

No. 10 Issue 03 | August 2013

MESSER 
Gases for Life

Gases for Life

The industrial gases magazine

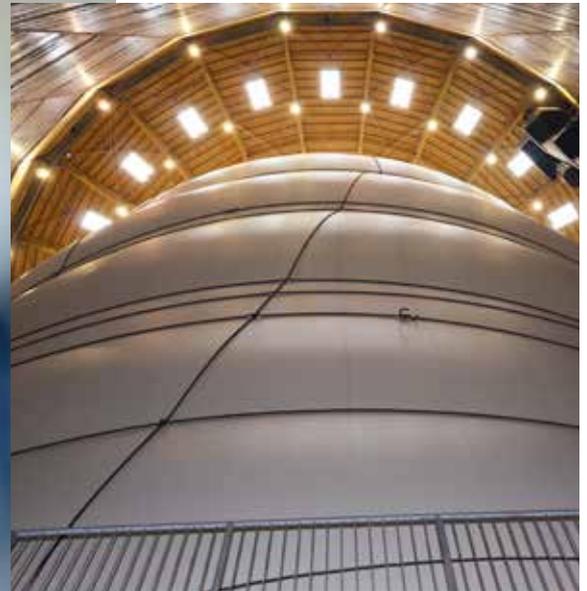
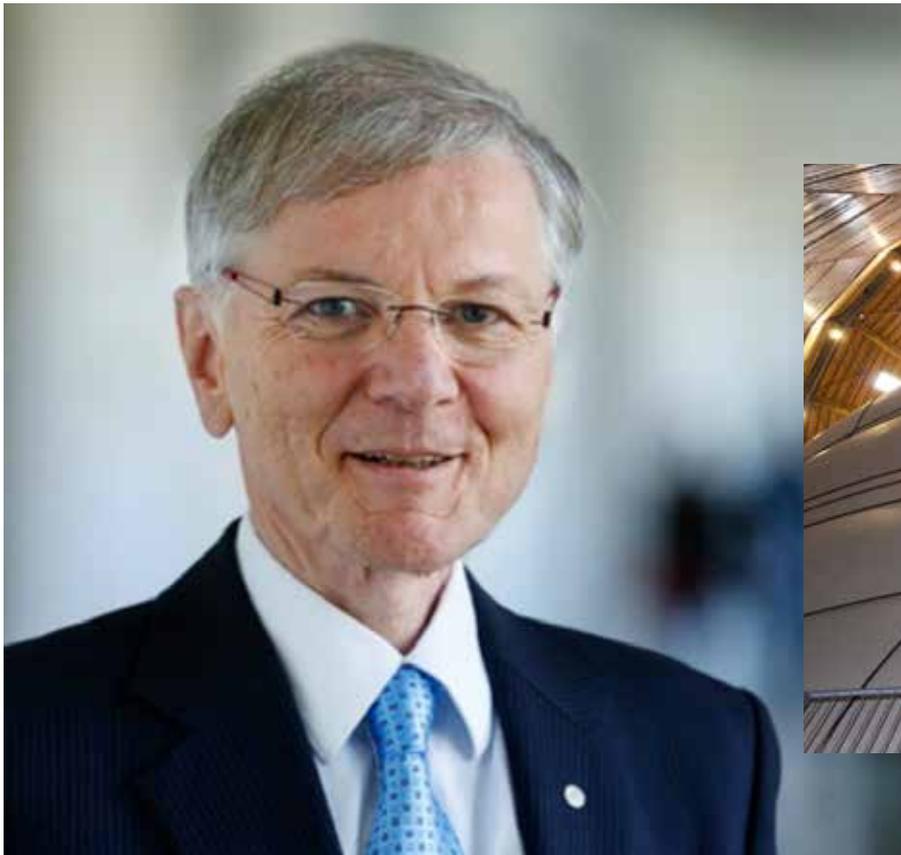
Service and know-how for
welding and cutting:

Perfectly joined

Gas supply:
MegaPack
innovation

Paper production:
The footprint is
getting smaller

PVC recycling:
Floor powder



View of the "Big Air Package", inside the Oberhausen Gasometer.

Dear Readers,

Did you take the car for a spin or go for a bike ride at the weekend, or did you simply relax in a sun lounger? If you did any of these things, you will have come into contact with steel or aluminium structures, the components of which are cut to size and joined with the aid of welding and cutting gases.

Welding and cutting – at first, that sounds like a traditional trade. But there is much more to it than that. It requires extensive experience as well as the optimal gas and the right process for the particular application in question. Messer is happy to pass this knowledge on to its customers, including in the form of welder training. We also supply the appropriate gases – from standard through to customised special mixtures. You can find out more about this in our cover story.

One example of an unusual metal structure is the Gasometer in Oberhausen, where the "Big Air Package", a fascinating installation by artist Christo, can presently be experienced. Messer is sponsoring this event and we are offering a special prize for the winner of our competition (page 19): a copy of the exhibition catalogue signed by Christo.

So it is certainly worth leafing through this issue of "Gases for Life". I hope you enjoy it.

Best wishes,

A handwritten signature in blue ink, appearing to read 'Stefan Messer'. The signature is fluid and cursive.

Stefan Messer



Cover Story

10

Perfectly joined

Cover photo:
Achim Wankum, welding and cutting application specialist at Messer in Germany.

Steel production and sheet metal working methods have been greatly refined over the last few decades. The advances in welding have also made a major contribution here, thanks in no small part to new gas mixtures. Messer has always played a part in driving forward improvements in welding and cutting processes through targeted research, development and consultancy.



Practical Focus

6

MegaPack innovation

Gas cylinder bundles have barely changed for more than 30 years. But the requirements they are expected to meet certainly have. With its newly developed MegaPack bundle, Messer has now made a quantum leap in the supply of gases, offering clear advantages in terms of safety, handling and ergonomics.



Using Gases

14

The footprint is getting smaller

Paper production requires huge quantities of water and chemicals. Gases and sophisticated technologies can be used to significantly reduce the consumption of energy and resources as well as the emission of harmful substances.

Good for you and the environment

This magazine not only brings you interesting articles and interviews – it is also kind to the environment. “Gases for Life” is printed on 100% recycled paper.



If you want to stop reading „Gases for Life“ please cancel your subscription rather than simply throwing the magazines away. You can do this by sending a short e-mail to angela.bockstegers@messergroup.com. We would kindly ask you to dispose of any magazines that you have finished reading as waste paper.

We will gladly send you additional copies of “Gases for Life” and are always happy to get new readers. In both cases, all that is required is a quick e-mail to angela.bockstegers@messergroup.com.

Other Sections

4	News
8	Worldwide
9	People Focus
16	Industry Spotlight
17	Green Page
18	GaseWiki
19	Dialogue, Imprint

Collect “Gases for Life”

For long-term storage of our magazine, request the free “Gases for Life” slipcase. Contact: diana.buss@messergroup.com





Anita Kötél, former member of the Gases for Life editorial team and currently on maternity leave, feeds her twin girls with healthy baby food.

Hungary: CO₂ for whey neutralisation

Good for babies

As the largest producer of semi-hard cheese in Hungary, the Tolnatej dairy processes 250,000 litres of whey every day. It uses carbon dioxide from Messer to regulate the pH of this valuable raw material in the production of whey powder, which is in demand as an ingredient in baby food and other food products. Whey contains healthy minerals as well as proteins that resemble those found in breast milk, which aid babies' digestion.

Mónika Csere, Messer Hungarogáz

Serbia: Gases for the car industry

Tank instead of trailer

Since last year, Messer in Serbia has been supplying hydrogen, nitrogen and oxygen to rubber and plastic manufacturer ContiTech's new plant in the northern Serbian city of Subotica. A subsidiary of German firm Continental AG, the company manufactures hoses for the car industry. The gases are used for heat treatment. What is unusual here is that the hydrogen is stored in an on-site tank rather than being supplied in trailers. ContiTech currently employs some 300 members of staff in Subotica. However, there are plans to expand the site, with the workforce expected to double by 2016.

Sanja Šamatić, Messer Tehnogas

Czech Republic: Industrial gases for the Benteler Group

Broad range

Automotive component manufacturer Benteler's facility in Rumburk, Czech Republic, will work with a complete range of industrial gases in future. At this production facility for automotive engineering, the company requires nitrogen, argon, liquid carbon dioxide and liquid oxygen, as well as dry ice pellets for cleaning press dies with the dry ice blasting process. This makes the Group the largest Messer customer in the Czech Republic. The Paderborn-based Benteler Group's operations are divided into three business divisions - automotive, steel/tube and distribution. In the Czech Republic, the Group also operates production facilities in Chrastava, Stráž nad Nisou and Jablonec nad Nisou.

Radek Hanzlík, Messer Technogas

Switzerland: Medical gases for clinics

Top in the Thurgau

The Spital Thurgau AG clinics in Switzerland require more than 2,000 cylinder fills of medical gases per year. Since September 2012, the clinics in Frauenfeld, Münsterlingen and Diessenhofen have been supplied by Messer. "The main reasons for the switch to Messer included cost-effectiveness, quality and delivery flexibility as well as the user-friendly cylinder management system," explains Claus Wittel, Technical Services Manager at Spital Thurgau AG. Messer has thus further consolidated its position in the Swiss healthcare sector and become the market leader in the Thurgau region.

Patrick Bodensohn, Messer Schweiz

Small tubes purged

The small plastic tubes in aerosol cans are purged with nitrogen to ensure that they are free of impurities before the spray cap is placed on the cans in the production line. Italian company Farmol's Hungarian subsidiary in Nyírbátor manufactures aerosol cans for pharmaceutical and cosmetic



Erika Dosztály, a member of the customer service team at Messer in Hungary, also uses aerosols to style her hair.

products as well as household chemicals. Farmol's customers include companies like Henkel and Schwarzkopf. Messer supplies the nitrogen in cylinders.

Mónika Csere, Messer Hungarogáz

Surfaces free of cracks and pores

Austrian firm Rieder uses nitrogen to cool the cement used in the manufacture of glass-fibre-reinforced concrete panels. The panels can look almost like wood and are capable of being handled on site without heavy machinery: the 13-millimetre-thin glass-fibre-reinforced concrete panels from Rieder are also completely fire resistant and do not require any subsequent painting or maintenance. The temperature during the forming process is a key factor in preventing cracking during production of the non-porous concrete facade elements. Cooling with nitrogen ensures that the concrete component meets high standards regarding strength and leak-resistance and also ensures that it achieves the desired surface quality. At the Kolbermoor works, all the cement is cooled with nitrogen – a process which, in the construction industry, is typically only used in the warm season.

Herbert Herzog and Heinz Amon, Messer Austria

Liquid air as energy store

Experts from the energy sector met at Messer in Bad Soden to discuss Liquid Air Energy Storage (LAES). There is an urgent need for effective energy storage in Europe because the transition to renewables has seen a surge in electricity generation from wind and solar power. Surplus electricity now threatens to overload the grids, while the flipside of green energy is that there will also be lulls in supply. The process of liquefying air through compression and cooling – part of the process of separating air into its constituent parts, oxygen, nitrogen and argon – requires a great deal of electricity. Liquid air can be stored in insulated tanks without further energy expenditure. When it evaporates and turns back into gas, this process can be used to drive turbines which feed some of the electricity back into the grid while at the same time producing cold which can also be stored and used in the process. In the opinion of the experts, this technology represents part of a potential solution for ensuring electrical grid stability in Germany as well. Messer is continuing to work in this area with its British partner Highview.

Diana Buss, Messer Group

“The integration of wind energy in Europe means that grid balancing services will be a market worth billions by 2020. Cryogenic energy storage has the potential to be part of the solution. Get into Gases.”
Tim Evison, Vice President Business Development and Strategic Marketing, Messer Group GmbH

MegaPack innovation

The first chemists who worked with gases in the 18th century used glass flasks and animal bladders to store the newly discovered volatile substances. The development of the gas cylinder in the 19th century then allowed the supply and storage of larger quantities of gas with a higher degree of purity. Improvements to materials finally also made high operating pressures possible – 200 bar became the standard in Western Europe in the 1970s.

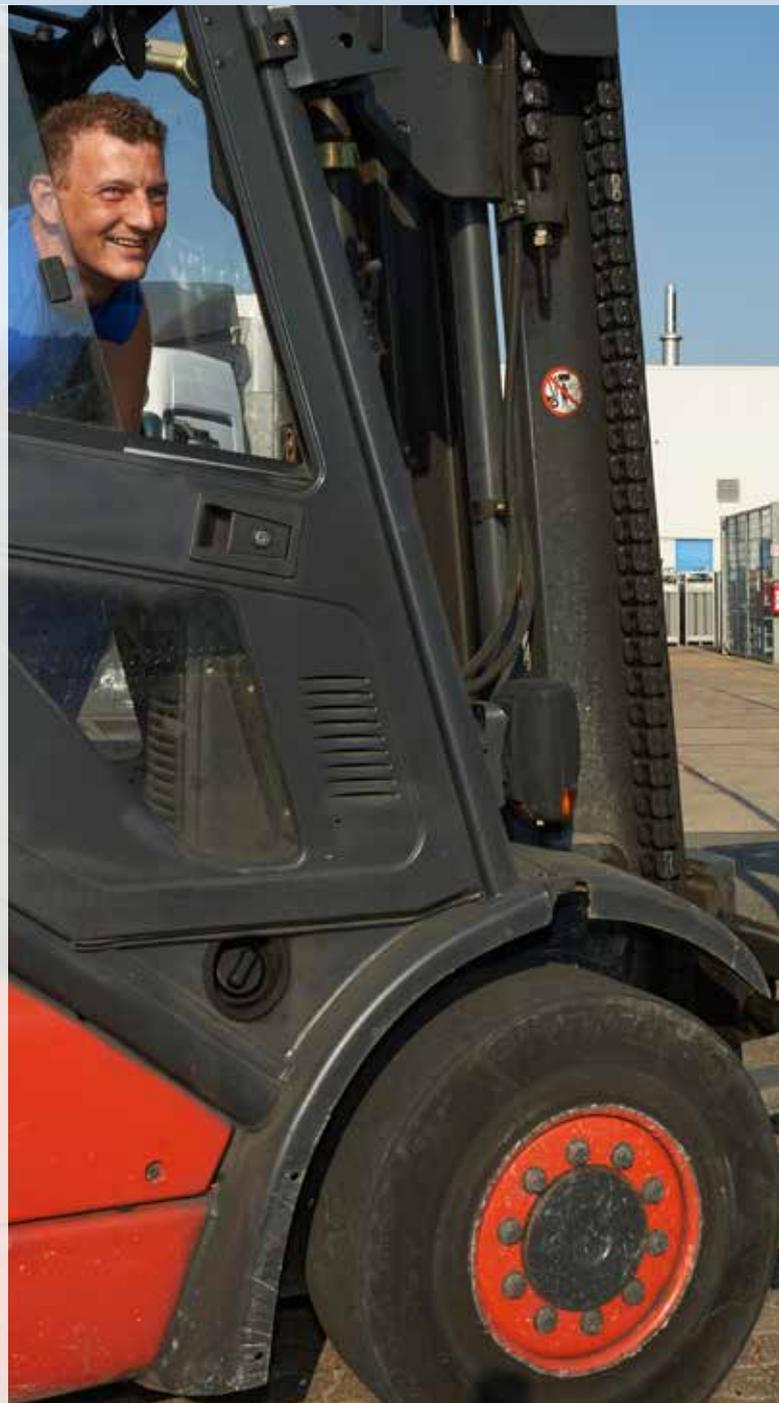
Supplying customers who require large quantities usually involves combining 50-litre cylinders in a steel frame to make what is called a bundle. The classic bundle consists of twelve gas cylinders and has been used in this form for decades. Today, more than 500,000 such gas cylinder bundles are in use in European manufacturing facilities alone.

Consumer requirements in terms of the quality of the gases have risen continuously over the last 40 years due to technical developments. The gases industry has played an active role in this through ongoing development of the manufacturing processes. However, cylinder bundles have remained virtually unchanged until now. With MegaPack, the new bundle from Messer, the supply of high-quality gases in bundles has now made a quantum leap.

“We have completely redesigned the cylinder bundle as part of a development project, and this represents a long-overdue leap forward in the packaging of industrial gases,” explains Alexander Kriese, Managing Director of Messer GasPack. “MegaPack brings quality to the fore and redefines safety. At the same time, it offers a completely new approach in terms of efficiency, ergonomics, sustainability and design. This ensures easier and more efficient operation for all users.”

At the red dot product design awards, a leading international design competition, MegaPack received an “honourable mention” for its particularly successful detailed solutions. Messer has filed several patent applications for its innovative solutions. The first MegaPack units are currently being delivered to customers in the laser technology sector.

*Alexander Kriese, Messer GasPack, and Tim Evison,
Messer Group*





The new MegaPack noticeably optimises handling at the filling plant (main photo) and transportation (top right). The difference compared with existing cylinder bundles is clear to see (top left).

Safety redefined:

- All gas-carrying components are thoroughly protected against impacts
- Only the connections and valves that are necessary for gas withdrawal are accessible
- Roll bars guarantee a high level of stability even in extreme situations **1**
- New, tamper-proof seal **2**
- Type of gas clearly indicated by product-specific colouring on the protective strips (in accordance with the international standard, e.g. white = oxygen, dark green = argon) **3**
- Gas connection at working height rather than head height
- Number of integrated gas-tight compression fittings reduced by half

Handling optimised:

- Central, ergonomically accessible operating panel **4**
- Large level indicator visible from a distance
- Duplex technology (pressure regulator integrated into bundle) facilitates gas withdrawal at 200 and 300 bar
- 300 bar means: fewer gas supply operating steps, enhanced operating efficiency & operational continuity, reduced purging losses
- Square footprint facilitates optimal use of space at the filling plant

Efficiency improved:

- Greater operational continuity (filling at 300 bar)
- Reduced purging losses
- Duplex concept (300 bar) for environmentally friendly and economical transportation



Further information:

Alexander Kriese

Managing Director

Messer GasPack GmbH

Phone: + 43 50603-262

alexander.kriese@messergroup.com



Annette Bonnen-Schlunke, who works in reception at Messer in Krefeld, Germany, adds some “greenery” to her workplace with flowers in a crystal vase.

Poland: Oxygen in glass production

Oxygen replaces methane

New technology is being used in the melting furnaces at the Violetta crystal glassworks in Stronie Śląskie, Poland. Enrichment of the combustion air with pure oxygen means that less methane is needed as fuel, resulting in lower CO₂ and nitric oxide contents in the waste gas and a reduced environmental impact. The crystal glassworks, founded in 1864, is one of the oldest glass producers in Poland and is also one of the last remaining manufacturers of traditional lead crystal. The machine- and hand-made collections are well-known among experts the world over.

Jaroslaw Ferda, Messer Polska

Sri Lanka: Dry ice cleaning of moulds

The perfect silhouette

Bra cups are given their shape by the moulded foam cups. The moulds used to produce the moulded foam cups are gently cleaned with dry ice. While lingerie is delicate and exquisite, the manufacture of bra cups from foamed plastics is a very prosaic technical process which involves polyurethane (PU) being foamed and shaped into a specified size and fit. Silueta Pvt Ltd., a company based in Sri Lanka, specialises in this stage of the production process. The company produces 100,000 pairs a month of foamed bra cups for brands like Victoria's Secret and Marks & Spencer. The moulds required for this need to be regularly cleaned in a gentle and efficient way, ensuring that all residues are removed. Silueta cleans its moulds with the ASCOJET 908 dry ice blasting unit from ASCO. It takes less than five minutes to clean a mould with

dry ice (carbon dioxide in its solid state), whereas the manual method used before took about 20 minutes per mould. With 16 moulds having to be cleaned every other day, this saves an enormous amount of time. Moreover, wear of the expensive moulds has also been greatly reduced as the dry ice blasting process does not damage the surfaces being cleaned.

Nicole Urweider, ASCO Carbon Dioxide



Dry ice blasting ensures gentle and efficient cleaning of the moulds used in the production of moulded foam cups.



People Focus

6 questions for

Dr. Hans-Gerd Wienands

Dr. Hans-Gerd Wienands (46) has been Chief Financial Officer of Messer Group in Bad Soden since 2004. He lives with his wife and daughter in Kerpen, near Cologne.



- 1. My biggest professional challenge at Messer so far has been...**
... the financing and refinancing exercises in 2004 and 2005 with which Messer significantly expanded its external finance and considerably reduced its reliance on the banks. Other companies did not succeed in doing so, and they paid the price for this during the financial crisis.
- 2. What typifies Messer for me is...**
... the strong and, in many cases, very friendly team spirit in the company which has grown over many years. That is one of the reasons why we sometimes find it easier to ditch old ways of doing things in order to be a more successful business.
- 3. My strengths are...**
... also my weaknesses: I'm an impatient person who wants to achieve good results as quickly as possible.
- 4. I have a weakness for...**
... food and drink, as you can probably guess by looking at me, unfortunately.
- 5. What fascinates you about gases and gas applications?**
I always like to tell our financial partners in Europe, China and the USA about how our gases are used in food products. San Pellegrino is one example that really is known all over the world. This makes our work transparent to outsiders and ensures that they can experience it up close.
- 6. The most important invention of the last century is...**
... the internet.

Germany: Nitrogen for research



Clearing the way: an icebreaking container vessel built by Nordic Yards. Among other things, the company's shipyards have been building high-tech vessels for use in the Arctic since 1946.

Freezing conditions

The Nordic Yards shipyard group will in future test new designs for ships and offshore facilities under Arctic conditions in the German town of Warnemünde on the Baltic Sea. This involves passing the components through a 15-metre test section that is cooled with cryogenic nitrogen from Messer. The nitrogen makes it possible to simulate the behaviour of the components in practice, for instance when transporting liquefied natural gas with a temperature as low as minus 164 degrees Celsius.

"Examples of the tests being carried out include new types of insulating materials," explains Burghard Zimmermann, Chief Designer at Nordic Yards. In addition, the stress behaviour of the material is analysed under extreme conditions. The first test models are a double-hull tank, a liquefied gas

deck line with deicing system and a double-walled bunker line, and these are repeatedly cooled from plus ten to minus 163 degrees Celsius and then thawed again. This research project is part of the POLAR (Production, Operation and Living in Arctic Regions) network funded by the Federal Ministry of Education and Research. The network is made up of ten companies and three research institutes.

Michael Behnke, Messer Industriegase



Test run of the first unit led by Burghard Zimmermann (centre): the tests under realistic conditions involve the use of cryogenic nitrogen from Messer.

Perfectly joined

Can you remember the last time you saw rust on a car? It is likely to have been a while ago! Steel production and sheet metal working methods have been greatly refined over the past few decades. The trend is towards material mixes that really are fit for particular purposes. The advances in welding have also made a major contribution, thanks in no small part to new gas mixtures.



Messer has always played a part in driving forward improvements in welding and cutting processes through targeted research, development and consultancy. The impetus for this comes from the intensive daily interaction we have with the users. And at Messer, service means active problem-solving and process optimisation with a long-term perspective. A large number of specialist suppliers manufacture parts and components for the automotive industry in particular.

Car safety

Staying with the example of the car, in the past an average mid-range car was held together by about 5,000 spot welds and over a hundred welded-on bolts or pins. To improve crash behaviour and corrosion resistance, increasing use is also being made of fusion welding processes such as MAG welding as well as laser welding and soldering. Welding and thermal cutting (dominated by laser and plasma cutting) are highly complex processes in which numerous details need to be considered: How thick is the sheet metal? Are different material combinations involved? Does the material have temporary rust protection or has it been galvanised? What is the direction of welding and from which side is it to take place? What kind of equipment is being used? Are fillers being used or not?

Consideration of influencing factors

"There is a huge number of potential influencing factors, and the sum of possible combinations is not even quantifiable," says Dr. Bernd Hildebrandt, who is in charge of Technology Management Welding and Cutting Gases at Messer's Krefeld site. "As a result, there is an almost bewildering variety of possible welding situations, and this is constantly increasing thanks to technical progress. Anyone who wants to keep up with the latest developments needs to have a good grasp of science." Messer not only has its own laboratories and



Mario Rockser, Welding & Cutting application specialist, explains how to check the gas flow rate to Benjamin Auweiler, a member of the editorial team.

top-class specialists, it also has a dense network of experts, as Bernd Hildebrandt explains: "Germany is a leader in welding technology thanks to its long tradition in metalworking. Not only is it home to many of the global market leaders in this industry, it also boasts a unique concentration of scientific institutions. We maintain a close working relationship with a considerable number of them and act as an intermediary between research and everyday welding practice."

Know-how = Problem-solving

Messer can therefore offer customers expert advice at the highest level. Bernd Hildebrandt describes this cooperation using the example of an agricultural machinery manufacturer: when the soil cultivation equipment left the factory, it still looked perfect, but not infrequently the paint at some of the welds would flake off when the appliance was used for the first time. "In a case like this, we would take a close look at the materials used and analyse the process in detail in order to determine the cause of the problem." The analysis involves looking closely at all the relevant parameters

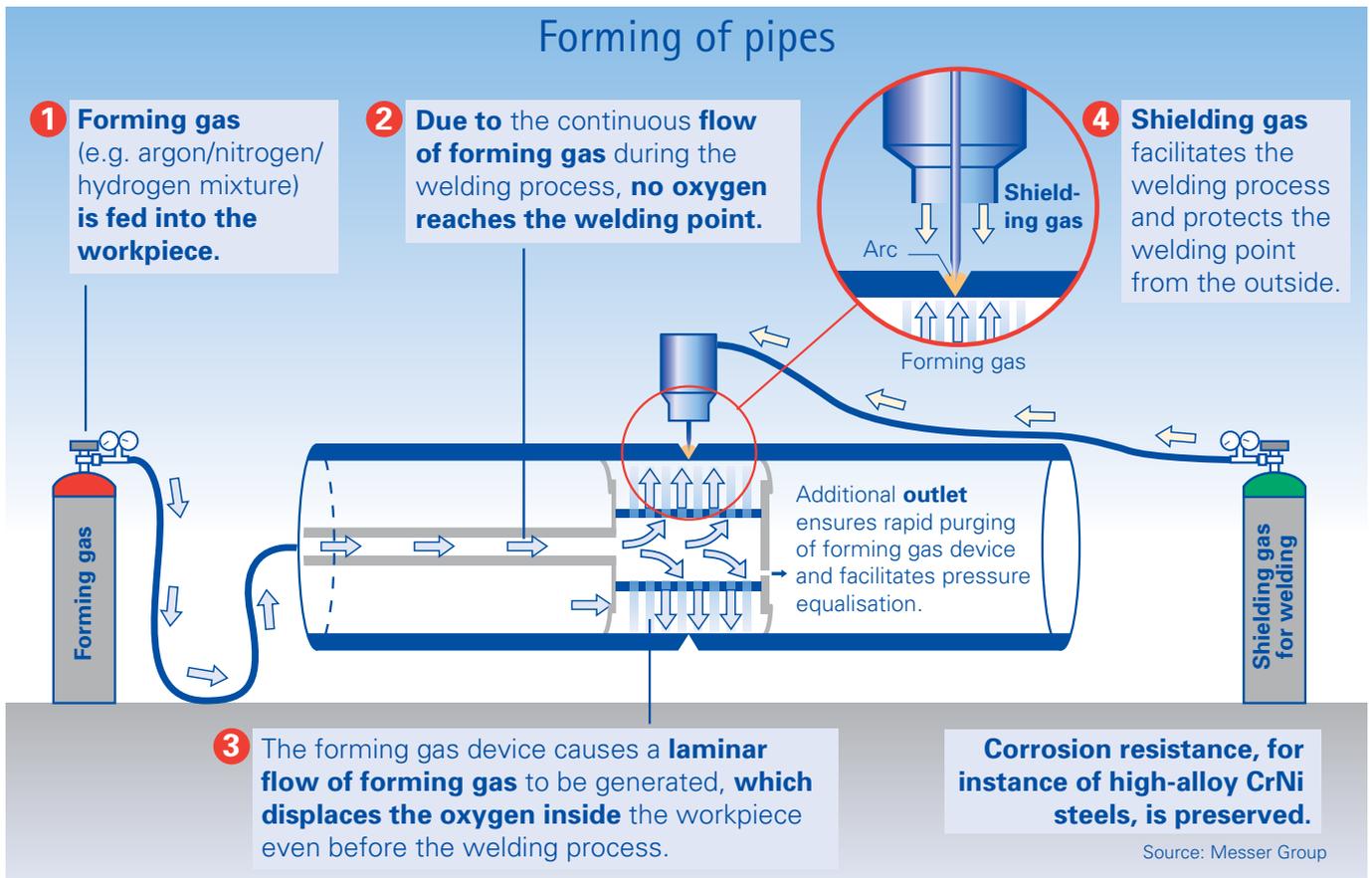
before suggesting solutions. These can refer to parts of the facility, individual process steps or the gases used. In the case of the ploughs, it transpired that silicate islands (slag islands) had formed on the welds. As soon as the appliances were exposed to the forces of tractor and soil, these superficial silicates (slag) became detached and caused damage to parts of the brand new paintwork. The remedy was provided by switching to a welding gas with an oxygen content of four per cent (Ferroline X4), which significantly reduces the formation of slag and weld spatter.

Harmful substances in the hose

When a water molecule (H₂O) gets into the arc during welding, it is broken down into its constituent elements – hydrogen (H) and oxygen (O). Both gases can have an extremely disruptive influence. High-alloy chrome-nickel steels react with oxygen, and this can lead to oxidation tint, which remains visible even after paint application. Hydrogen likes to penetrate liquid metal: this leads to unwanted pores with aluminium and can cause cracks in the weld with structural steel. Normal air humidity is often the

Continued on page 12 →

Forming of pipes



When welding gas-sensitive materials such as CrNi steels, oxidation tint should be avoided to ensure corrosion resistance. This also requires the reverse side of the welding point to be adequately protected against oxygen and moisture from the ambient air. This is achieved through forming.

source of these "harmful gases". The water molecules do not get into the welding process directly from the air, though, as it is kept away by the shielding gas. However, the shielding gas itself can be contaminated by air humidity. This is generally caused by unsuitable line hoses. In the case of simple compressed-air hoses from DIY superstores, it only takes a few seconds for a significant quantity of H₂O to penetrate the rubber jacket in the form of water vapour. While thorough

purging with clean shielding gas helps, this is not always feasible with spot welding processes. The most effective precaution is therefore to use high-quality hoses. Simple compressed-air hoses are quite unsuitable.

Only hoses specifically intended for welding should be used. These are normally certified in accordance with DIN EN ISO 3821 (formerly DIN EN 559) or DIN EN 1327. Further assistance is provided by the DVS technical

bulletin 0971 "Guidance on selecting gas hoses for gas-shielded arc welding".

Pore formation in the weld not only depends on the moisture content in the gas, but also on the gas mixture itself. For example, when welding aluminium with Argon 4.6, pore formation can be detected from as little as 490 ppm. With Aluline He50, an argon-helium-nitrogen mixture, this figure more than doubles to 1,250 ppm,



Stefan Messer and Dr. Bernd Hildebrandt at Schweissen & Schneiden 2009

Meet our experts at the **Schweissen & Schneiden trade fair in Essen**

16-21 September 2013, Hall 6.0 Stand D117

Messer will be joined by:

- **Messer Cutting Systems**
– Cutting machines
- **Messer Soft**
– Software for welding and cutting machines
- **Castolin**
– Filler materials
- **Jenoptik**
– Laser welding machines



We look forward to seeing you there!

which means that pore formation only begins when the moisture content is much higher.

Fundamental questions

Time and again, the exchange of information and ideas with users also leads to new, fundamental questions, because there are continual advances in welding. One such example is the question of pore formation with aluminium – pores weaken the weld and therefore the stability of the metal structure as a whole. Particularly with the modern, quick welding processes, very small pores can form in large numbers, which are barely visible when carrying out the normal X-ray check; the result of a recently concluded test at Messer. "But we were also able to show that the risk of pore formation can be significantly reduced by using new ternary mixtures with a high helium content," explains Michael Wolters, Technology Manager Welding & Cutting.

Partner to medium-sized companies

Be it a research project or user support – the starting point is always the question of process optimisation with and for our customers. In the metal-working industry, we deal with many small and medium-sized companies which are structurally suited to Messer. Messer can have an input into research and development, we offer extensive know-how and are represented in the important industry bodies. The same applies to our international presence, which enables us to provide appropriate support to globally operating customers with, for example, production facilities in China. Michael Wolters: "We are the right size for both."

Dr. Dirk Kampffmeyer, Messer Group



Further information:

Dr. Bernd Hildebrandt

Head of Technology Management
Welding and Cutting Gases
Messer Group GmbH

Phone: +49 2151 7811-236

bernd.hildebrandt@messergroup.com

Interview with

Wolfgang Peeters, company signatory and welding instructor at Carl Lixfeld GmbH & Co. KG

"Messer helps us select the optimal gas."



Gases for Life: How did you first come into contact with Messer?

Wolfgang Peeters: We got our gases from Messer in the past. Then there was also the contact we had through the German Welding Society (DVS).

Gases for Life: Why have you decided to offer Messer gases for sale?

Wolfgang Peeters: We wanted to round off our portfolio and in Messer we have chosen a technology partner that can offer us comprehensive support.

Gases for Life: What form does this support take?

Wolfgang Peeters: Our customers come to us with a product and want us to provide the appropriate welding technology. We select the process, carry out feasibility studies for

automated processes and define the parameters. Messer helps us select the optimal gas.

Gases for Life: That sounds like a fairly minor matter.

Wolfgang Peeters: But it's not. The gas has a major bearing on the quality of the weld and on the welding process itself. For example, one of our customers manufactures sheet metal cladding for transport racks. This was previously welded with the TIG process. Messer suggested using a new ternary gas, and this has allowed us to switch to a MIG/MAG process, which has greatly benefited the customer: greater deposition efficiency, quicker cycle times and first-rate welds which do not require any reworking.

Editorial Team

Lixfeld Schweißtechnik

Founded in 1905, the metals company took on the role of agent for welding equipment manufacturer Cloos in 1956. This was later followed by further agency roles for Hypertherm and Plasma Laser Technology. Today, the product range includes plasma cutting equipment, welding robots and plasma-hybrid welding machines. The company's portfolio is rounded off by a repair workshop as well as a service department for welding power sources and welding robots. Lixfeld,

which has sites in Siegen and Kempen, has also been selling Messer gases since 2012.



Gases and technologies for environmentally friendly paper production

The footprint is getting smaller

Whether it's the shopping list and then the receipt from the supermarket, the document for an office meeting, the colouring book for the children, or toilet rolls – we all use paper on a daily basis, despite computers and the internet. According to the German Pulp and Paper Association (VDP), more than 22 million tonnes of paper, card and cardboard were produced in 2012 in Germany alone.

Huge quantities of water and chemicals are required to make saleable paper from a tree trunk or a pile of waste paper. At the same time, gases and sophisticated technologies can be used to significantly reduce the consumption of energy and resources as well as the emission of harmful substances.

Messer has worked long and hard on developing applications and solutions that facilitate sustainable paper production. This has led to the concept of the "Green Paper Mill", which was nominated for the Austrian TRIGOS award for Corporate Social Responsibility in 2011. Elements of the sustainability concept are being implemented at Czech paper manufacturer KRPA Holding for example. As early as 2010, Messer installed a facility for neutralising alkaline wastewater with carbon dioxide at the company's headquarters in Hostinné, in the foothills of the Sudeten Mountains. Dissolved in water, the carbon dioxide is turned into carbonic acid, which can replace ecologically harmful and expensive mineral acids.

In a second step, Messer planned a biological treatment facility for KRPA – to break down the organic load – which in the end was built and commissioned in 2012. The new facility uses an existing basin that had been freed up, and supplements the mechanical-chemical technology that was used before. Instead of ordinary air, the system introduces pure oxygen into the wastewater treatment facility's activated sludge basin. This allows a high level of aerobic bacterial activity, which significantly accelerates the biological degradation processes in the compact facility. The new plant has been in operation since the beginning of January 2013. The quality of the wastewater has improved dramatically since then. The figures are 70 per cent below the statutory limits – to the benefit of the Elbe, in the upper reaches of which KRPA is based.

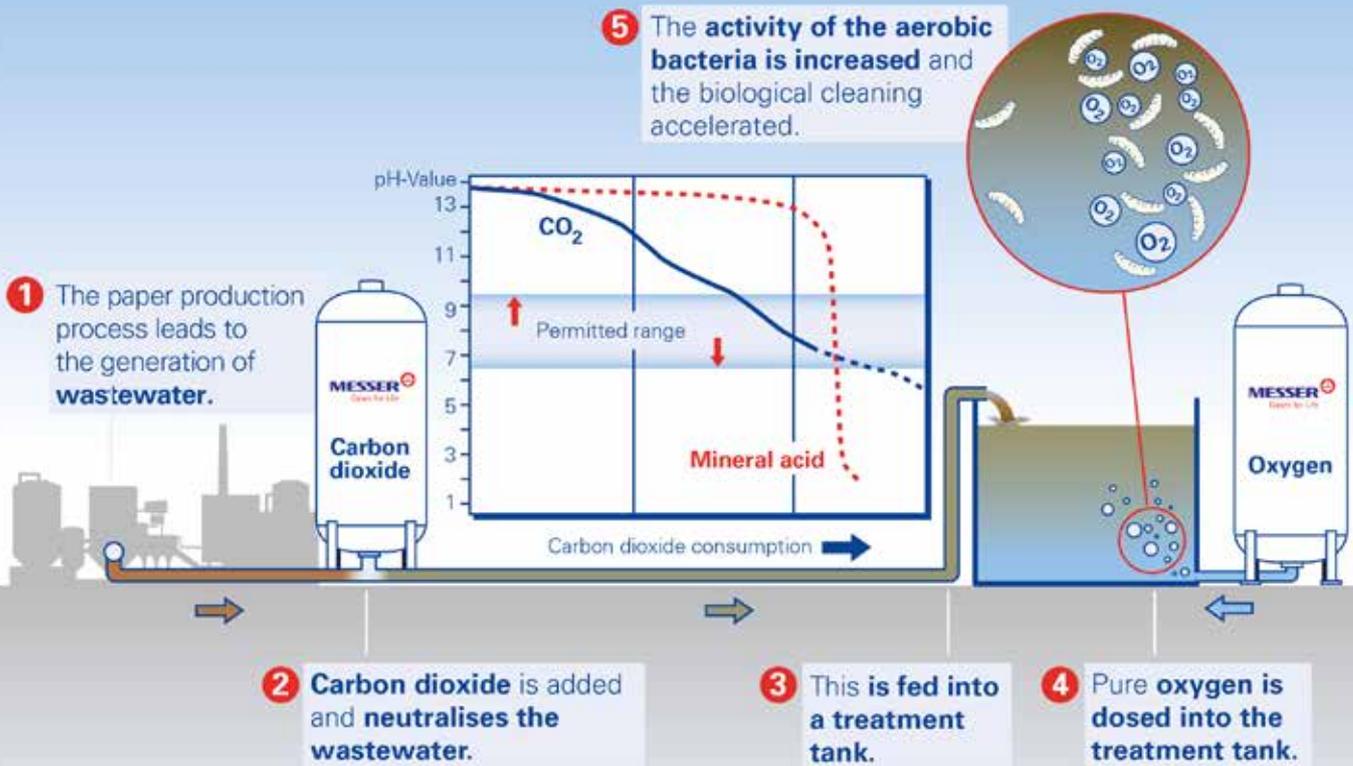
In order to further reduce the ecological footprint of paper production, Messer in Spain is working with Span-

ish tissue paper manufacturer Gomà-Camps and Slovenian research institute IOS on a European Union funded project to develop environmentally friendly and cost-effective technologies for the paper industry. The funding is being provided as part of the Eurostars Programme, which supports research and development cooperation between European companies. The aim of this is a closed-loop water circulation system to reduce consumption of fresh



The neutralisation of alkaline wastewater is a task faced by many industries.

Principle of wastewater treatment with CO₂ and O₂



Source: Messer Group

water and energy as well as the use of toxic chemicals. The specialists are also working on a process which facilitates completely chlorine-free bleaching of the raw fibres. This could significantly increase the proportion of recycled fibres in paper production.

The research project has been running since September 2011. Initial experiments were conducted in the laboratory, and these have been continued as

industrial scale tests at Gomà-Camps since autumn 2012. They involve the use of carbon dioxide as well as oxygen and ozone. The project phase is due to be completed by mid-2014.

Gomà-Camps is strongly committed to making its production methods as sustainable as possible, and this is one of the reasons it has been working with Messer for many years. The group, which is based in La Riba (Tarragona),

has been awarded the EU Ecolabel, the European Union's most important environmental certification. Messer supplies the company with carbon dioxide, which is used to stabilise different parameters during paper production; in addition, oxygen from Messer ensures biological wastewater treatment at Gomà-Camps. The paper company annually produces some 90,000 tonnes of tissue paper at its production centres in Spain and Portugal.

Editorial Team



A Gomà-Camps employee notes down readings from the CO₂ control module.



Further information:
Dr. Monica Hermans

Manager Application Technology
Chemistry/ Environment
Messer Group GmbH

Phone: +49 2151 7811-221

monica.hermans@messergroup.com

Industry Spotlight

Automotive

Chemical Industry

Recycling

▶ **Food**

Medicine



Photo: © Ina Peters, iStockphoto.com

Hungary: CO₂ fertilising for greenhouses

More lecsó

Floratom, a large horticultural business based in Szeged in southern Hungary, uses carbon dioxide supplied by Messer to boost the yield from its greenhouses. When the atmosphere in the hothouses is enriched with CO₂, the plants tolerate higher temperatures without any detrimental effect on the quality of the fruit. In contrast to other fertilising methods, no additional moisture is introduced into the greenhouses with the gas. Floratom was the first horticultural business in Hungary to use this method – including for the cultivation of tomatoes and peppers, which are key ingredients in lecsó stew, a Hungarian speciality.

Mónika Csere, Messer Hungarogáz



László Kékesi, Regional Sales Manager of Messer Hungarogáz in a greenhouse operated by Floratom Kft in Szeged.

France: Gourmet gases for organic bread and cake mixes



Margot Joubert runs her business together with her sister and with great attention to detail.

Sisterly synergy

Marlette, the French producer of organic bread and cake mixes, uses Gourmet gases from Messer for packaging its products. The company name is an amalgam of the owners' first names – Margot and Scarlette Joubert. The two sisters – Scarlette is a qualified hotel manager, Margot a food engineer – set up their business in 2010. They source the wholly natural ingredients for the bread and cake mixes from their home region of Poitou-Charentes, which is also where their young company is based. The quality of their products and the trend towards greater awareness of healthy eating have seen Marlette enjoy strong growth. The products are sold in delicatessens, including some famous outlets such as Le Bon Marché department store in Paris. "I loved baking cakes with my grandmother and have always wanted to run my own business," says Margot about the idea behind the start-up. She is in charge of production while Scarlette takes care of sales, communication and marketing. Messer has supported them in developing an efficient packaging method which meets all the criteria for organic food. Following their success in France, Belgium and Switzerland, the two sisters now want to conquer the British and Asian markets as well.

Angélique Renier and Jean Yves Berlie, Messer France

Germany: Dew point measurement in brewery

Frost protection for CO₂

During the fermentation process in beer brewing, carbon dioxide is produced, which is later re-used in subsequent stages of production. Before this happens, however, the gas is first liquefied and stored temporarily. The privately owned Erdinger brewery uses a CO₂

dew point tester from ASCO to monitor the liquefaction process. This measures the moisture in the gas. The brewery thus ensures that the moisture content (water vapour) of the carbon dioxide remains low during liquefaction and the gas does not freeze. One of the ways in

which the brewery uses the carbon dioxide obtained is to pressurise the fermentation and pressure tanks. In addition, CO₂ is used to displace the air from bottles and barrels prior to filling. If the beer came into contact with oxygen, it would quickly go flat.

Nicole Urweider, ASCO Carbon Dioxide

Cold grinding facilitates efficient PVC recycling

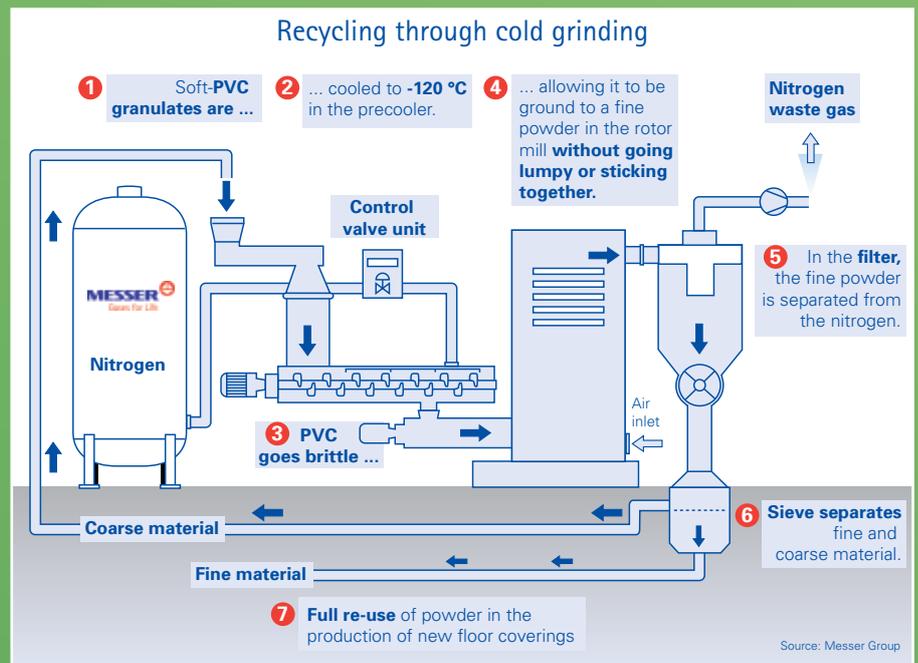
Floor powder

Polyvinyl chloride (PVC), a material used for pipes, cables, window frames or floor coverings, is difficult – and expensive – to dispose of. Recycling, therefore, is not only kind to the environment, but also to the bottom line.

PVC is the third most widely produced plastic in the world. It is virtually predestined for floor coverings: durable, easy to clean and available in countless variants.

The efficient recycling of material residues and rejects is an important economic and ecological priority for Hungarian floor covering manufacturer Graboplast. Following a two-year test phase, a recycling facility was recently commissioned at the Tatabánya site, which will initially recycle 1,000 tonnes of the plastic per annum from the company's own plants.

At the heart of the recycling process is cold grinding. The coarsely crushed plastic residues, or granulates, are cooled to minus 120 degrees Celsius in a Messer pre-cooler using injected liquid nitrogen. At such low temperatures, the PVC becomes as brittle as glass. It can be ground to a fine powder



der without it sticking together or going lumpy. The control system and the cryogenic gas are supplied by Messer. Careful metering allows precise adjustments to be made to

the temperature in the mill. The PVC powder produced in this way is fully re-used in the production of new floor coverings.

*Mónika Csere and István Herczeg,
Messer Hungarogáz*



Material residues and rejects are collected for efficient recycling at Graboplast.



Cold grinding makes the PVC go brittle, allowing it to be ground to a fine powder.



The PVC powder is fully re-used in production, where it is processed to make new floor coverings.

Shrink fitting – Pure physics for a firm fit

Shrink fitting looks very easy: simply put the piece in place, it fits firmly, job done! Things only get difficult when it comes to separation because a shrink-fitted connection cannot be undone without mechanical destruction.



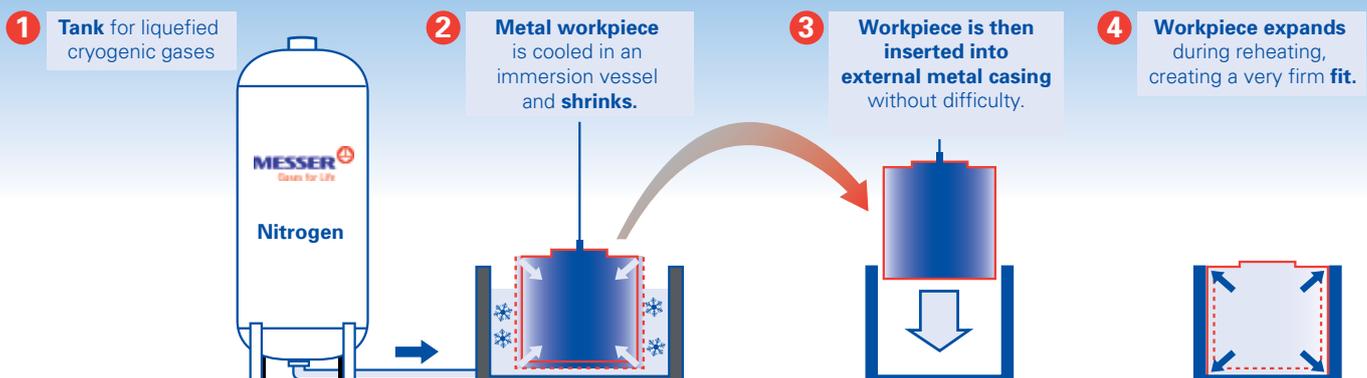
An immersion vessel is used to cool internal components to extremely low temperatures in order to shrink them very slightly.

Almost all materials shrink a little when they cool. Shrink fitting makes use of this physical phenomenon to connect two metal components, for instance a drive shaft and a gear wheel. This requires two workpieces where the external dimensions of one piece correspond to the internal dimensions of the second piece with a very slight overmeasure. The internal workpiece is cooled with cryogenic CO₂ pellets or in an immersion vessel containing liquid nitrogen until it has shrunk sufficiently. This creates the necessary clearance to allow the part to be fitted into the opening of the external component. As a rule, fractions of a millimetre are sufficient for this. Now it is only a matter of

waiting. During reheating, the workpiece expands, creating a very firm fit. There is no need for additional components such as bolts, wedges, clamping rings or welds. This also means that there can be no stress peaks or weak points due to technical reasons. The crystalline structure of the metal also remains unimpaired – in contrast to processes which use heat. So shrink fitting does not damage the material, and it is safe, quick and economical. It is used for shafts, ball bearings, bushes or journals, among other things, which are subject to heavy usage.

Peter Dissevelt, Cryotechnik Dissevelt, Viersen

Shrink fitting of metal parts



Source: Messer Group

Pretty colossal!



It weighs almost half a tonne and, with a diameter of 2.15 metres, even towers above basketball giants. The largest and heaviest tractor tyre from Czech tyre manufacturer MITAS can cope just as easily with soft ploughed soil as with hard rocky ground. Of course this requires it to be extremely tough – which is achieved thanks in part to nitrogen from Messer. During vulcanisation – the stage in production when the rubber is made strong and tough – the gas absorbs the heat that is generated, thus ensuring high product quality.

For more on this and many other gas applications, go to:

www.GasesforLife.de

