented markets like India and China our sales and logistics network is structured accordingly. Multiple local offices or regional wholesalers take care of our customers' wishes and act as local representatives of our Group companies, too.

Direct contact to decision-makers

The automotive leather segment is heavily industrialised, so we limit our contacts to the decision-makers in the relevant customer groups. Our aim is always to know: What are the development trends? What does the market want? What new demands

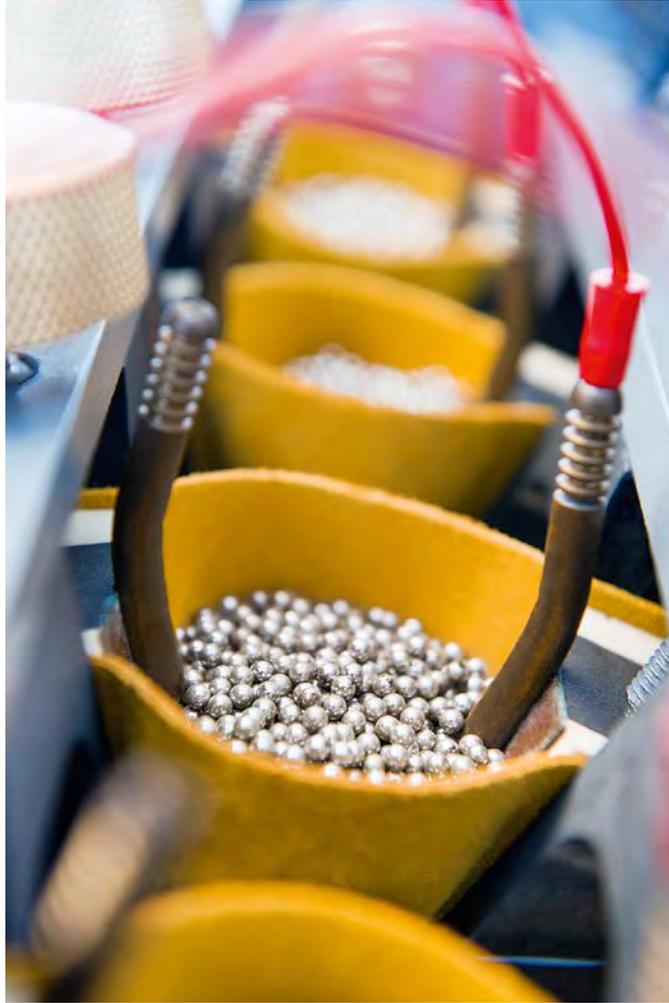
will be made of us in the near future? In terms of product safety and environmental protection, restricted substances are also playing an ever greater role in the automotive industry. We are responding to these demands with innovative formulations, customised product specifications and our in-house research.

»No-worries« products and exclusive services

High product quality is a prerequisite for our success. Development work is always based on the rule: when applied correctly, a product must do exactly what the user expects it to do. We supply a »no-worries« product that works every time. Our customers get consistent reliability from our services. This includes the global presence of our field service, who offer the tanneries technical assistance in many areas – from adjusting the product and different hides through to new developments for the latest leather fashions. Important service components are the permanent availability of our products and the very short response times in order processing. Often it is the little things that set us apart from the competition. They include our sophisticated analytical capacities, which are available to our customers free of charge.

Further improvements in service quality

Ongoing investment is an important basis for our success. A dust extractor was recently added to our test tannery and the mechanical processing stages in the wet end process have been expand-



▷ All analytical methods, like the measurement of hydrophobic values, create the basis for »no-worries« products that are an international success. They are available to our customers free of charge as part of our service.

ed further. All this helps to keep improving our service quality. An additional offer to our customers is to send their technicians regularly to our headquarters in Lahnstein for training courses in process engineering.

Attracting and retaining staff worldwide

Information is not only shared with our customers, but also within the Group. The leather technicians at our production and distribution sites interact regularly, which generates vital synergies. We scour the globe in a bid to recruit skilled new employees. Many of our technical sales representatives do in fact come from the countries in which Zschimmer & Schwarz operates. Contact with training institutes and schools in Germany, Brazil, England, Spain and Mexico serve to generate an interest in our company at an early stage. This is also the aim behind the links to two Chinese universities, which we are sponsoring by awarding scholarships. We also support various independent research institutes, for example by sponsoring the Test and Research Institute Pirma-

sens (PFI), a world-renowned testing and development centre for shoe materials. The same applies to the internationally recognised Research Institute of Leather and Plastic Sheeting (FILK) in Freiberg, which is accredited for the automotive industry.

Growth against the grain

For years the international leather market has only seen marginal growth rates. Bucking this trend, we have generated an average annual growth rate of between 2.5% and 5%. This is largely due to the strong performance of the automotive leather sector. As the luxury segment gets bigger and leather interiors are offered as an option in more model versions, we believe that conditions are ideal for building on our strong position as a supplier of fatliquors and for maintaining our market leadership in the years ahead.



△
More than 50 years of experience in additive development and applications technology go into making our products – for example here in the refractories business unit.



A global leader in the ceramics industry

The system solutions from the Ceramic Auxiliaries Division are an indispensable manufacturing component in all areas of the ceramics industry. Its portfolio of chemical auxiliaries currently comprises some 600 products, making it the largest in the world.

The ceramics industry has undergone significant technical changes since industrial production began: the introduction of dry pressing technology in the 1960s, the development of flat-screen printing, the application of high-pressure casting in the sanitary sector and the decoration of tiles using Rotocolor technology, which since 2010 has been succeeded by digital printing. As the new technologies all require new additives, the Zschimmer & Schwarz product portfolio has expanded considerably with every innovation in the ceramics industry.

Products for all ceramic production stages

Today our standard programme comprises around 600 speciality products for the ceramics and powder metallurgical industries. They are used in all technological production stages of the ceramics industry – from preparation to the shaping of diverse materials and the glazing and decorating of ceramic surfaces. Their application affects both the physical and chemical properties of the ceramic raw materials as well as its design and functionality. Furthermore, they make an important contribution to achieving reproducible results, reducing manufacturing costs, meeting higher environmental standards and producing high-quality end products.

A wide range of applications

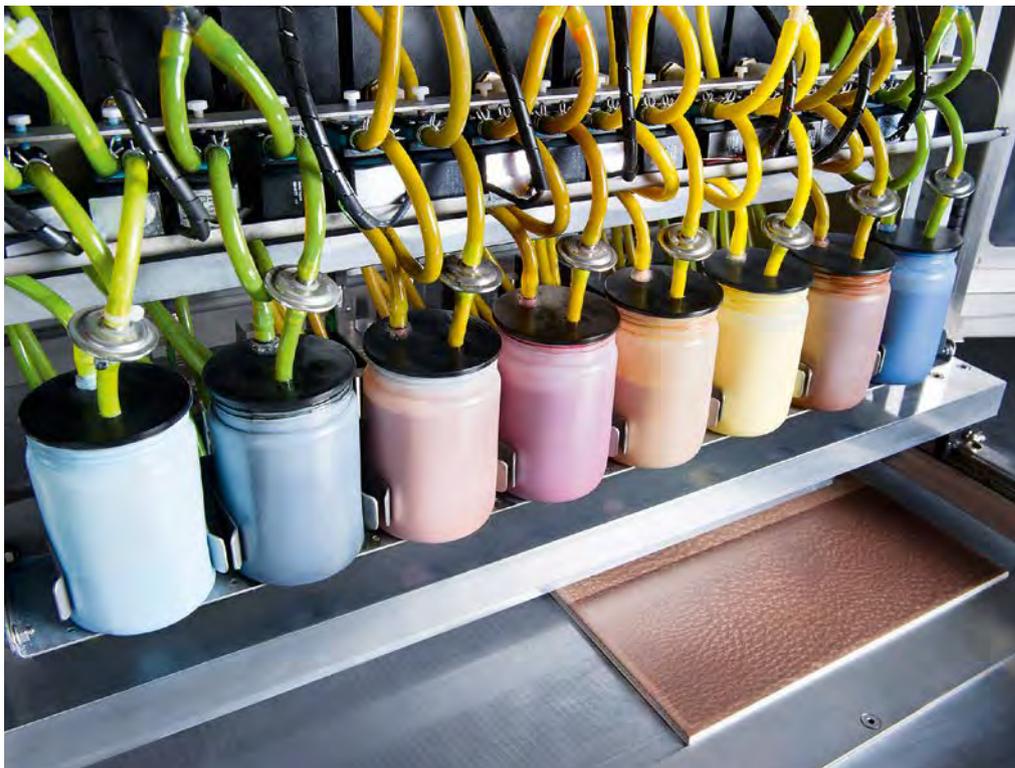
In terms of the diversity and scope of its products, the Ceramic Auxiliaries Division's portfolio is not only the largest within Zschimmer & Schwarz, but also the biggest in the world. It ranges from the traditional ceramics markets like tiles, tableware, sanitary ware and refractories to technical ceramics and glass. A few years ago it was joined by powder metallurgy.

Today the hard metal powders are prepared under similar aspects to that used in the ceramics industry. We have therefore been able to adapt our products successfully and win over new customers.

Our extensive range of additives for the ceramics industry has made Zschimmer & Schwarz a name to be reckoned with worldwide. In comparison with our competitors, who only cover individual segments like sanitary ware, tableware or refractories, we are the only one to offer a full range.

New milestone: inks for digital printing technology

Our most recent success is the development of inks for digital printing in the tile industry. For us as a provider of chemical auxiliaries the decision to move into the production of inks was prompted by declining demand for decorative auxiliaries. This in turn was due to customers switching from screen printing and Rotocolor printing to digital printing technologies that require no decorating auxiliaries. In 2011 we began developing digital printing inks and building a production plant in Spain. By 2013 our sales were already well above budget – although the competitive environment had changed. Beforehand our competitors used to be suppliers of chemical auxiliaries; now we also compete with producers of ceramic glazes, pigments and inks. In 2013 we invested in a second production plant for digital printing inks in China. At the same time we have given our customers the opportunity to create and modify specific decorations and designs. With our own designers and a new high-performance scanner we now offer a full-service range of digital printing consumables.



▷
The latest addition to our portfolio are inks for digital printing technology, an area in which we have positioned ourselves successfully.

»We have been working together for more than 40 years. Zschimmer & Schwarz has always been a dependable partner and knows how to provide focused, comprehensive technical advice, from one professional to another. Today we are a market leader in spray granulation for technical ceramics and the fine ceramics industry. We generate 25% of our revenue in export markets. Dependable supplies, first-class products and foresight are required to maintain and build on this position. The test series that we get as a service from Z&S to optimise the properties of our products by using new, high-performance additives help us to do just that.«



Dipl.-Ing. Martin Dümlein
Managing Director
Quarzsandwerke Weißenbrunn,
Bauer & CO., Weißenbrunn

Problem-solving is our primary goal

As a provider of speciality products we develop and optimise our portfolio in a process of close consultation with our customers. Every development process is based on discussions that we hold regularly with our customers around the world – in the course of on-site technical servicing by our staff at production and development sites or via representative offices dedicated to specific areas. Our aim is to use our knowledge of ceramics and chemistry to find a solution to the problems described by our customers. Often this takes place by means of technological refinements to adapt existing basic formulas to the customer's precise needs. This enables us to get products to the customer within a matter of weeks. It is our extensive portfolio and more than 50 years of experience in additive development and applications technology that enable us to provide this level of service.

A consistently high standard

The Ceramic Auxiliaries Division has an excellent reputation for quality and product sustainability, as does the entire Group. Our aim for the entire product range can be expressed as follows: to guarantee long-term quality and outstanding customer service. Once the properties of a product have been defined, our customers can count on them for good. Development work that focuses on problems, a technical centre with excellent measuring and

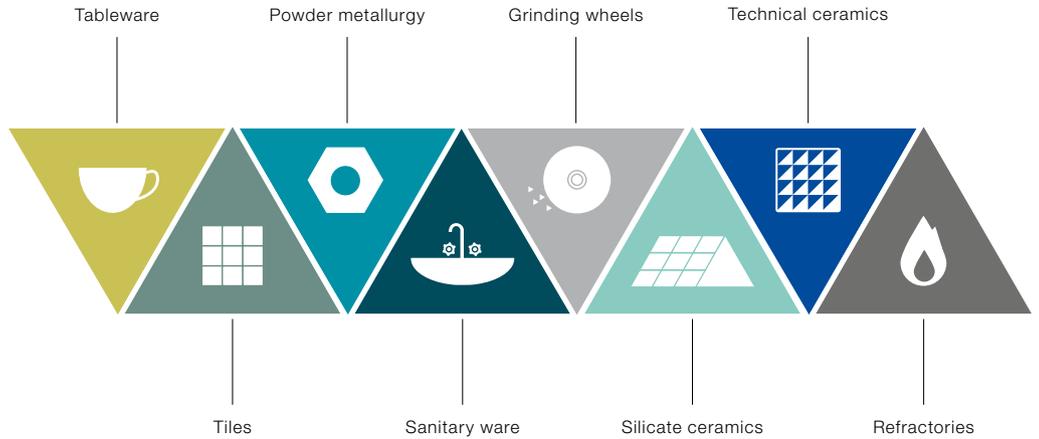
analytical equipment, and practical application technology are the tools we use to do so.

Continuous investment in new technologies is another important factor for us when it comes to quality assurance. New laboratory equipment has been purchased for digital printing methods over recent years, including tools for grinding fine powders. They enable us to meet the high demands made by the market for digital printing inks.

Well-trained ceramic technicians on-site

The Department of Materials Engineering, Glass and Ceramics at Koblenz University of Applied Sciences and the State College of Ceramic Design and Ceramic Technology in Höhr-Grenzhausen – just a few kilometres away from our headquarters in Lahnstein – both provide ideal conditions for recruiting employees that bring our standards in quality and services to life. In addition to qualified chemists we also employ ceramic engineers and technicians who have mostly completed their apprenticeships in Höhr-Grenzhausen. Our close cooperation includes work placements and support with bachelor's and master's dissertations. We also work closely together with the Research Institute for Inorganic Materials – Glass/Ceramics in Höhr-Grenzhausen. The partnership covers both concrete customer specifications and basic research, for which we contribute our additives.

BUSINESS UNITS IN THE DIVISION:

**Global distribution spanning 70 countries**

Together with our international subsidiaries and national offices we have built a worldwide production and development network. Most of the basic development takes place at our headquarters in Lahnstein and we use the Zschimmer & Schwarz production sites in Italy, Spain, Brazil, Argentina, the USA, China, Turkey, Russia, Mexico and Egypt to modify products for specific local applications. This enables us to optimise our response to regional and customer-specific requirements, which are a particular feature of the tile industry. As the raw materials available around the world vary considerably, different product formulations are needed, which are made locally at the individual manufacturing sites. Then there are our development sites in Germany, Italy, Spain and Turkey, which all exchange information on a regular basis. The Group companies also coordinate their sales and marketing activities and decide on portfolio additions for the individual countries.

Growth potential at many levels

We are confident about our performance in the years ahead. As in the past, we will continue to make investments as required by the market. Our investments are coordinated with the producers of the machinery, so that our customers can benefit from the latest developments as quickly as possible. We see substantial new growth potential from entering sectors like the glass and carbon industries. Success here depends on how quickly we are able to penetrate these markets with existing products

or on the level of development spending required to gain a foothold, as the case may be. As a supplier of speciality chemicals, our know-how and services, along with the quality and sustainability of our products, will remain the main elements of our strategic marketing and customer relationship management.



△
Our textile auxiliaries have successful positions in classic and upcoming markets. They provide brilliant colours and sharp contours in the fast-growing field of digital textile printing.

Innovations for enhancing textiles

The Textile Auxiliaries Division is the wellspring of the company and well positioned for the future. For polyamide finishing, anti-yellowing agents, technical textiles and digital printing; the division combines globally recognised premium products with outstanding technical services.

As the first business of the company established in 1894 in Chemnitz, the Textile Auxiliaries Division has a great heritage and has always focused on the future of the industry with great flexibility. Just a few years ago we concentrated on the classic areas of textile conditioning, dyeing and finishing, but early in the new millennium we successfully entered new markets: from digital textile printing to technical and functional textiles, not to mention ecological systems. An important component of our portfolio extension was the acquisition of Lefatex Chemie GmbH in 2013. The well-known supplier of speciality chemicals for the textile, carpet and nonwoven industries considerably strengthened our position in the finishing and coating markets. Internally we have also adjusted to rising demand, and in 2011 both the laboratory and production areas were expanded by up to 50%. They are now among the most modern facilities in the Zschimmer&Schwarz Group, which is represented on the main textile markets with a total of eight sites. In addition to Germany they are China, Brazil, Argentina, Mexico, the USA, Russia and Italy.

Core competence in fixing agents

We are global leaders in polyamide aftertreatment. Textile finishing companies around the world increase the colour fastness and washability of their textiles with the Zetesal series of products from Zschimmer & Schwarz. Zetesal NR has been the top product for two decades, its increasing sales revenues flying

in the face of every product life cycle. With this finely graduated series we have extended our core competence to the entire range of fixing agents. Other members of the Zetesal family cover cellulose products or optimise chlorine fastness in swimwear.

A great way to fight yellowing

A few years ago we prepared the ground for another successful textile specialisation by developing anti-yellowing agents which guarantee lasting colours and brilliant whites. Our product line, which we distribute under the Protelan brand name, covers almost every process stage in the production of textiles, especially for polyamide and its lycra blends. Protelan ensures cost-saving processes and high-quality textiles by meeting the demands of end users for long-term brilliant whites and colour shades.

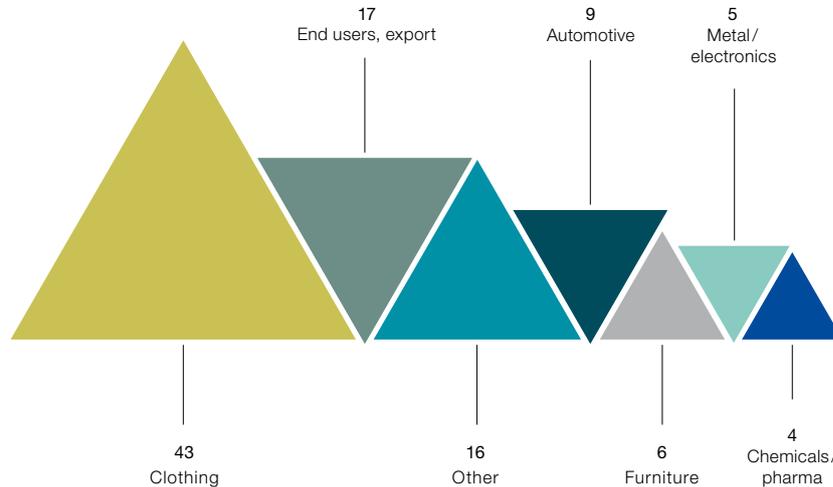
The edge in technical textiles

Although 80% of the market for conventional textiles is located in Asia, the technical textiles used in automotive production, construction or medicine mainly come from Germany. With Triple Fresh SSGE we exclusively offer a catalyst which eliminates unpleasant ammonia, nicotine and formaldehyde smells without using UV light. It acts as an air freshener for both textile and non-textile products. The new product ZS-Microsilver is also unique. This antibacterial agent works at a microscale level and so prevents the silver from being absorbed by the skin.



FAR MORE THAN JUST CLOTHING

Customer structure of the textile industry in Germany, revenue share in % (2010)



Source: destatis/Yearbook 2011/2012, Textil + Modewelt, from: Chemie Report

»At lululemon athletica, we are always looking for new and innovative ways to bring technical beautiful athletic apparel to life. We needed to figure out the best way to fasten bright and neon colours to polyamide fabrics. Z & S was one of our key partners – with their expertise and scientific approach, they helped us to develop an innovative, industry-leading process. I would like to express my sincere thanks to the Z & S team for their commitment to greatness and partnership on this project.«



Yogendra Dandapure
Senior Sourcing Manager
lululemon athletica,
Vancouver

Ecological standards offer opportunities

Our practical environmentalism is also picked up in product development, which is met by an ecological realignment of the textile industry. One new green technology entails compressing the manufacturing process to save energy, water and wastewater. Ever more compact systems are more susceptible to faults, however, and make higher demands of the ambient parameters. Zschimmer & Schwarz seized this opportunity with EconDye. EconDye is a process that enables washing, dyeing and aftertreatment processes to be carried out in one bath and delivers significant savings in production time and water consumption. A modular system for a modified new low-temperature bleaching technology will also be brought to market shortly. Depending on the desired effect it means that bleaching temperatures can be reduced by 30° to 40°C. The reduction in carbon dioxide emissions that results from this new technology represents a huge ecological benefit. We also support our customers' sustainable and environmental production processes with products that comply with numerous certification guidelines, including Oeko-Tex, the Global Organic Textile Standard (GOTS) and bluesign®.

Close to customers and markets

Knowledge of market requirements and suitable responses to them has been a major factor in our success. Permanent monitoring of our markets and competitors, as well as our very good customer

contacts, enable us to spot trends early and develop specific products to match. We regularly invite customers to Mohsdorf to compare notes and to bring international experts together. Training courses and conferences with presentations on the latest technical topics are also part of our customer dialogue. The »Diamontex« innovation days were a particularly successful example. In 2013 for the first time they looked at the future of the digital textile printing market, in the company of customers and guests from the printing, textile and media sectors.

Our strength: technical service

The main connection to our customers, and simultaneously one of our great strengths, is our technical service. Our strategy of advising customers on-site, with technical sales staff who understand the chemical background, sets us apart in the highly complex textile finishing industry. Customers appreciate the personal contacts, which have been built up over many years, and the trust that comes with them.

Investments in technology and know-how

The customisation and optimisation of our products takes place in state-of-the-art laboratories. Among the larger investments in recent years have been the purchase of a coating machine for technical textiles and a steamer and printing machine for digital printing in partnership with a manufacturer of printing machines. We have also made substantial invest-



▷
We produce a large number of auxiliaries for applying functional finishes to carpets. They are preceded by extensive testing, like measuring the effectiveness of our antistatic agents shown here.

ments in training our employees. To do so we also involve our strong network of partners from the textile industry, such as Saxony Textile Research Institute, Institute of Textile Technology and Process Engineering Denkendorf (ITV) and German Textile Research Centre North-West (DTNW). Various development projects with universities also contribute to ensuring our future competitiveness.

Expansion with further specialisation

Our percentage of products exported is relatively high, because the market is centred in Asia. Most production work is carried out in Mohsdorf, which covers Germany and its neighbours, our main markets by revenue. As mentioned earlier, it is supported by international sites in China, Brazil, Argentina, Mexico, America, Russia and Italy. In addition to production facilities, these factories also have the laboratories necessary to ensure that application technology work can be carried out on-site. In the years ahead the intention is to focus more closely on Europe and Africa.

Sharp focus on markets of the future

In addition to technical textiles, inkjet printing technology will play an important role as we proceed. Here we are working on preparation products which guarantee customers sharp outlines, brilliance, depth of shade and colour fastness for their digitally printed textiles. One product that has already been launched successfully is Diamontex®, a preparation system that works as a stand-alone solution for almost all fibre groups. We also intend to strengthen our position in effect chemicals, which advance the functionalisation of textiles in areas such as moisture management, flame retardants and odour reduction. The acquisition of Lefatex already helped us here and we are currently researching other product developments, such as fluorocarbon-free lipophobic auxiliaries. Textile auxiliaries from Zschimmer & Schwarz stand for premium German-made products, which function constantly and dependably over many years and adhere to the motto: right for the first time – every time.



CUBLEN
K 3014

CUBLEN
K 3014

CUBLEN
K 3014

Phosphonate granules in the world's best quality

The Phosphonates Division sells customised products for industrial and domestic water treatment under the brand name Cublen®. The division's particular strength is a special process for manufacturing phosphonate granules.

The phosphonate business has gone through a fundamental change over the past decade. The emergence onto the global market of competitors from Asia has turned what used to be a speciality chemical into a commodity business with declining margins and much tougher conditions for the few remaining European suppliers. Despite this, the Phosphonates Division has achieved continuous growth over the last ten years and made a number of key investments. They have made it possible to increase production volumes tenfold since the former East German company was acquired by Zschimmer & Schwarz in 1993. Today, the Phosphonates Division in Mohsdorf has a modern, high-performance factory within the Zschimmer & Schwarz Group, whose modern laboratories, production facilities and logistics meet the highest standards.

Highly effective in many applications

The basis for our success is a series of phosphonic acids and their salts (phosphonates), which we sell under the brand name Cublen® as aqueous solutions and granules. Their different chemical structures give the Cublen® products a variety of characteristics. This enables us to offer our customers tailor-made products that are highly effective in many different applications.

The bulk of our production, up to 60 %, goes to the laundry and detergent industry. Our customer base includes well-known brands as well as the main manufacturers of own-brand goods. Cublen® products are also used wherever problems caused by

the industrial use of water need solving. This is particularly the case with water treatment, which on a global scale is the largest consumer of phosphonates. In our division it represents the second-largest source of revenue. Our customers are water treatment companies, who in turn use the products to treat cooling water from power plants, in the product of petrochemicals and in the production of drinking water.

An important internal supplier

Another major sales area, which also generates important synergies within the Group, is the supply of phosphonates to our Ceramic, Leather and Textile Auxiliaries Divisions. Cublen® phosphonates increase the solid proportion of ceramic slurry, they prevent calcium stains on leather and enable the necessary washing, dyeing and bleaching processes in textile production as part of the Textile Auxiliaries Division's phosphonate programme.

Completely new granulation process

The first milestone in the division's development was in 2001 with the investment in a fluidised bed reactor to produce phosphonates as a granular solid. This completely new process was developed in-house and makes it possible to produce mildly hygroscopic phosphonate granules. To this day it is a unique selling proposition in phosphonate production. Manufacturers of washing and cleaning agents appreciate the many advantages offered by Cublen® granules, especially in the production of cleaning tablets. The granules are characterised

◁
Cublen® phosphonates are mainly used in the laundry powder and detergent industry.



▷
Zschimmer & Schwarz is the only company
in the world to manufacture mildly
hygroscopic phosphonate granules.

by their onion-like, evenly rounded construction and the low hygroscopic values resulting from their reduced surface area. This makes them free-flowing, easy to dose and process-stable over extended periods. Cublen® granules do not agglomerate and guarantee precise doses per packaging unit. Sieves integrated into the reactor also make it possible to supply granules of different dimensions, each with an even distribution of particle sizes. The granules can therefore be matched to the granularity of the detergent, which also reduces the risk of separation during transport.

Significant production increase

Cublen® products are primarily produced in Mohsdorf near Chemnitz in Saxony, where in 2011 another major investment was completed: the construction of a new production facility. The investment delivered a significant increase in production, as well as a great improvement in safety equipment, and ensured simplified internal handling and more sustainable energy use. This all improved our delivery capacities considerably. Now all batch sizes, from tank trucks and IBCs to drums and canisters, can be delivered smoothly and quickly.

Environmental protection at many levels

In the course of expanding production we also invested in better environmental protection, which goes beyond what is required by law. Since 2011 all the waste gases from the old and new production plants are being burned. They then go through a

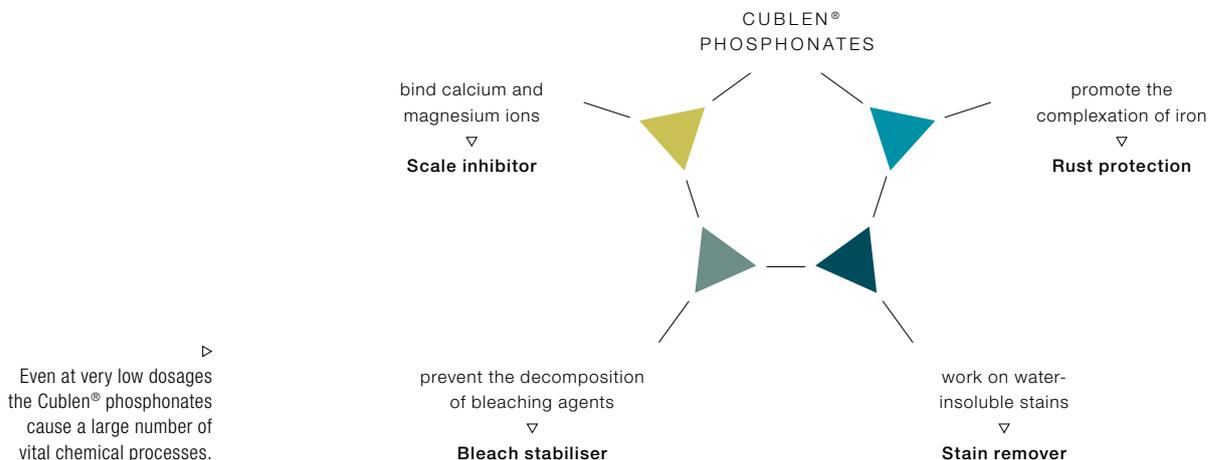
wet absorption process, known as an alkaline scrubber, which removes the resulting hydrochloric gases. An integrated heat recovery system uses the waste heat produced to generate steam. We also play an active role in research into phosphonates and their impact on the environment. In a partnership with Stuttgart University we are sponsoring a research project on the »Biodegradation of phosphonates in wastewater«. Other projects to develop sustainable new products and analytical methods are being carried out with the Chemnitz and Ilmenau universities, and the Brandenburg Technical University in Cottbus.

Key focus: quality, flexibility and service

Research and development also plays an important role internally, with a view to new and improved products. With sophisticated analytical technologies we continuously work to optimise existing products and elaborate concepts for new ones. These are based on both concrete customer specifications and permanent market observation, which allow us to open up new areas of application and to win new customers. Since not all water is alike, one of our strengths is to provide our customers with individual solutions. A production process that flexibly adjusts our products to meet jointly defined customer requirements is one of our outstanding service levels.

An important factor in product quality is metastability, which plays a big role in our research. Every new product is tested for about six months to ensure

FUNCTIONS OF CUBLEN® PHOSPHONATES IN LAUNDRY PRODUCTS:



▷ Even at very low dosages the Cublen® phosphonates cause a large number of vital chemical processes.

there is no undesirable crystallisation during storage and transport. We test the stability of our products under a wide variety of conditions by means of warehouse trials, simulated transport and temperature programmes. This enables us to guarantee the shelf life, optimal handling and functionality of our phosphonates for many years and so ensure that our customers' production processes run smoothly.

Ever more specialities

One of the biggest challenges in the future will be successfully setting ourselves apart from our competitors. The aim is to create products that constitute highly specialised solutions for our customers and are protected – by their complex mode of action – from substitution by competing products. Our main sales region is currently Europe, where we sell our products via the Zschimmer & Schwarz international subsidiaries and external distributors. We plan to extend our geographical scope by establishing new speciality products. The potential applications include all sectors where water is used on an industrial scale. Increasing global water shortages mean that the treatment of drinking water is another important market of the future.

Encouraging differentiation

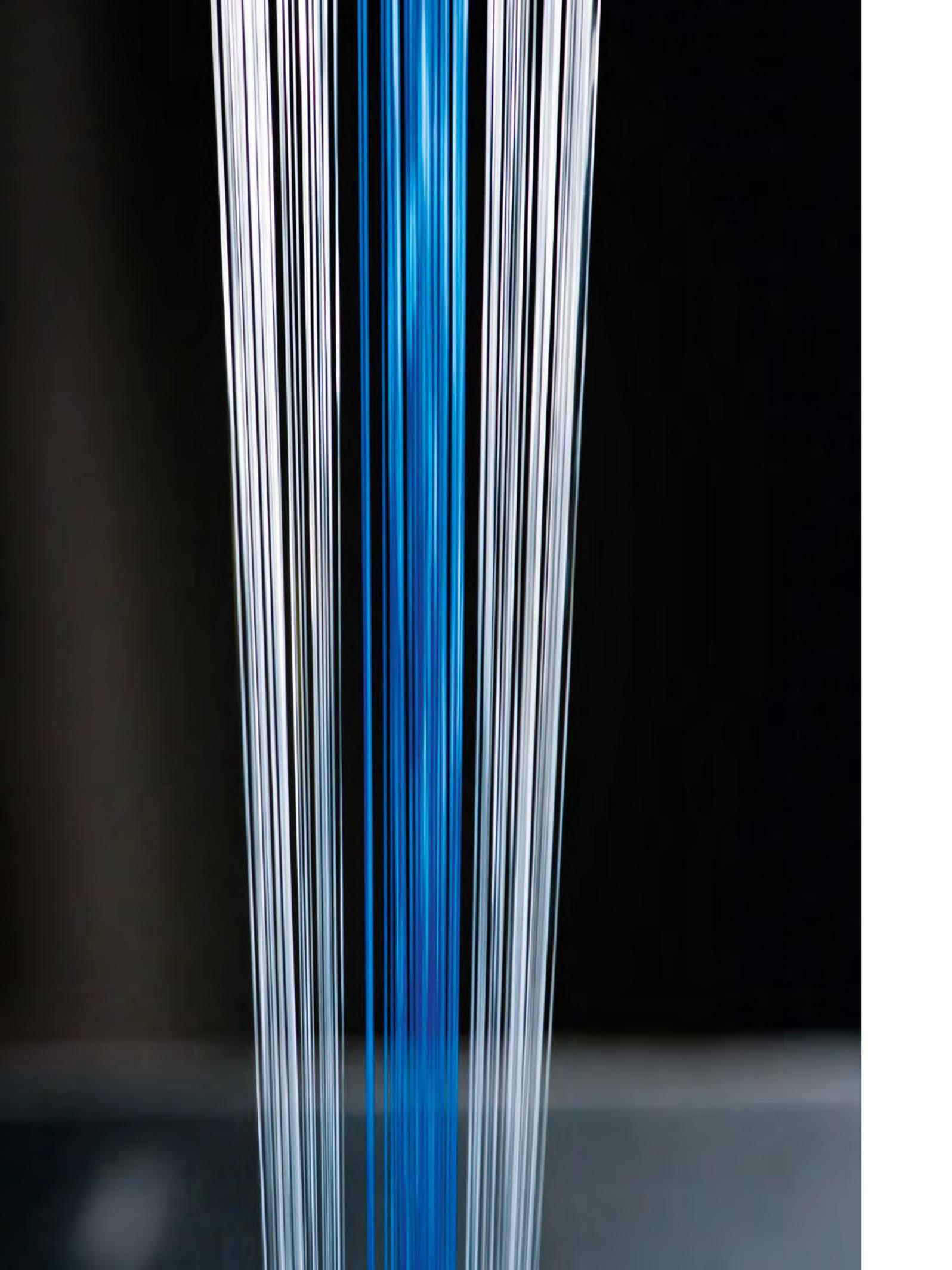
One topic that has become more important recently and will continue to require a great deal of attention in future is the increasing regulation of phosphonates. Here, we aim to help the general public differentiate between phosphonates and phosphates by means of focused public relations work. Whereas phosphates

have been shown to contribute to eutrophication (the concentration of nutrients in an ecosystem), tests under realistic conditions in sewage treatment facilities have proven that phosphonates are fully biodegradable, albeit at a slow rate. Phosphonates have successfully replaced phosphates in detergents in the past and function at much lower dosages than phosphates, mostly labelled as »<5%«. In this typical low concentration the Cublen® phosphonates are responsible for a number of vital chemical reactions in water treatment – and at present cannot be replaced by any other raw materials.

»Zschimmer & Schwarz is a compelling partner for us in terms of reliability and quality. Their first-class technical support allows us to develop and strengthen very good customer relationships with individual solutions. Our colleagues in eastern Europe value Z&S as a loyal, open and transparent partner. In technical, logistical and price terms Z&S is one of the best partners around for our colleagues in Serbia and Romania. In Poland and Hungary our people are also very pleased with their professionalism, delivery capacities and technical know-how. We look forward to doing more business with them.«



Nordmann, Rassmann GmbH



The fine art of fibre finish

The Fibre Auxiliaries Division operates in a complex environment in rapidly changing markets. With a wide range of products for manufacturing man-made fibres and nonwovens the division became a recognised international supplier of speciality chemicals.

The portfolio of around 200 fibre auxiliaries, lubricants and components is divided into four product groups or submarkets: technical yarn, textile yarn, carpet yarn and staple fibre/nonwoven. Our spin finishes and lubricants are used in very different markets and enter at the very beginning of the value chain in the manufacture of numerous industrial and consumer goods. They ensure the functionality of hygienic disposables, building stabilisers and protective films, tyre cord and needle-punched articles for automotive, geo- and agricultural textiles, carpets and textile filament yarns for the clothing and the home textile sectors. We see ourselves not only as a supplier, but as a partner to the man-made fibre and nonwoven industry. Our strength is our detailed knowledge of these specialised markets. It enables us to understand customer requirements precisely and to develop products that ensure a high level of process stability.

Knowledge ensures success

Synthetic filament yarns are subject to enormous stress during the spinning process. High spinning speeds increase the friction and so the demands on the spin finishes and auxiliaries. In modern extrusion spinning, the real challenge is to apply the spin finishes quickly and homogeneously at an amount of approximately 0.5 to 1.5% to the filaments. These filaments are moving at extrusion speeds of up to 6,500 metres per minute – or 390 km/h – and have a yarn mass (titre) of just a few dtex – which is up to

15 times finer than a human hair. Thanks to our continuous product development we have been able to establish the product family of Fasavin spin finishes in the market, which enable consistently high yarn quality, both in terms of functionality and homogeneous distribution on the yarn. They guarantee the smooth processing of the yarns and support the entire process chain.

Practical tests give us the edge

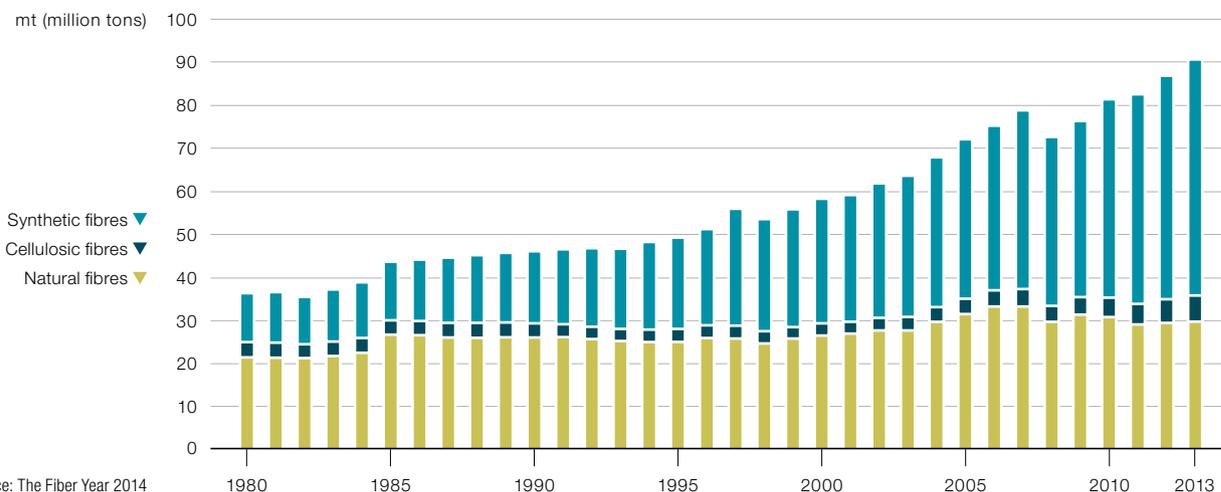
Pilot lines for testing new spin finishes and lubricants enable us to transfer products successfully from laboratory to market. Therefore customers can reduce their own trials with new and alternative spin finishes to a minimum. The products of all our four segments are well-established in the market and in some cases have become benchmarks.

Textile yarn – tailor-made solutions

Depending on the production process, required properties and further processing, these fine yarns need individually tailored spin finishes to ensure a stable process flow and efficient production. Zschimmer & Schwarz has specialised in the development and production of spin finishes for fully drawn yarns (FDY), which have been approved in global man-made fibre manufacturing for decades. The range is completed by coning oils, the Conol types for drawn textured yarn (DTY). New developments for partially oriented yarns (POY) round off our product range. These yarns are used in the clothing and the home textile market.

<1
Pilot line at Zschimmer & Schwarz –
BCF filaments leaving the spinneret
after extrusion, prior to spin finish
application.

WORLD FIBRE CONSUMPTION



Source: The Fiber Year 2014

»For companies that have made a conscious decision continuing to carry out development work in Germany, it is both an obligation and a challenge to develop products with a clear added value for the customers. Zschimmer & Schwarz takes complete responsibility in this respect: great products, various pilot spinning lines and a strong service culture make the company a long-term partner with whom we are in close contact.«



Dipl.-Ing. Jochen Adler
Head of R&D Project Management
Oerlikon Barmag,
a branch of Oerlikon
Textile GmbH & Co. KG, Remscheid

Technical yarn – high demands on spin finishes

Spin finishes for technical yarn have to withstand very high process speeds and temperatures. These yarns are of high tenacity and, depending on their final use, should also be dyeable (e.g. for car safety belts). For the manufacturing of tyre cord, where improved adhesion between rubber and polyester yarn is required, we offer our special adhesive activator: a product that enables our customers to save a complete production step. In contrast to the conventional multistep process, this product is applied as a secondary spin finish just before the winder. We have also achieved a successful position in a number of end-use segments, including nets, ropes, safety belts and tarpaulins, as well as in monofilaments and tapes for artificial grass and food packaging.

Significant market presence in BCF carpet yarns

The division's roots are in the development of spin finishes for the production of carpet yarns (BCF = bulked continuous filament). In the final product, carpet yarns differ widely in terms of touch and brightness. Besides ensuring process stability, our products affect the properties and functionality of the yarn, on spin-dyed and raw-white polyamide and polyester yarns, or soft to harsh touch of polypropylene yarns. The wide range of products is internationally recognised and has achieved a significant market position.

Specialists in staple fibre and nonwovens

We have established a strong position with our auxiliaries for staple, filling and short-cut fibres and with customised finishes for nonwovens and needle-punched articles. These products are used in yarn for agriculture, automotive and geotextiles. Further strengths are products providing hydrophilic effects on nonwovens for hygiene disposables, such as the Lertisan HD product line, which are used for diapers and incontinence pads. »HD« stands for »hydrophilic durable«: the hydrophilic properties allow multiple »strike-through« which means that they are not lost after the first contact with liquids but remain available for further fluid transports. The auxiliaries contain only a minimum of water and are formulated in a way allowing a longer shelf life. With our own finishing line we provide a special service – we offer a product presentation on customer's nonwoven.

An eye on all customer requirements

Joint developments with customers are practised in all product groups and stand for our intensive cooperation with all relevant market participants. Thus we stay in close contact with customers' production and quality management as well as with sales and purchasing. This is how we manage to follow customers' needs and support them to optimise the oil pick-up (OPU) of our products, to minimise emissions and to reduce cleaning and care cycles.



▶ Our measuring technology enables us to determine various textile parameters that are important for the performance of our products. Here: preparing a yarn count measurement.

Services ensure a win-win situation

Our services are an effective way of setting ourselves apart from competitors. With our excellent analytical laboratories and a wide range of measuring instruments we support our customers to determine the key settings and textile parameters that are important for our spin finishes to perform correctly. These services create a win-win situation for our customer and for us: they enhance their productivity and give us a better understanding of their demands.

European and international success

In line with market developments our sales activities are not limited to the European and Middle East Area (EMEA) but are expanded more and more to Asia, where around 80 % of the global man-made fibre production takes place. With approx. 65 % production volume, China occupies a special position in this hemisphere. Therefore our auxiliaries so far produced in Germany, Italy, South America and the USA have been completed by production in China. Together with our local offices and partners we sell to more than 50 countries and offer our technical services worldwide.

Our future is in niche markets

Our core activities concentrate on building up our market position and on opening new markets for new fibre types. Ideas for innovations are very much

driven by our customers, and especially by machine and polymer manufacturers, with whom we maintain regular contact. Productivity gains, energy savings and new high-performance fibres are permanently creating higher demands on our products. The decisive criterion for our success is the in-time development of customised products and we measure ourselves against this benchmark every day. Our current portfolio is well established in the market and is backed up by a wide range of services. Our goal today and in the future: to be the first port of call for highly specialised spin finishes and lubricants for a growing number of man-made fibre manufacturers.

KEY ZSCHIMMER & SCHWARZ SITES



AMERICA

- ▼ USA, Milledgeville/GA^{1,2,3}
- ▼ USA, Greenville/SC²
- ▼ USA, Dayton/NJ^{2,3}
- ▼ Argentina, Buenos Aires^{2,3}
- ▼ Brazil, São Leopoldo^{2,3}
- ▼ Mexico, El Marques-Querétaro^{2,3}

AFRICA

- ▼ Egypt, Sharquia^{2,3}

EUROPE

- ▼ Russia, Shakhty^{2,3}
- ▼ Italy, Tricerro^{1,2,3}
- ▼ Italy, Sassuolo^{2,3}
- ▼ Italy, Milan²
- ▼ Spain, Villarreal^{2,3}
- ▼ Switzerland, Kloten²
- ▼ France, Paris²
- ▼ Turkey, Istanbul^{2,3}

GERMANY

- ▼ Lahnstein^{1,2,3}
- ▼ Burgstädt^{1,2,3}
- ▼ Montabaur^{2,3}
- ▼ Brüggen^{2,3}

ASIA

- ▼ China, Hong Kong/Shanghai²
- ▼ China, Foshan^{2,3}

¹ Administration, ² Sales, ³ Production

Zschimmer & Schwarz is also represented around the world via a dense network of wholesale partners.

Focus on customers

Zschimmer & Schwarz Chemie GmbH is the holding company for 22 companies worldwide, 16 of which have their own production facilities. Our global network puts us in a position to respond quickly and flexibly to both the market and the sector-specific requirements of our customers. One glance at our headquarters in Lahnstein shows the high standards that apply here – and throughout the Group – in terms of quality consciousness, production capacities and flexibility.

The plant in Lahnstein has a comprehensive range of different production facilities, which allow in combination with the appropriate process technology, a wide variety of chemical reactions and enable a high degree of vertical integration. Our broad portfolio of chemical products covers both a large number of different chemical substances and customised formulations for specific applications. All our processes, including product development, raw material sourcing, production, logistics and shipping, are subject to an extensive quality management system. The safety and protection of our employees, the plant and the environment are a high priority, as is the efficient use of energy.

Production: high quality standards and 100 % testing

The manufacture of our products takes place in eight individual production plants, which are supplied with feedstocks from a central warehouse and, in some cases, from storage tanks on-site. Each year they produce a total volume of 140,000 tons of some 900 different products. The equipment used includes discontinuous stirred-tank reactors for reactions such as esterification, amidation, polymerisation, oxidation and sulfitation. Continuous falling film reactors are used for the sulfitation and sulfonation of a wide range of different ingredients, including short-chain alcohols for making special anionic surfactants. Thin-film evaporators and powder mixers add up with physical processes to a broad array of production options at the site. Both

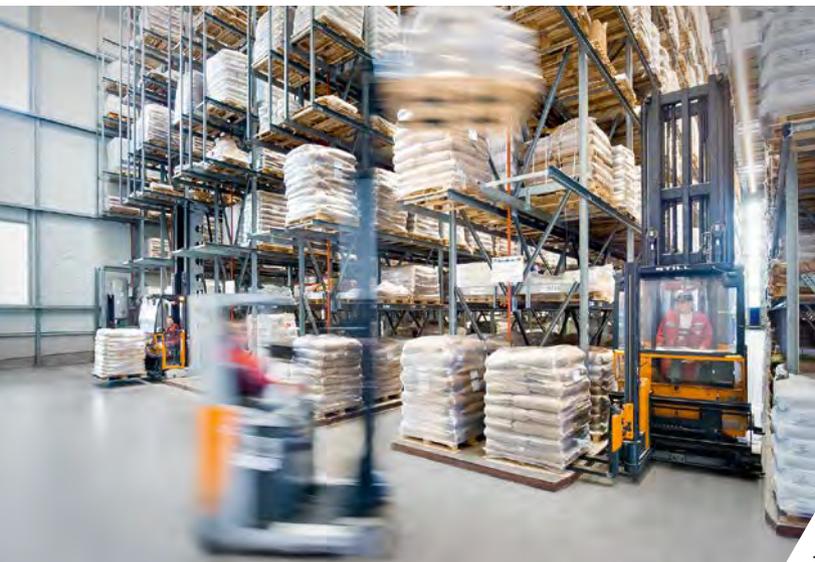
when feedstocks are delivered and for intermediate and finished products, 100 % inspections ensure compliance with high quality standards; end-to-end traceability of all products is obligatory.

Far-seeing purchasing policy ensures supply of raw materials

In an average year, we need more than 100,000 tons of some 800 chemicals for use as feedstocks in our own production. In addition to all the well-known manufacturers, we also use a large number of wholesalers to ensure dependable supplies. This redundant sourcing procedure ensures that we always get the right high-quality materials with guaranteed availability and in the necessary quantities.

Logistics for some 20,000 different articles

A broad assortment of raw materials and finished products combined with diverse types of packaging, from canisters to IBC and tanker trucks, add up to around 20,000 different articles and constitute a demanding task for all our logistics operations. A sophisticated enterprise resource planning system is used to handle these material flows. A large number of storage tanks are available to store high-turn-over liquids. At the heart of our logistics centre is a fully automated high-bay warehouse with space for 12,000 pallets; it is used to store packaged goods such as IBC's and drums. Modern pick-and-pack facilities ensure the rapid shipment of product deliveries, of which 500 tons leave the factory every day.



1



2



3

The factory in Lahnstein (1–5)

- 1 Logistic solutions need to be found for some 20,000 different articles; here, bagged products in the solid goods warehouse.
- 2 Many different kinds of apparatus are used to produce a wide range of speciality chemicals.
- 3 Synthesis vessels in one of the eight individual production plants.

Numerous environmental protection measures

All the factory's wastewater is treated in our own treatment plant, which is especially adapted to the substances it contains, before being fed into the public water system. Physical, chemical and biological processes are used to treat the water and attain an overall degradation ratio of over 98%. Scrubbing methods such as wet absorption, electrostatic separation and thermal waste gas treatment reduce emissions of air pollutants to below the statutory limits. In addition to the construction techniques in common use nowadays, a sophisticated system of subsidiary wells provides effective protection of the on-site groundwater.

The factory's entire energy consumption is controlled by a certified energy management system in compliance with DIN EN ISO 50001, which is integrated into our quality management system. Its aim

is the continuous improvement of energy efficiency and the thoughtful use of resources. Wherever possible, packaging is not disposed of at the plant or on customers' premises but is recycled by means of various systems.

Passive fire protection and safety measures

As a chemical company we have an obligation to take passive fire precautions, to operate our plants safely and to implement active safety measures. One key element of this is our factory fire brigade, which is present around the clock and is fully equipped. Particularly exposed areas are fitted with stationary firefighting equipment such as sprinklers or CO₂ extinguishers, which guarantee a high level of business continuity.

Other selected Zschimmer & Schwarz production sites (see next page):



5

- 4 In 1989 the existing firefighting service became an officially recognised factory fire brigade.
- 5 In addition to external firefighting training they also take part in regular drills.

4

MOHSDORF, GERMANY

High demand for phosphonates, especially in the last few years, has caused volumes to rise sharply and made it necessary to expand the synthesis facilities at the site in eastern Germany. In 2011 production capacities were thus boosted by 60 % with the addition of five more stirred-vessel reactors. The reactors' process and safety design makes it possible to carry out a large number of different chemical processes within a relatively broad range of physical parameters. Their complex synthesis programme includes chemical reactions with inorganic acyl chlorides such as phosphorus trichloride or phosphorus oxychloride. A central incinerator with a system of upstream scrubbers is available to treat the waste gases from all synthesis tanks and peripheral apparatus.

A special dryer is used to produce phosphonate granules, making it possible to use them in solid formulations. In addition to phosphonates, the factory in Mohsdorf manufactures products for the textile industry as well as small quantities of leather auxiliaries.

TRICERRO, ITALY

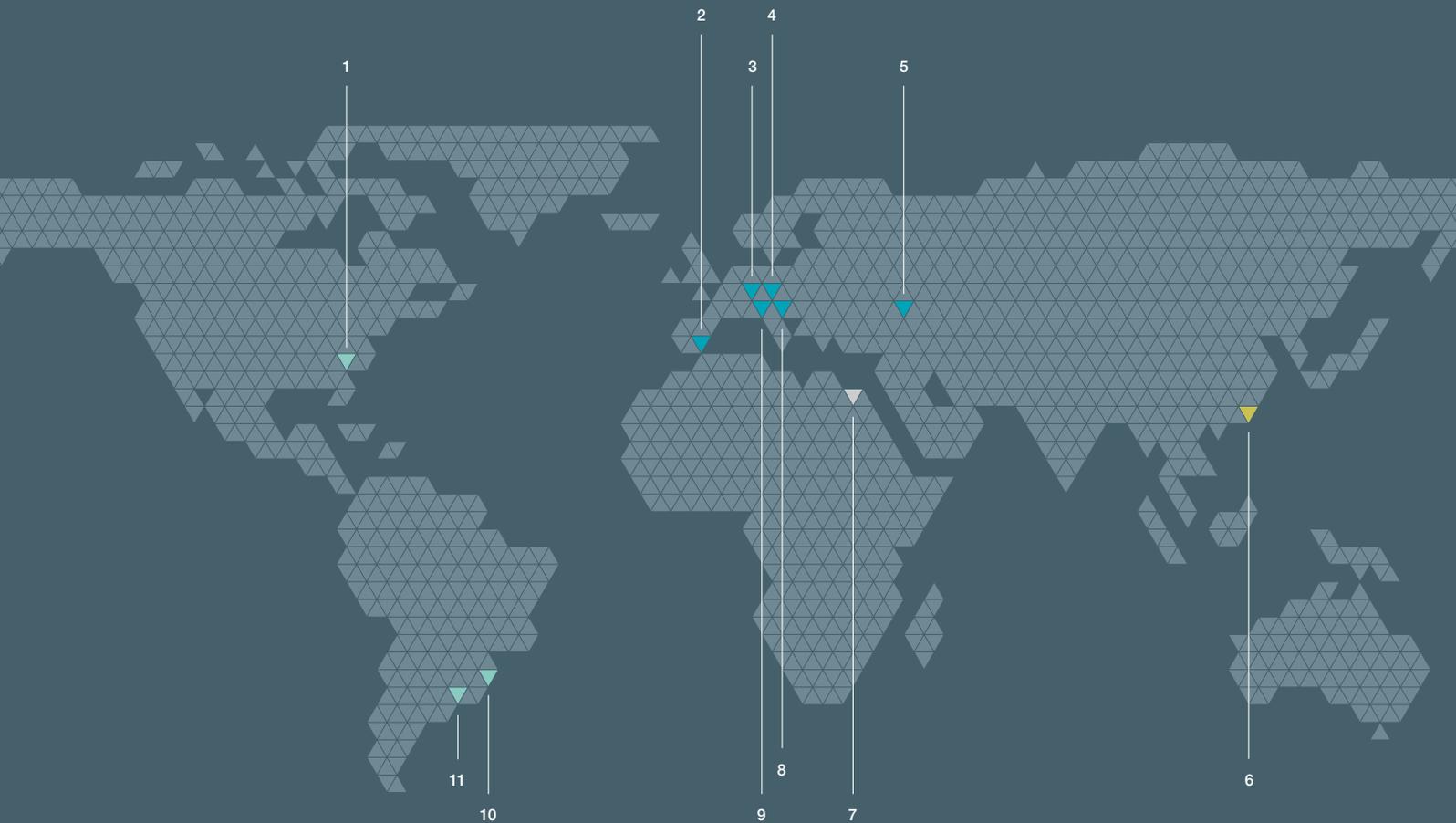
The factory in Tricerro in northern Italy is the largest company in the Zschimmer & Schwarz Group after the headquarters in Lahnstein, and produces raw materials for cosmetics. It has two continuous plants for sulphating fatliquors and their derivatives as well as discontinuous reactors for making amphoteric surfactants and esters. Also in Tricerro is another Z&S company, Zeta Esse Ti, which produces its own leather, fibre and textile auxiliaries at the site.

PILAR, ARGENTINA

This production site near Buenos Aires went into operation in 2010 and has facilities for making special chemicals for the leather and textile industries. In 2012 it was expanded for the first time with a plant to make retanning agents, sales of which soon rose swiftly. Polymers are synthesised in the modern reactors and then dried in spray dryers to produce retanning agents in powder form. Horizontal mixers make special blends that are sold as formulations.

Employer on a growth track

All over the world, Zschimmer & Schwarz is seen as an employer with secure long-term prospects. Driven by business growth and acquisitions of other companies, the international workforce has risen by 16% in the last five years. The speciality chemicals supplier gives its 1,100 members of staff a framework in which they can realise their full potential.





1

»For our customers I'm the face of Z&S, Inc. I come to them as a problem solver with the authority to take many decisions on the spot.«

PAUL CUTHBERT, SALES MANAGER
MILLEDGEVILLE, USA



3

»My apprenticeship at Z&S had a high practical content. Now I enjoy the benefits of the company's size, with a broad job description and nice colleagues.«

SANDRA STÖHR, LAB TECHNICIAN
LAHNSTEIN, GERMANY



2

»I pull all the strings connecting production, purchasing and sales. The satisfaction of my customers and my own high degree of autonomy are very important to me.«

MARÍA JOSÉ POZO, SALES MANAGER
VILLARREAL (CASTELLÓN), SPAIN



4

»Our auxiliaries are shipped worldwide. Chemical products require very high safety standards, and that is precisely the approach we have to our work.«

MARCEL MEHLHORN, LOGISTICS DIRECTOR
MOHSDORF, GERMANY



6

»My work is highly varied and encompasses imports, accounting and liaising with public authorities. My commitment was recently rewarded with a promotion.«

YVONNE CHENG, OFFICE MANAGER
HONG KONG, CHINA



5

»We are a team where there really is no ›I‹ in team. The international outlook of Z&S also corresponds to my priorities.«

IRINA BEZRUKOVA, MANAGING DIRECTOR
SHAKHTY, RUSSIA



7

»My work in the production department is important for establishing efficient processes. Z&S has great faith in my work.«

KHALED KOURA, PRODUCTION MANAGER
EL OBOUR CITY, EGYPT



8

»My laboratory trials often take a round-about way to reach their target. I get the latitude I need to be creative and develop innovative solutions.«

ROBERTO FERRARI, TECHNICAL DIRECTOR
SASSUOLO, ITALY



9

»In addition to producing first-class products I have been able to pursue my career at Z&S. Now I'm responsible for continuous process improvement.«

DOMENICO DAFFARA, PLANT MANAGER
TRIGERRO, ITALY



10

»Nothing works without administration. I manage all the important documents for account management and order processing and keep everything under control.«

LENICE HAHN, ADMINISTRATION MANAGER
SÃO LEOPOLDO, RIO GRANDE DO SUL, BRAZIL

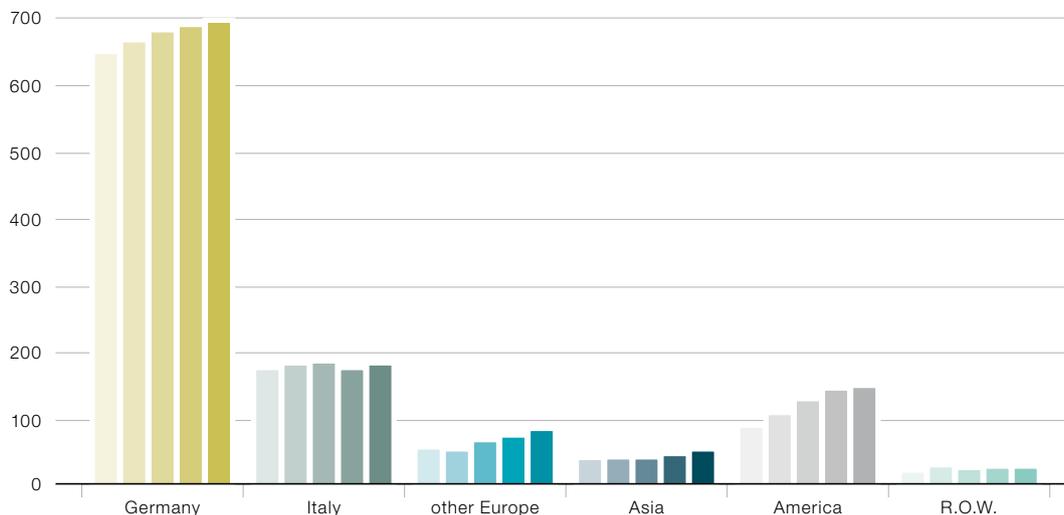


11

»I'm in close personal contact with my customers. For them I'm simply ›Walter‹ and I represent Z&S Argentina as a whole.«

WALTER PROVENZANO, DIRECTOR OF
APPLICATIONS TECHNOLOGY, LEATHER AUXILIARIES
PILAR, BA, ARGENTINA

EMPLOYEES BY LOCATION
2009–2013



The Group's fast growth over recent years can be seen in the increase in staff numbers from 2009 to 2013 (+ 157). Out of 1,113 employees worldwide, 474 were based in Lahnstein (total Germany: 693) at the end of the financial year 2013. After Germany, Italy is the country with the most employees (179). The chart above provides further information on the personnel situation.

ZSCHIMMER & SCHWARZ LAHNSTEIN

**Vocational and professional training:
more succession planning**

Zschimmer & Schwarz offers a large number of interesting occupations, both in the chemical and commercial fields. In line with the nationwide trend, we are also seeing a lack of scientific and technical specialists. Offering our own apprenticeships in many areas is one way of countering this deficit. Our well-trained apprentices have often won prizes awarded by the Chamber of Industry and Commerce in Koblenz.

By providing broad job descriptions within the individual disciplines we are able to attract and retain both specialists and line managers. We encourage and train talented young people from within the company by means of a wide range of activities. In this context we are paying more attention to the topic of strategic succession planning: it will start in Lahnstein and be rolled out to the other Z & S sites. Professional training courses are an important part

of our human resources development work. The high standard of technical equipment in the development and applications technology departments means that the jobs here require extremely specialised knowledge.

**Closer cooperation with universities
boosts recruitment**

Zschimmer & Schwarz enjoys close ties with regional schools and universities as part of its recruitment policy. The success of our activities can be seen in class visits and the interest shown by students in work placements in scientific areas. In future, recruiting activities for our own apprenticeships will focus more on the subsequent career prospects. For many years now we have taken part in a vocational training cooperative along with other companies from the region.

Personnel marketing at university level will also feature more prominently than in the past. The partnership between universities and trade associations has an important function in this respect. In 2013 this included the work carried out in the trade association by the Care Specialities Division, which was aimed at adding specialist subjects in surfactant chemistry to existing degree courses. Another concrete concept we are involved in aims to attract young scientists to the chemical industry by providing opportunities for them to write their bachelor's and master's dissertations.

For many years the Ceramic Auxiliaries Division has had a close working relationship with the State College of Ceramic Design and Ceramic Technology in Höhr-Grenzhausen, near Koblenz.

Staff loyalty remains high

Zschimmer & Schwarz is a considerate employer, giving its staff great freedom and responsibility in their work, as well as long-term job security and attractive remuneration packages. This is rewarded by the high degree of loyalty in our workforce. It can be seen in an average length of service of 18.4 years at the Lahnstein site (not including apprentices, as of 06/2014).

Workplace design, which is a prerequisite for employee satisfaction, is based on two principles: close involvement with processes and individual decision-making authority to achieve targets. This entails a high level of responsibility, which is an attractive feature for employees and contrasts with the situation at larger companies. Other benefits are the transparent organisational structure and the high degree of job security resulting from the company's sustained strong performance.

Health management initiative launched

In 2013 Zschimmer & Schwarz introduced a reintegration management programme to help staff get back to work after an illness. Positive feedback confirms the programme's effectiveness.

We are working to offset the effects of demographic change and the parallel trend towards longer working lives by means of a company health management scheme. Plans have been drawn up to implement the scheme at the Lahnstein site. The company also sponsors various sporting activities organised by the employees themselves. Another project is to introduce company health days.

Human resources information from other selected Zschimmer & Schwarz sites:

ZSCHIMMER & SCHWARZ MOHSDORF

The workforce at the plant in Mohsdorf, Saxony, has been increasing steadily since it was established in 1993 (2013: 145 employees). The company is currently involved in a pan-regional pilot programme to introduce a sustainable company health management scheme. It will entail different patterns of working hours and other rules depending on an employee's stage in life. Staff are also showing much greater interest in the company's suggestion programme. Zschimmer & Schwarz Mohsdorf

is a sponsor of the nationwide foundation »House for Young Researchers«, which promotes early education in the natural sciences and technology.

ZSCHIMMER & SCHWARZ CHINA

Z&S Chemical in Foshan and the sales office in Shanghai use a wide range of loyalty incentives to keep the fluctuation rate close to zero. Since the company was established in 2007 this has included a very intensive introductory programme, which is not typical for the country. It is followed by an integration phase with process responsibility. Voluntary annual health checks are offered and used by almost all employees. Together with above-average wages this goes a long way to creating a highly productive atmosphere. The company is based in a rural area of the province Guangdong, in southern China, and recruits employees by means of its involvement in relevant degree courses at the local universities.

ZSCHIMMER & SCHWARZ LATIN AMERICA (ARGENTINA, BRAZIL, MEXICO)

Z&S Mexico and Z&S do Brasil provide incentives that include health insurance benefits for employees and their families. The Brazilian production site also has a high level of staff continuity thanks to its secure market position: ten of the 37 employees have been with the company since it was founded in 2004. Argentina, by contrast, has high integration expenses because of the high fluctuation rates that are typical of the country's low-wage sector. In-depth professional discussions among staff are a high priority in the three Latin American companies, especially for the leather technicians: their jobs are so closely connected that they operate in all three countries. This enables them to become qualified to a very high level compared with the market standard.

Room for further growth

In order to retain our global competitive edge, we need the right environment. However, for a few years now we have been exposed to particular external factors that make high demands on our productivity. Financial costs, high labour intensity in technical areas and legal restrictions such as the EU chemical regulation REACH all represent particular challenges. The same applies to the German »Renewable Energies Act«, which puts the country at a disadvantage due to the additional expenses it imposes. A direct comparison with the energy costs at our other sites around the world confirms the suspicion that Germany's international competitiveness is suffering. Companies will not be able to recoup the additional costs simply by making more efficient use of resources. As a result of these two extra cost factors we see risks to our company's performance in some areas, especially if the value chains within the sector are broken by international outsourcing among our upstream suppliers.

We can only confront these challenges if we continue to keep the company on a broad footing and maintain our sharp focus on the customer. At the end of the day, this means that the competitive drawbacks imposed on the location have to be offset by greater innovation. New product development, new customer groups and regional expansion have therefore been key elements of the Zschimmer & Schwarz growth strategy in the past and will remain so in the years ahead.

Technological advances make it necessary to monitor the market permanently and respond quickly to trends. In the past we have done this very successfully. We broke new ground with digital printing for the ceramics industry and can look forward to further growth in the future. A similar trend towards digital printing can be seen in the textile industry,

too. Here, the Textile Auxiliaries Division will be able to benefit from the experience gained in the Ceramic Auxiliaries Division. One completely new development is the coating of fabrics made of high-performance fibres for use in textile-reinforced concrete. The fabric is applied to buildings and then covered with fine concrete. This makes it possible to have finer layers and more flexible shapes than with ferro-concrete. We hope that this development will lead to a steep rise in demand in the coming years, now that the first regulatory approval for this construction technology, known by the brand name of TUDALIT®, has been granted. It also provides a much cheaper alternative to replacing concrete elements when refurbishing existing buildings. Other construction products are expected to receive regulatory approval in the future. Our Care Specialties Division is also aiming to acquire new customers, in particular in the dyes and paints industry. To do so it is developing customised products to support our potential customers.

As we already have a strong presence in the EU, the main focus of our geographic expansion will be on growth regions outside Europe. Here we see particular growth opportunities in rolling out new products and production methods to other regions, in order to bring our services as close to the customer as possible. We will be helped by the ability of our organisational structure to adapt to individual market requirements. Disturbances due to political conflicts or changes in the economic environment may have a temporary effect on the course of our business or the price of raw materials. This makes it all the more important to diversify our divisions and expand geographically as planned. One area that will play a greater role in organisational development in future is sustainable personnel development. Our competitiveness is based on our ability to develop and manufacture high-quality speciality chemicals.



▷
 New product development, new customer groups and regional expansion have been key elements of the Zschimmer & Schwarz growth strategy in the past and will remain so in the years ahead.

The staff skills this requires represent a substantial competitive advantage, which has to be developed in line with the company's objectives. At the same time it is vital not to lose the existing advantages that come with being part of the German »Mittelstand«. We therefore want to keep our company attractive for currently active employees and ensure it can continue to attract new staff by means of a wider range of personnel development activities. The aim is also to enable our employees to derive more benefits from our position as an international company.

One important pillar for securing our future development is solid financing arrangements with which to drive external growth through acquisitions. In this

context we are pleased that our shareholders have expressed their commitment to furthering the expansion of our Group.

Our strong performance in the past enables us to look to the future with optimism. We are confident that our diversified portfolio, global presence and solid finances give us room for further growth. In the years ahead we intend to achieve this in many different ways.

Board of Directors

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Zschimmer & Schwarz Company history



1894

1 January: Otto Zschimmer and Max Schwarz establish the wholesaler Zschimmer & Schwarz and begin selling drugs, dyes and chemicals in Chemnitz, Germany

1925

Development work starts and first patent is registered: »A process for producing a Balsam of Peru substitute«

1933

Company founder Otto Zschimmer dies at the age of 70 in Chemnitz

1970

Establishment of Ursa Chemie GmbH, now a contract manufacturer for the chemical and cosmetics industry and a manufacturer of products for the electroplating industry

1972

Establishment of Z&S Italiana and start of surfactant production and sales, initially in southern Europe

1909

First in-house production facility commences operation at a factory site in Greiz-Dölau, Thuringia; until 1945 the Z&S chemical factory in Dölau is the company's largest production plant with some 500 employees

1939

Acquisition of Flesch-Werke AG in Oberlahnstein on the Rhine; from 1959 the site of the company's headquarters and the largest Z&S production facility

1945 - 48

Seizure and expropriation of all Z&S plants in Saxony and Thuringia. The shareholders flee with their families to West Germany

1960

Company founder Max Schwarz dies at the age of 91 in Lahnstein. First company established abroad: Z&S France, based in Paris, begins to distribute paper auxiliaries. Launch of the Ceramic Auxiliaries Division in Lahnstein

1978

Establishment of the first Group company in South America: Z&S Argentina; from 2008 development of own production capacities for leather, textile, fibre and ceramic auxiliaries

1980

Inauguration of the fully organic wastewater treatment plant at the Lahnstein site; at DM4 million the company's largest-ever single investment at the time

1985

Establishment of Zeta Esse Ti in Italy, initially just for the production and distribution of textile auxiliaries; leather and fibre auxiliaries are added later



1990
 Entry into the Italian ceramics market with the acquisition of Ceramco and its Spanish subsidiary Ceramco España; initially a wholesaler for ceramic auxiliaries, later renamed Z&S España; development of own production capacities from 2002

1995
 The Textile Auxiliaries Division moves from Lahnstein to Saxony, where Z&S Mohsdorf was established two years earlier.
 A new continuous sulphurisation plant and the new logistics centre are completed as part of an extensive modernisation and expansion programme at the Lahnstein site

1998
 Acquisition of a manufacturer of textile auxiliaries and establishment of Z&S, Inc. in Milledgeville/Georgia, USA and expansion of the Divisions Fibre and Ceramic Auxiliaries, Phosphonates and Care Specialities

2000
 Development of production capacities for special chemicals for the leather, ceramics and textile industries in Brazil, the second-largest market for tiles in the world and one of the world's largest markets for automotive leather

2005
 Z&S Chemical (Foshan) is established in China, the world's biggest market for the ceramics industry. In 2007 own production of ceramic auxiliaries starts, later also textile, fibre and leather auxiliaries

2006
 Establishment of Z&S Russia with production facility for ceramic auxiliaries and distribution network for the Divisions Fibre, Leather and Textile Auxiliaries and Care Specialities

2006
 Establishment of Z&S Mexico, initially as a distributor of leather auxiliaries, later with own production of ceramic and textile auxiliaries

2010
 Acquisition of Euro Kimya, development of ceramic auxiliaries business in Turkey

2012
 With the new product group Trucolor, Z&S develops and produces within the Ceramic Auxiliaries Division inks for printing tiles using digital printing technology

2013
 Acquisition of Lefatex Chemie GmbH with products for coating textile and carbon fibres and fabrics for use in textile-reinforced concrete

