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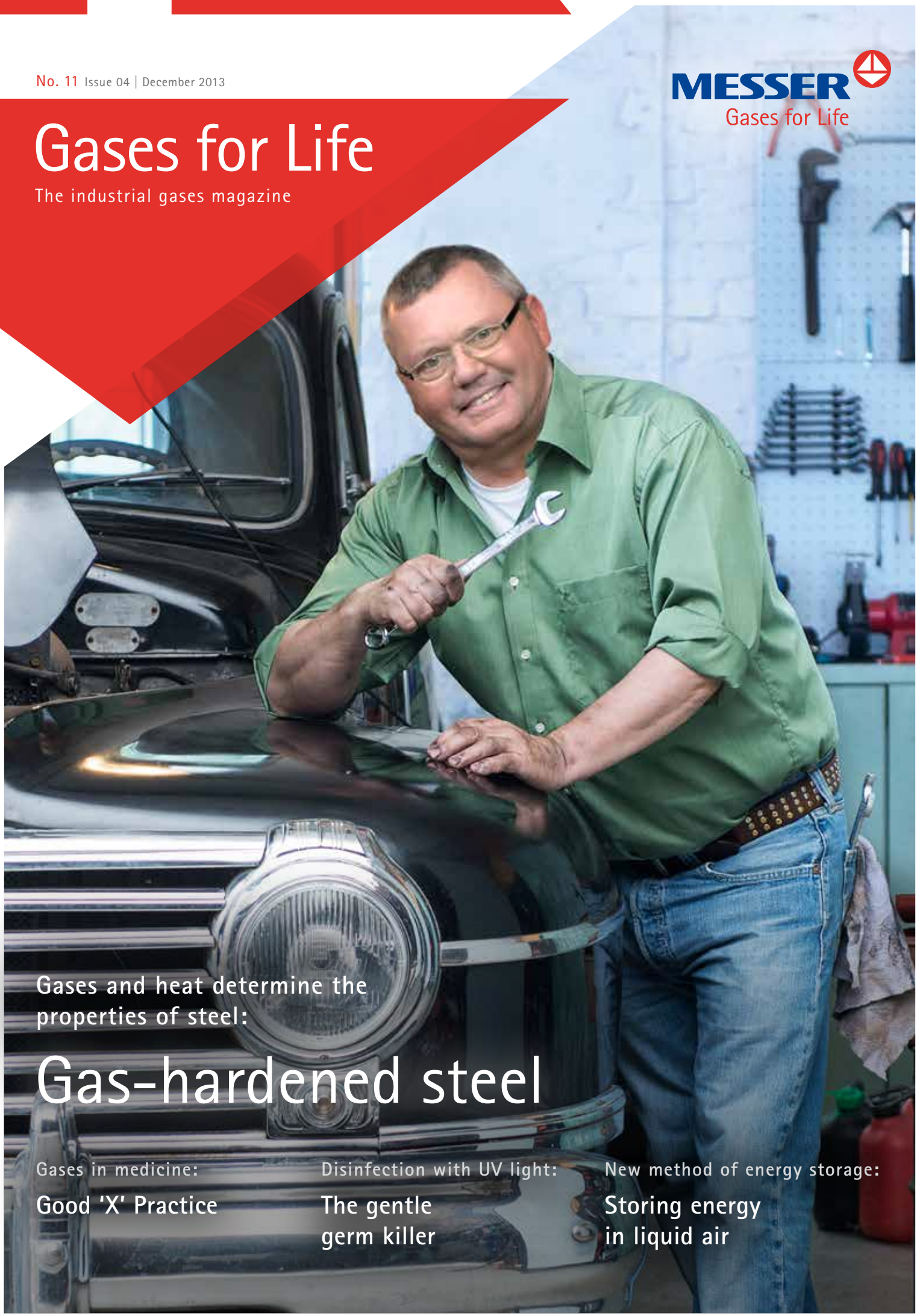
MESSER
Gases for Life

Gases for Life

The industrial gases magazine



Gases and heat determine the properties of steel:

Gas-hardened steel

Gases in medicine:

Good 'X' Practice

Disinfection with UV light:

The gentle germ killer

New method of energy storage:

Storing energy in liquid air

Dear Readers

Given the temperatures recently, it is safe to say that the warm season is over. But winter has its pleasant aspects too. It gives car enthusiasts the opportunity to get their classic cars back into tip-top condition and is the ideal time for cosy cooking nights with family and friends.

We encounter Gases for Life in garages as well as kitchens. They ensure that tools never lose their sturdiness and give stainless steel kitchen appliances their gleaming surfaces. Even the little metal screws that hold a dishwasher together are made resistant and durable with the aid of gases.

If you are looking for a special pre-Christmas experience, I recommend a visit to the "Big Air Package" in the Oberhausen Gasometer. This installation by artist Christo is a fascinating combination of space and silence – making it particularly appropriate for the pre-Christmas period. You still have until the end of December to visit this exhibition, which may be Christo's last in Europe.

I hope that you have an eventful December but also get to enjoy some peace and quiet so that you can recharge your batteries for 2014.

Best wishes,

Stefan Messer

Cover photo:
Hans-Peter Schmidt, metallurgy application specialist at Messer in Germany, has a weakness for old cars and good tools.

Cover Story

Practical Focus

Using Gases

Good for you and the environment

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Other Sections

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The bridge over the Garonne was designed by architecture firm Lavigne & Cheron.

France: Gases for metal working

Building bridges

The construction of "Jacques Chaban-Delmas", Europe's largest vertical-lift bridge, in Bordeaux also involved, among other things, the use of Messer gases. Messer in France supplied oxygen and acetylene to cut the giant metal supports to size. The structure is already regarded as the new symbol of the south-western French metropolis. The 117-metre-long central section of the bridge, which is named after a former mayor of the city, can be raised to a height of 59 metres above sea level in just twelve minutes. This means that even large passenger ships and freighters can negotiate the Garonne river. The bridge was officially opened in March by French President François Hollande.

Angélique Renier, Messer France, and Eric Theet, Carbon-Blanc

Belgium: Gases for detonative cleaning

Controlled explosive force

The pressure and sound waves generated by a gas explosion are the most effective way of removing blockages in storage facilities as well as hard deposits and dirt in incinerators. The waste incinerator in Rotterdam has also been cleaned using detonative cleaning. The explosion was effected during normal operation of the incinerator with the aid of the patented Detoclean process from van Gansewinkel Industrial Services. Messer supplied the necessary gases. A lance measuring more than six metres in length was used to fill a balloon inside the incinerator with ethane and oxygen. A controlled explosion of the gases, tailored precisely to the facility, then produced the immediate cleaning effect.

Haitze van Veller, Messer B.V.

Slovenia: Oxygen for glass production

Efficient and environmentally compatible

To increase production capacity, glass producer Steklarna Hrastnik commissioned an oxygen tank for glass melting in the first quarter of 2013. It allows glass production of 90 tonnes per day – twice as much as in the old furnace, and with the same space requirements. Messer in Slovenia installed the oxygen tank and is supplying the oxygen as well as supporting this long-standing business partner with the necessary know-how. With this new acquisition, Steklarna Hrastnik, one of the oldest glassworks in Slovenia, has not only increased production but also reduced the emissions of harmful substances as well as energy costs. Supported by Messer, the glassworks has applied for EU funding for the conversion from air to oxygen combustion through the Sustainable Industry Low Carbon (SILC) scheme.

Bernard Grobelnik, Messer Slovenija, and Davor Špojlarič, Messer Group

Krisztina Lovas, Marketing Manager at Messer in Hungary, likes to buy fresh apples at the market, even before work.

Hungary: Gases for fruits

A fresh atmosphere

Hungarian fruit processor Szatmári Ízek, based in the small town of Csenger, uses Messer gases to keep harvested fruits fresh until processing or marketing. Once the fruits have been put into storage, the twelve rooms in the company's cold store are sealed off and flooded with a mixture consisting of nitrogen and carbon dioxide. This gas displaces the oxygen, thereby preventing most of the biological processes that can cause the quality of the fruits to deteriorate. Some 10,000 tonnes of apples are harvested in the area around Csenger every year. In addition, there are significant quantities of pears, plums and sour cherries. Szatmári Ízek's production includes fruit juices and dried fruits.

Mónika Csere, Messer Hungarogáz

Croatia: Oxygen for steel production

Efficiency for arc furnace

Croatian steel company Adria Čelik (Adria Steel) uses an oxyfuel-based firing system to heat its arc furnace more efficiently. This allows particularly high temperatures to be achieved. The oxygen that Adria Čelik needs for the combustion process is supplied by Messer in Croatia. Two on-site tanks at the steelworks ensure that the furnace has a constant supply. Adria Čelik also gets argon from Messer, which it uses in the aftertreatment of steel.

Miljenka Debeljak, Messer Croatia

Switzerland: Gases for compressor tests

Messer supplies MAN

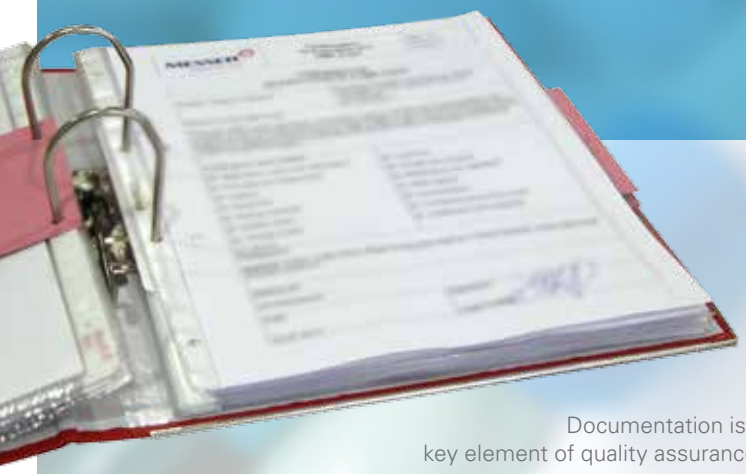
In order to simulate the operation of its gas compressors in a test bed, MAN Diesel & Turbo Schweiz AG uses various gases and gas mixtures – primarily nitrogen, but also helium and carbon dioxide – as a replacement for natural gas. Messer in Switzerland has been supplying the gases since January 2013. At its site in Zurich, MAN manufactures turbo compressors for the oil and gas industry, for air separation and for vacuum systems in the paper industry. Messer has installed a nitrogen tank and a bundle filling station on the factory premises in order to ensure a reliable supply of nitrogen to meet the substantial requirement at all times.

Patrick Bodensohn, Messer Schweiz

Gigantic: open gas compressor for major industrial applications

Good 'X' Practice

Medical gases enter the human body directly or are used on it. They must therefore meet particularly high quality standards. To ensure that this happens, Messer complies with the strict Good Manufacturing Practice guidelines issued by the European Commission.



Documentation is a key element of quality assurance.

The required composition of medical gases is defined in the European Pharmacopoeia, that is to say, in the relevant monographs. Strict adherence to these monographs is, of course, one of the requirements for Good Manufacturing Practice (GMP). While quality management systems such as the well-known ISO 9001 system create good foundations, they are no replacement for adherence to the GMP guidelines. "GMP adopts a comprehensive approach," explains Matthias Thiele, Vice President Medical and Pharma Gases at Messer. "For example, it also includes organisational structures and personal responsibility." Thus, for example, the heads of production and quality control must be two different persons. A Qualified Person (QP) is responsible for personally approving each batch of medicinal products. The QP must have a certificate of competence and be registered with, and recognised by, the relevant authority.

The regulation also takes account of virtually every other aspect of manufacturing: quality management, rooms and equipment, documentation, production methods, quality control systems and measures, as well as self-inspection and dealing with complaints or product recalls. The section on personnel provides a description of general principles while also dealing, in particular, with the responsibilities of staff in key positions as well as the subjects of training and personal hygiene. "All staff who are involved in the manufacture or sale of medicinal products must be familiar with the product properties as well as GMP in their area, with the main focus on drug safety at all times," explains Matthias Thiele.

Messer's national subsidiaries carry out self-inspections every year; official inspections by the authorities take place at least every three years or as and when required. The Messer headquarters in Bad Soden also carries out an audit of the national subsidiaries every three years. This involves simulating recalls, tracing batches and carrying out meticulous examinations of the status of the documentation.

"Besides GMP, which is mainly geared to the manufacturing process, the related processes are also increasingly being managed in terms of defined, good practice," the expert explains. This includes the sales department, for instance, which has to comply with Good Distribution Practice (GDP), and the area of drug safety, for which Good Pharmacovigilance Practice (GVP) has been specially defined. GxP is also used as

The main applications of medical gases:

- Anaesthesia
- Diagnostics
- Combined anaesthesia
- Surgical interventions
- Respiratory therapy

- Cooling of magnets in MRI scanners
- Medicinal baths
- Pain therapy
- Storage of biological materials

Quality management is an integral part of the sale and distribution of medical gases.

a general term for good practice. Matthias Thiele does not view this comprehensive set of rules as a burden: "We are talking about people and their health. Compliance with the rules is a matter of course for us. Furthermore, we constantly strive to use the strict control regime and regular inspections and audits to further optimise our processes in every respect."

Katrin Hohneck, Messer Group

Medical gases for Slovakian hospitals

Most of the hospitals in Slovakia get their medical gases from Messer. The suppliers were chosen through a public call for tenders, the aim of which was to gain a standardised pool of suppliers, a better overview of deliveries, greater transparency and reduced costs.

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Germany: Nitrogen for waste gas cleaning

Sustainable production

Messer has installed a waste gas cleaning facility – based on the DuoCondex process – for specialty chemicals company Evonik Industries AG. It is used at the Steinau plant to separate solvents and other hydrocarbons in order to ensure compliance with the emissions limits even as production is increasing. The Evonik plant in the 'Grimm Brothers' town of Steinau, in the state of Hesse, produces biodegradable special surfactants, primarily for the cosmetics and detergent industries.

Evonik Industries AG's Steinau plant feels it has a particular obligation to protect the environment over and above the statutory requirements as it is located in an idyllic setting surrounded by the Rhön, Spessart and Vogelsberg Mountains. Since the plant's cooling requirements are met by the regenerative use of waste cold, it seemed suitable here, both economically and environmentally, to use the DuoCondex process – developed for the recovery of pure substances and mixtures of substances – to separate a multi-substance mixture for further recycling of residues. In other words, the gaseous nitrogen that is produced by the vaporisation of liquid nitrogen is required for production processes anyway.

The process, developed by Messer, makes use of the extremely low temperature of liquid nitrogen to separate all the waste gas components apart from air and nitrogen in multiple stages through freezing and condensing. Moisture is separated in a pre-condenser which is cooled with a refrigerating system. The cold supply for the main condenser begins with the vaporisation of the liquid nitrogen at minus 196 degrees Celsius. Cooling for separation of the hydrocarbons takes place in a multi-stage, temperature-controlled way via circuits and the interconnection of a regenerative heat exchanger. This reduces the temperature difference between the waste gas to be cleaned and the cooling, gaseous nitrogen on the walls of the condenser. This, in turn, improves the cleaning performance, and prevents aerosol formation, localised freezing-out of concentrations and the blockage of the tube bundles, while also extending the running time before defrosting is necessary.

Adapting and designing the process required intensive cooperation between the plant engineers and the operator. It makes sense to run a pilot plant with appropriate instrumentation first, in particular to take account of the varying amounts of waste gases produced with very different compositions. This can be supplied by Messer.

Thomas Kutz, Messer Industriegase, and Dr. Klaus Michalek, Evonik Industries AG

Photo: Evonik Industries AG

Installation of the DuoCondex facility at Evonik Industries in Steinau

Switzerland: Gases for turbine construction

Comprehensive supply

Messer planned and implemented the gas supply systems for hydrogen, propane, natural gas and nitrogen for Alstom's new combustion laboratory in Birr, Switzerland. Messer is also supplying the gases required for the operation of the laboratory. Alstom is a global leader in the world of power generation, transmission and rail infrastructure. The company wants to use the new laboratory to further strengthen its competence in the area of gas turbines by further developing and optimising turbine combustion technology for thermal power stations. "For example, we are working on reducing the quantity of nitric oxide, achieving a homogeneous flame and preventing pulsation during the combustion process," explains head of laboratory Thomas Guntern. This is the third laboratory that Messer has converted for Alstom. And the next joint project is already in sight: "Planning for another laboratory will begin in the autumn of this year," says Thomas Guntern.

Markus Epple, Messer Schweiz

Modern gas supply system in a laboratory

Spain: Process gases for the pharmaceutical industry

Reliable quality

Pharmaline is a new Messer product line offering manufacturers of pharmaceuticals throughout Europe a solution for the use of process gases. It is subject to a specific quality management regime that has been tailored to market and industry requirements. While there are as yet no standardised guidelines for process and pharmaceutical excipients, their quality still has to meet the highest standards, of course. As a manufacturer of medical gases, Messer is well acquainted with quality assurance.

Marion Riedel, Messer Ibérica

People Focus

6 questions for

Snežana Stošić

Snežana Stošić (52) has been working in quality management at Messer Tehnogas since 1990. A chemical engineering graduate, she lives with her husband and two children in Smederevo.

1. **My biggest professional challenge at Messer so far has been ...**
   … gaining experience over time. This has allowed me to develop an internal methodology for determining the level of grease on the surfaces of objects by means of UV spectrophotometry in collaboration with the Vinča Institute in Belgrade.
2. **What typifies Messer for me is ...**
   … the many and varied opportunities to work with people with whom I feel I have a close professional bond.
3. **My strengths are ...**
   … my firm conviction that knowledge is accumulated in a team and that this leads to quicker and better solutions being found.
4. **I have a weakness for ...**
   … honesty and sincerity.
5. **What fascinates you about gases and gas applications?**
   The importance and variety of applications as well as their possible uses in medicine.
6. **The most important invention of the last century is ...**
   … sadly the knowledge of how major discoveries can be misused.

Gas-hardened steel

Steel and stainless steel are found in every home: from gleaming cookware to electrical appliances. The thing holding together the shell of a washing machine looks, at first glance, like an ordinary screw. But the demands placed on it are great: it has to cut its own female thread through galvanised and enamelled metal, and it must not lose its head even after many years of constant tension and vibration. So it needs a hard surface and a tough core. This applies even more to parts that are exposed to strong forces, for instance in gearboxes or ball bearings. Elaborate heat treatment in the right gas atmosphere ensures that each steel component gets the right combination of properties.

Sheet, wire, tube and bar – these are the most important basic forms in which steelworks supply their products to the metal-processing industry. These primary products are cut into appropriate parts and then given the required shape. The methods used include heating and forging or, in a cold state, pressing and machining. Relatively soft steel is needed for cold working and for processing with drills, lathes and milling machines. A finely distributed carbon content and a specific crystal structure facilitate easy machining and forming. The process of soft annealing is used to produce this kind of material. This involves slowly heating the steel to around 720 degrees Celsius and keeping it at this temperature for several hours before cooling it to room temperature within a specified period of time.

Fatal attraction

With soft annealing, a typical heat treatment period in a furnace can last 30 hours. "If oxygen gets into the furnace, there is a danger that it will dissolve the carbon out of the steel and combine with it to form carbon dioxide," explains Hans-Peter Schmidt, Technology Manager for Metallurgy at Messer. "This attraction can cause the decarburisation of the outer layer of material. This would mean the steel losing a component in this area which has a decisive bearing on its subsequent use." Moreover, the steel's iron atoms themselves can also react with oxygen, and the hotter the environment, the more rapidly this occurs. Annealing furnaces are therefore constantly purged with large quantities of inert nitrogen to keep oxygen out and prevent both reactions.

Between extremes

After the shaping process, there is generally no longer any requirement for "soft steel". Gear wheels or those washing machine screws now need to be hardened. This is done by reheating the workpieces. At a temperature of approximately 850 degrees Celsius, the crystal structure and the distribution of carbon atoms changes. After quenching the homogenised hardening material in an oil bath, the workpieces become extremely hard but also very brittle at the same time. This other extreme falls far short of the requirements as well.

123foto@istockphoto.com

Sarah, the daughter of Gases for Life editor Marlen Schäfer, loves to cook. Stainless steel pots and cookware, which owe their gleaming surfaces to the use of industrial gases, are indispensable for this.

Reheating to lower temperatures between 200 and 500 degrees Celsius – tempering – gives the steel the toughness and strength that make it fracture-resistant and mechanically robust. Further heat treatment steps are not uncommon, for instance to get rid of stresses in the crystal structure.

(Un-)Wanted reactions

Most thermal treatments involve the use of nitrogen, which makes up the bulk of the furnace atmosphere and, as an inert gas, does not produce any unwanted reactions. In cryogenic form, nitrogen can also be used to cool the workpieces after heat treatment. It gives the parts additional hardness and stability. Punches for coin production are treated this way for example.

However, there are also chemical reactions that are perfectly welcome. Hydrogen (H_2) can be used for the targeted reduction of oxides: H_2 molecules combine with the bound oxygen of each oxide to form steam (H_2O), which is purged from the furnace with

Continued on page 12 →

The metal components in wind turbine drive trains have to withstand particularly high stresses and strains.

Application	Messer know-how	Advantages
• Hardening, case hardening, carbonitriding	• Production of gas mixtures of nitrogen, methanol, ammonia and propane	• High quality of furnace atmosphere, flexible choice of mixtures, no start-up losses, alternative to other carrier gases
• Plasma, low-pressure carburising and vacuum hardening	• Dosing of high-purity acetylene or propane at low pressure and quenching with nitrogen	• Environmentally friendly processes through reduced addition of carburising gases and clean hardening material
• Nitriding and nitrocarburising	• Use of mixtures of ammonia and nitrogen with addition of carbon dioxide or propane	• Optimised use of pure gases to produce defined nitrided layers and increase efficiency
• Bright annealing of chrome steels and sintering of metallic powders	• Targeted injection of hydrogen, nitrogen, argon or mixtures thereof into furnaces	• Optimisation of hydrogen addition with improved heat transfer through hydrogen
• Increase resistance to wear and dimensional stability of hardened steel alloys	• Transformation of residual austenite through targeted cooling with liquid nitrogen	• Improved martensitic microstructure and dimensional stability of machine parts, tools and moulds
• Calibration of sensors and gas analysers with calibration gases	• Selection of optimal gas concentration, handling of calibration gas cylinders and installation of measurement technology	• Compliance with test regulations and quality standards regarding process parameters

the nitrogen-hydrogen mixture. This prevents unwanted discolouring and produces gleaming surfaces.

Wear-resistant surfaces

Not only can gases be used to prevent decarburisation, they can also be used for the targeted introduction of carbon into the steel to make its outer surface layer much harder, thereby significantly increasing its durability. In the manufacture of large drive trains for wind turbine generators, carbon from the furnace atmosphere is introduced into the steel to a depth of up to eight millimetres," explains Hans-Peter Schmidt. "It is derived from propane or other hydrocarbons, which is added to the process gas in a regulated way. In addition to nitrogen, hydrogen and propane, the carburising gas mixture consists of carbon monoxide, carbon dioxide and steam. Each of these components has its particular effect on the rate of absorption of carbon.

Besides carburisation, the process of nitriding the steel ensures particularly hard and wear-resistant border zones, which are needed for, say, heavily used

tools in the manufacture of aluminium profiles or for special slide bearings. This involves the use of ammonia (NH_3), a nitrogen compound.

In contrast to molecular nitrogen (N_2), the nitrogen atoms that are released are dissolved in the steel more readily and in higher concentrations, leading to the formation of extremely hard iron nitrides in the outer layer. A compact and closed compound layer of just one to two hundredths of a millimetre is optimal.

"This only covers some of the fundamental heat treatment processes," emphasises the metallurgy expert. In industrial practice, there is an almost bewildering number of process variants, which are used to produce a wide range of steel properties. Each one has its particular temperature pattern and the quantity of gases added must always be tailored precisely to the process in question. In addition to what are often large quantities of gases, this requires a great deal of specific know-how as well as high-quality measuring and control equipment. Hans-Peter Schmidt: "Messer customers get all this from a single source."

Editorial Team

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Interview with

Hans-Jürgen Hartnack, Head of Heat Treatment, EJOT GmbH & Co. KG

"Now we always have the optimal gas atmosphere in our processes"

Gases for Life: Which gases do you use in your hardening furnaces?

Hans-Jürgen Hartnack: A mixture of nitrogen and methanol makes up the basic atmosphere. Propane is also added if carbon is required in order to make the alloy harder in the border zone or to compensate for carbon losses.

Gases for Life: How important is the precise composition of the gas mixture?

Hans-Jürgen Hartnack: It is of vital importance for product quality. We optimised it with the help of Messer experts after they had carried out precise measurements of the gases during heat treatment.

Gases for Life: What was the result of these measurements?

Hans-Jürgen Hartnack: It showed us, for example, that we could control the process more precisely with flowmeters of a different design from the ones we had been using previously. We have also closely examined the composition of the gas atmosphere for each product and process and further optimised it in collaboration with Messer. Thanks to the precise measurements, we have also been able to make our furnaces even more airtight.

Gases for Life: How can one improve airtightness through gas measurements?

Hans-Jürgen Hartnack: The measurements indicate where the gas composition in the furnace differs from that of the injected gas mixture. This is a pointer to where one might find and get rid of potential weak spots in the furnaces. Thanks to the precise analysis that was carried out and the optimisation measures that were recommended, we now always have the perfect gas atmosphere in our processes.

Gases for Life: Why did you choose Messer?

Hans-Jürgen Hartnack: We have had a good working relationship with Messer for a long time. The price/performance ratio is right, and we always get very competent advice when we need it.

Editorial Team

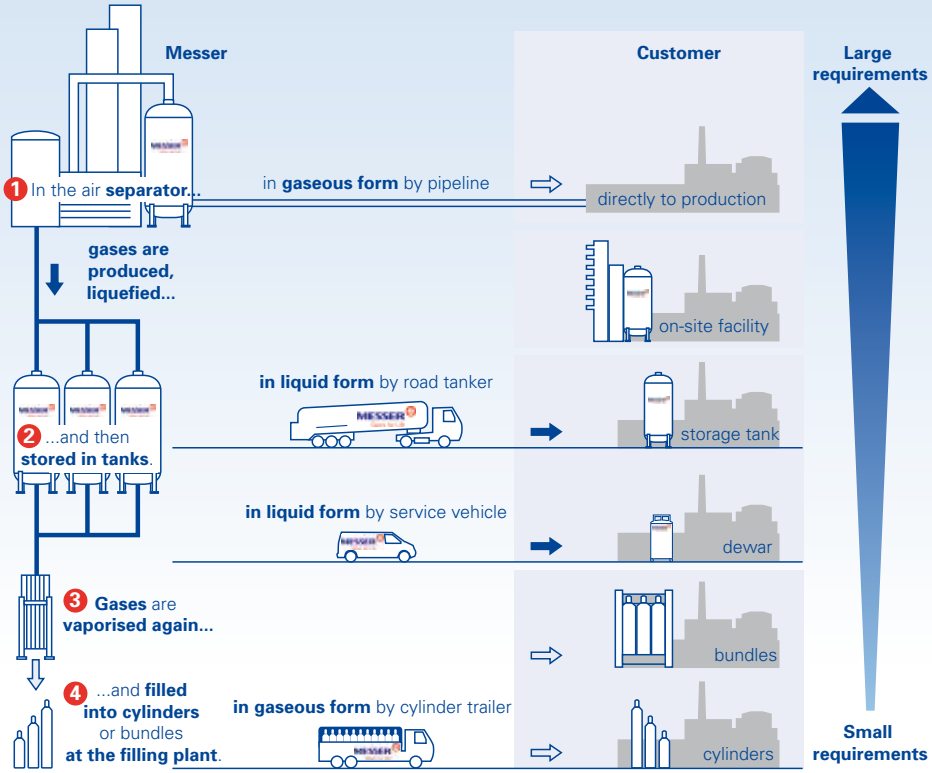
EJOT HOLDING GmbH & Co. KG

Today's EJOT Group has its origins in the former Adolf Böhl screw factory in the Westphalian town of Berghausen. Nowadays the company employs more than 2,100 staff worldwide and has its headquarters in Bad Berleburg. With its sales and manufacturing companies, it is one of the European market leaders in fastening technology. The areas in which its products are used include the construction, plastics technology, automotive, household appliances, electronics and telecommunications industries as well as the leisure and sports equipment industry.

From cylinders to pipelines

When heat treating metal, 1,000 cubic metres of nitrogen is quickly used up. Environmental testing laboratories, on the other hand, are more likely to measure their gas consumption in millilitres, for instance when conducting chromatographic tests. The form of delivery must be appropriate for the quantity involved.

Whether the quantity is huge or minimal, the gases are crucial to the success of the process in question. Therefore, there has to be security of supply, and the form of delivery depends on the extent of the requirements. In the case of acetylene, for example, the smallest quantity delivered to Messer customers is just 1.7 kilograms of the welding gas. Smaller workshops and amateur mechanics usually get the small quantities they need from a gas dealer, who sells the products in cylinders – metal pressure vessels for gases. The cylinders are available in different sizes, generally from two to 50 litres. If individual cylinders are no longer sufficient, they are supplied in bundles of four, six or more cylinders. The newly developed MegaPack cylinder bundle from Messer (see Gases for Life 3/2013) is a hightech vessel for medium requirements which can do a lot more than just store gases. However, when it comes to, say, filling kilometres of pipes at an oil refinery with inert nitrogen, even the bundles are far from sufficient. Here you need road tankers, which deliver the gas in compressed or liquid form. This delivery is stored in suitable tanks located at the customer's premises.



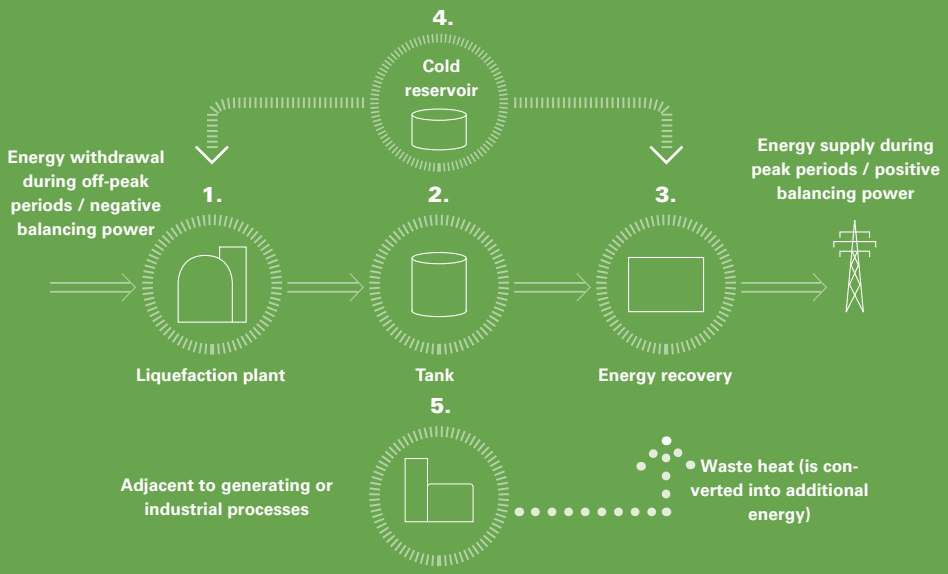
Even greater quantities of gas can be supplied via pipelines such as the ones installed in some industrial parks. This is the case in El Morell in Spain, for example, where Messer supplies gases to the chemical facility by pipeline. Finally, for bulk consumers without a pipeline nearby, there is the option of an on-site air separation unit. Messer takes care of planning, construction and operation.

Editorial Team

Storing energy in liquid air

The technical term for energy storage through air liquefaction is Liquid Air Energy Storage or LAES for short. This system probably has the potential to supply energy to the grid operator in line with demand at all times, thereby avoiding supply shortages. This is particularly important if green electricity is being generated from wind and solar power.

Energy storage innovations are eagerly awaited more than ever today. As the German Advisory Council on the Environment (SRU) wrote in a special report in January 2011: "There is broad unanimity amongst all the stakeholders that, as renewable energy's share in Germany's power supply grows, the need for additional energy storage capacity will increase." But how? Liquid air energy storage could provide some impetus. It is flexible, can be used anywhere and is based on a core Messer competence. Liquid air is a new energy storage solution which uses tried and tested components and could play an important role in the future of low-carbon energy. Air liquefaction, one part of the process of air separation, is energy-intensive. 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.



The use of liquid air for grid-based energy storage could increase energy security, cut greenhouse gas emissions and create an entirely new industry. To develop this technology and exploit it commercially, Highview Power Storage and Messer Group have entered into a strategic partnership with the aim of jointly driving forward the development of appropriate systems for integration into industrial gases facilities. Renewable energy is not always generated at the "right time", resulting in surpluses – for example at night, when there is little demand. Air liquefaction enables energy to be stored and made available for peak times and / or as a zero-emission fuel. Liquid air can be used in a number of new motor types as well as in grid-compatible, large-scale energy storage systems.

Diana Buss, Messer Group

Highview's first liquid air energy storage pilot plant.

Slovakia: Gases in the fastener industry

Creating connections

In the manufacture of electrical fasteners, gases are needed for, among other things, the brazing of cable links as well as for surface finishing. For the former, Klauke Slovakia, one of the leading suppliers in this area, has been getting liquid oxygen and ethylene from Messer in Slovakia since 2004. Messer has also been supplying liquid nitrogen since 2012, which is used as a protective gas in tin plating. Klauke produces terminal elements, cable connectors, cable bundles and insulating sheaths as well as application tools and circuit boards with printed connections.

Erika Hergottová, Messer Tatragas

Switzerland: Dry ice for the catering trade

Freshness on rails

The drinks in the minibars on wheels used by Swiss Federal Railways (SBB) are chilled with dry ice to ensure that they stay nice and fresh. ASCO supplies packs of dry ice slices to the SBB subsidiary elvetino, which provides the catering service for rail passengers.

Nicole Urweider, ASCO Carbon Dioxide

White packs of dry ice slices chill the minibars on wheels used on Swiss trains.

Spain: Welding gases for the automotive industry

Even penetration

Automotive supplier Kirchhoff Automotive in Figueruelas near Zaragoza uses Ferroline gases in its automatic welding machines to produce, among other things, dashboards for the Mercedes-Benz works in the Basque city of Vitoria. The main gas used is Ferroline C18. This shielding gas mixture ensures even penetration and keeps spatter to a minimum. Messer in Spain supplies gases to some 150 automotive industry suppliers. Kirchhoff operates highly automated production facilities in which it manufactures metal structures for Opel and Mercedes

Modern dashboards have a stabilising metal structure which is produced with the aid of shielding gases for welding.

bodywork and chassis. The automotive industry is one of the most important sectors of the Spanish economy. The country is in second place in this sector within Europe. Nine leading car manufacturers have major production centres there, with more than 85 per cent of production being exported.

Marion Riedel, Messer Ibérica

Romania: Nitrogen for automotive electronics

More efficient soldering

The Bosch Group, one of the world's largest automotive suppliers, has been getting liquid nitrogen from Messer in Romania for its facility in Jucu, Transylvania, since April 2013. The plant develops and manufactures electronic control units. The inert gas is used in the wave soldering machine, where it displaces the oxygen that can lead to adverse reactions during soldering of the circuit boards. Soldering in a nitrogen atmosphere reduces slag formation and helps to improve quality and reduce costs.

Wolfgang Indenhuck, Messer Romania Gaz

A perfect start is half the battle in drag racing.

France: Nitrous oxide injection for drag racing bikes

Masterly acceleration

Stéphane Haissmann, the 2012 French Super Street Bike Champion, has been riding a racer that is supplied with nitrous oxide (N_2O) from Messer since the summer season of 2013. Nitrous oxide, also known as laughing gas, is injected into the cylinders, where it accelerates the fuel combustion process as an oxygen carrier. This is a significant advantage in drag racing, where the rapid release of energy is key.

Angélique Renier, Messer France


The nitrous oxide is injected into the cylinders.

Germany: Shielding gases for CO_2 laser welding

Gas mixtures replace helium

Helium is often the shielding gas of choice when welding with a CO_2 laser. However, the valuable noble gas can easily be replaced: Messer has developed gas mixtures using argon, helium, oxygen, carbon dioxide and hydrogen, which facilitate the same weld quality as that achieved with pure helium. Laser welding is becoming increasingly important. It is being used more and more frequently for welding high-quality components – and it has long since ceased to be the preserve of large concerns such as the carmakers, with small and medium-sized enterprises also using it.

Dr. Dirk Kampffmeyer and Michael Wolters, Messer Group

Gases for the manufacture of disinfectant UV lamps

The gentle germ killer

Anyone who has ever had sunburn knows the unpleasant effect of UV light: it can destroy living cells in a short space of time, leaving behind painfully burnt skin. However, the destructive force of ultraviolet radiation can also kill microbes. For instance, it is used to disinfect the water in swimming pools or the air in operating theatres. At LightTech in Hungary, where the special antibacterial UVC lamps are manufactured, gases are an indispensable part of the production process.

UV light with a wavelength below 280 nanometres literally tears the gene's chain molecules apart. If a germ or a virus is exposed to such UV radiation, it will, at the very least, no longer be able to reproduce. To disinfect indoor air, it is circulated within the radiation range of a UVC lamp – preferably in the air conditioning system itself. After a while, all the air will thus have been exposed to the short-wave light. Examples of the use of UVC light for disinfection include the food industry, restaurant kitchens and hospitals. UV disinfection of water also has a pleasant side effect: the UV light turns oxygen (O_2) into ozone (O_3), which not only attacks the germs but also breaks down impurities such as sun creams and bodily fluids without the use of chemicals.

Disinfectant UV light is usually produced with low-pressure mercury vapour lamps. LightTech is one of the leading suppliers worldwide. Neon and argon, and less often gas mixtures with xenon and krypton, are used as the filling gas for the lamps. In order to avoid oxidation of the metal parts, nitrogen is used as a protective gas. LightTech uses Messer's oxyfuel technology for glass melting. This requires 40 per cent less natural gas than the technology used previously. Moreover, carbon dioxide emissions are also lower. LightTech gets all the gases it uses from Messer in Hungary.

Editorial Team

For Marvin, son of Messer employee Benjamin Auweiler, nothing beats a visit to the baths.

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From left to right: Desirée Landerer, Roberto Talluto, Angela Bockstegers, Dr. Christoph Erdmann, Krisztina Lovas, Marlen Schäfer, Nicole Urweider, Benjamin Auweiler, Reiner Knittel, Zsolt Pekker, Diana Buss, Dr. Dirk Kampffmeyer and Michael Holy
(Not pictured: Tim Evison, Dr. Bernd Hildebrandt, Monika Lammertz, Dr. Joachim Münzel and Marion Riedel)

Competition

Delicious!

In this issue of the magazine, readers have the chance to win a gourmet hamper and give their kitchen appliances a day off. For your chance to win this special prize, all you need to do is answer our questions relating to this issue of Gases for Life. The letters in the numbered boxes will provide you with the answer. Please send it by email with the subject line "Gases for Life competition" to: diana.buss@messergroup.com. The deadline is 30 January 2014. Please remember to include your name and address. The competition is not open to employees of Messer Group companies or their families. In the event of multiple correct answers, the winner will be picked randomly. The result of the draw will be final and not subject to appeal.

Which gas has the chemical formula N_2O?

13 10

4

What does the abbreviation "GMP" stand for?

14

6 11 7 12

2

What is the name of Europe's largest vertical-lift bridge?

8 1

9 – 3 5

Congratulations!

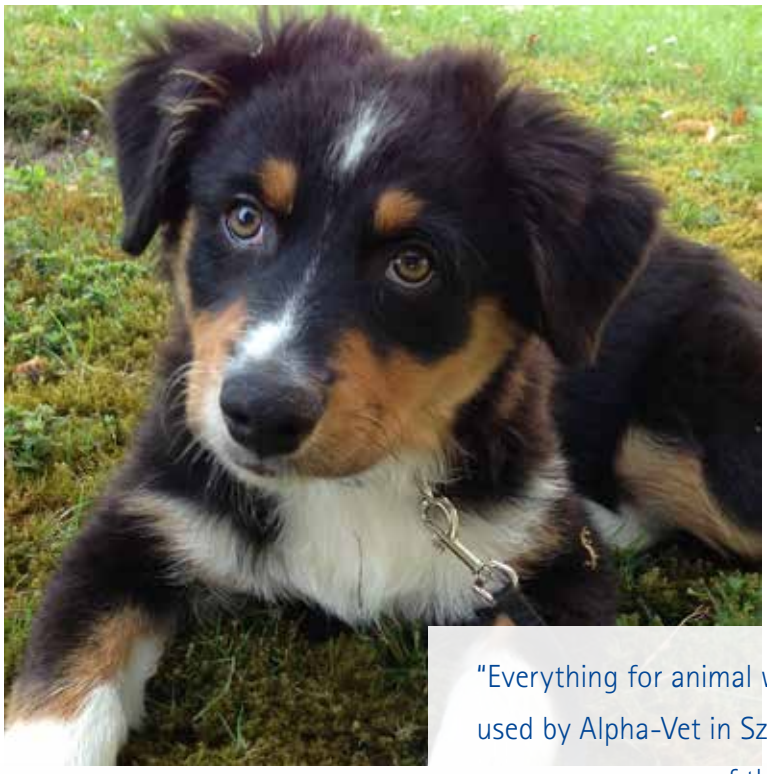
The winner of the last competition was Michael Schön, Erndtebrück, Germany. The correct answer was "FORMING"

Answer:

1	2	3	4	5
6	7	8	9	10	11	12	13	14

Have fun and good luck! Your "Gases for Life" team!

Alpha animal?!



"Everything for animal welfare" – that is the motto used by Alpha-Vet in Székesfehérvár, Hungary. The company runs one of the country's most modern veterinary clinics and even produces its own drugs for our four-legged friends. The research laboratory's gas chromatograph uses high purity laboratory gases from Messer for precise compositional analysis. Gases thus play their part in looking after the health and welfare of man's best friend.

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

www.Gases for Life.de