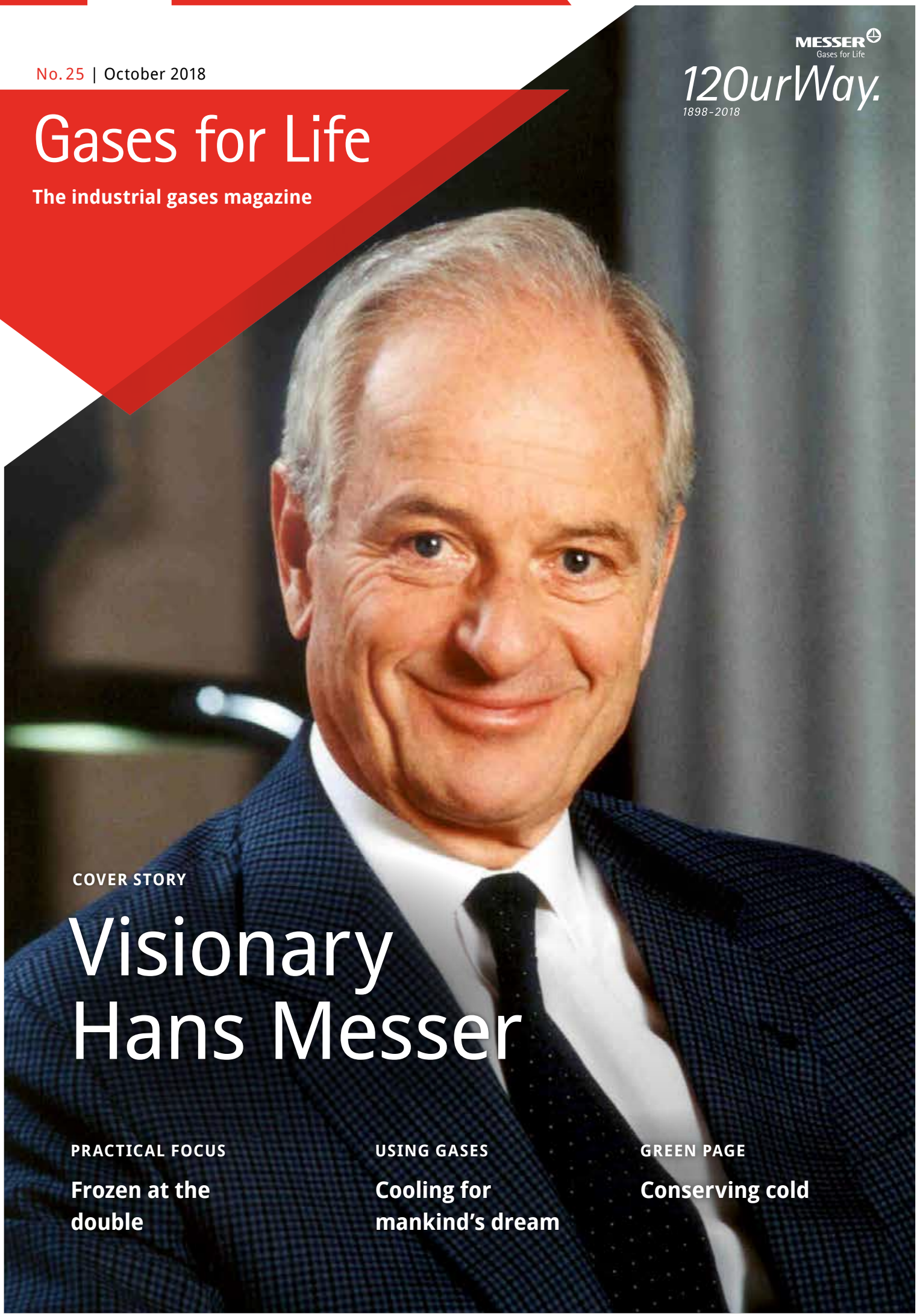
No. 25 | October 2018

MESSER Gases for Life

120urWay.
1898–2018

Gases for Life

The industrial gases magazine



COVER STORY

Visionary Hans Messer

PRACTICAL FOCUS

Frozen at the double

USING GASES

Cooling for mankind's dream

GREEN PAGE

Conserving cold

Dear Readers,

Summer is over – and what a summer it was. Some people found it far too hot while others think it was wonderful. The summer of 2018 certainly brought us extremely long dry spells, with a significant impact on agriculture in particular. Climate change just cannot be explained away.

Of course we can't stop global warming with our know-how and our *Gases for Life*. But we can contribute to slowing down the process. This is happening in refrigerated logistics, for example, where cryogenic gases provide an environmentally friendly alternative to traditional, diesel- powered cooling units.

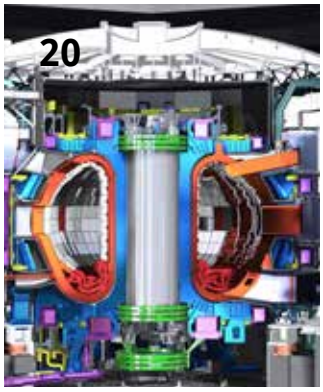
Breaking new ground in the application of industrial gases is as much a tradition at Messer as taking up business challenges. My father, Hans Messer, is an example of this. His work is the subject of the cover story in this issue of "Gases for Life".

We are currently on the verge of taking another major step forward: subject to approval by the relevant competition authorities, we will, in a joint venture with CVC Capital Partners Fund VII, take over most of Linde's gases business in North America as well as individual business operations in South America. Watch this space.

Stefan Messer
CEO and owner of Messer

Correction
One of our readers, Günter Aichele, discovered an error in the last issue of our magazine. On page 13 it said: "1931 – Messer becomes the first producer of electric welding machines". Mr Aichele rightly points out that there had already been "other producers of electric welding machines for many years". The error occurred because we had shortened the original wording: "As the first manufacturer of oxyacetylene equipment, Messer commences production of electric welding machines in 1931". We are grateful to Mr Aichele for drawing our attention to this matter.

Our cover photo:
When Hans Messer took over at the helm in 1953, Messer was profiting from the economic boom of the 1950s. In parallel, the company was targeting international growth.



"Gases for Life" is printed three times a year in German, English, Hungarian, Slovakian, Spanish and Czech. Go to www.messergroup.com for comprehensive information about "Gases for Life"

Collecting "Gases for Life"
For long-term storage of our magazine, request the free "Gases for Life" slipcase:
angela.bockstegers@messergroup.com

Good for you and the environment "Gases for Life" is printed on 100% recycled paper. We would kindly ask you to dispose of any magazines that you have finished reading as waste paper. If you want to stop reading "Gases for Life" please cancel your subscription rather than simply throwing the magazines away. We will gladly send you additional copies 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.

Gas mixture for frothy-creamy beer

Hungary | The Borsodi brewery has put the country's first nitrogen-enriched lager on the market under the name "Borsodi Nitro". The gas is added during the brewing process and is also used – in combination with carbon dioxide – when pouring the beer.

The nitrogen gives the head a creamy, firm consistency while the CO_2 bubbles impart a turbulent foaminess to the freshly poured draught lager. This is reflected in the advertising slogan chosen for the new brand: Born in a storm.

Mónika Zimányi-Csere, Messer Hungarogáz

Opening of the new test facilities

New competence centre in Krefeld

Germany I In June, CEO Stefan Messer opened the Messer Group's new competence centre in Krefeld as part of the celebrations to mark the company's 120th anniversary. The physicist and Nobel laureate Dr Georg Bednorz, one of the discoverers of superconducting ceramics, was the guest of honour at the official opening. The centre came into being as a result of the merger of the technical centres in France and Germany. Some 25 engineers from Application Technology are on hand to provide their support and process expertise of various applications in the Chemistry/ Environment, Industry, Food and Welding & Cutting segments.

The centre in Krefeld is therefore equipped to deal with gas application issues across different sectors. The centre's equipment includes mills for cryogenic grinding, tunnel freezers for food and machinery for welding. The central gas supply also facilitates large-scale testing at different pressures and temperatures. Besides carrying out work on customer-specific applications, the competence centre also has a training function and supervises bachelor and master's theses. The centre is also available to Messer customers. They can organise specialist events and symposia there.

Thomas Böckler, Messer Group

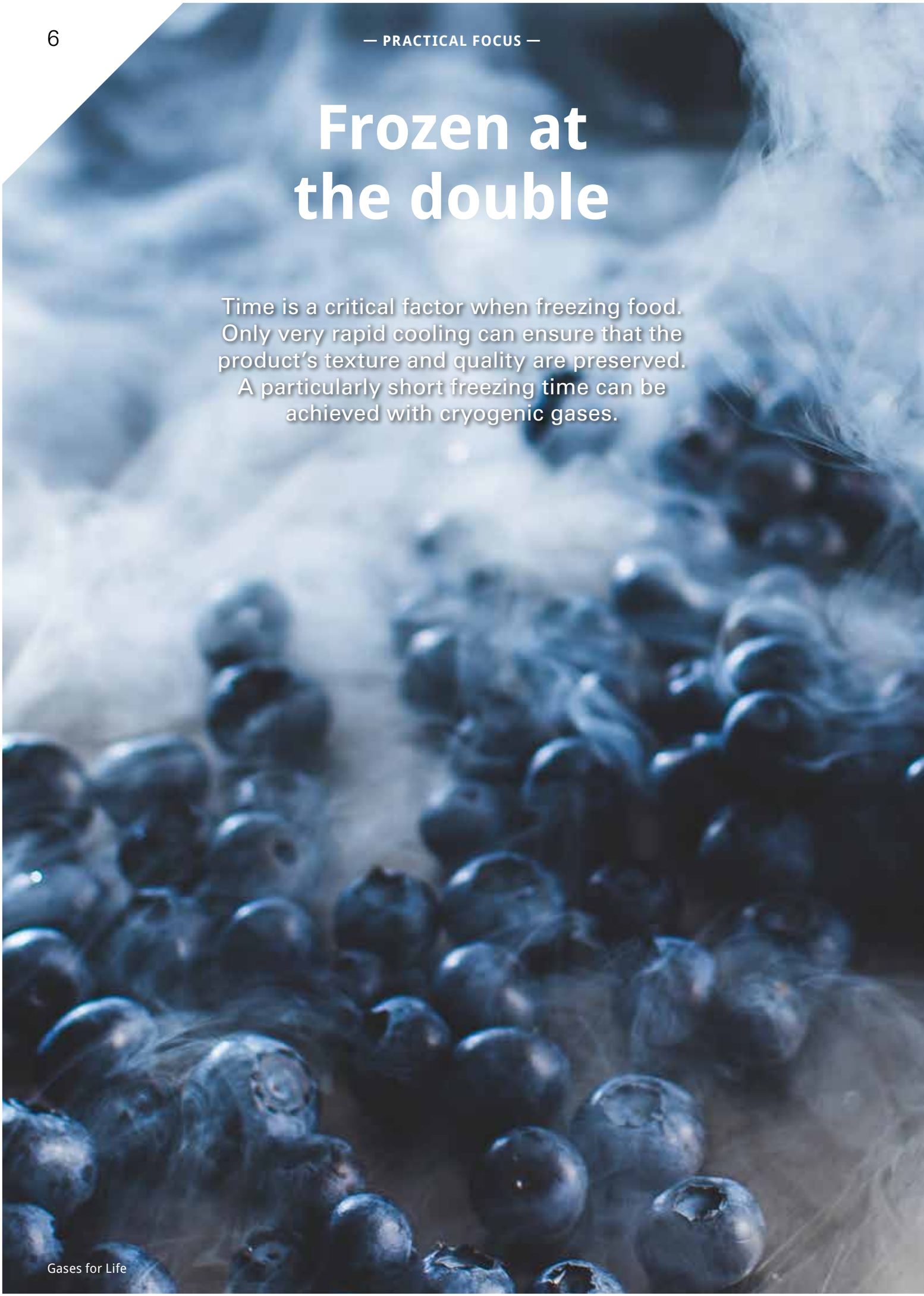
Welding for grape harvesting

Slovakia | Pellenc, a manufacturer of agricultural machinery and electric hand tools, uses Messer's Ferroline C8, welding argon and nitrogen, for metal processing. The gases are used in the production of grape harvester components in Nové Mesto nad Váhom. Messer recently installed a 20-tonne nitrogen tank at the Slovakian site, which has a production area of around 11,000 square metres and a workforce that includes 70 welders. The factory, which belongs to France's Pellenc Group, also has two laser cutting machines.

Michael Holy, Messer Tatragas

Frozen at the double

Time is a critical factor when freezing food. Only very rapid cooling can ensure that the product's texture and quality are preserved. A particularly short freezing time can be achieved with cryogenic gases.

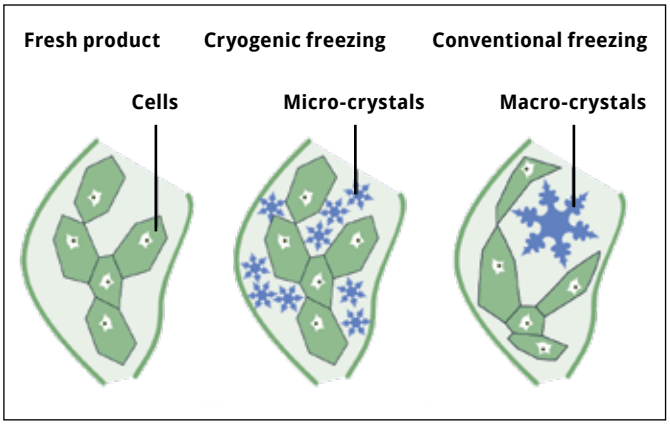


"Cooling in a normal freezer is often a very slow process," says Johanna Mroch, a food applications specialist at Messer, explaining the difference between conventional and cryogenic cooling methods. "This leads to the formation of large ice crystals, which damage the cell walls of the frozen product. Appearance and taste are often negatively affected as a result. A cryogenic process ensures much more rapid cooling. The ice crystals do not get the chance to grow in size, leaving the original quality of the products largely unchanged."

Nitrogen-sauce shower

In practice, the necessary freezing rate can only be achieved with a cryogenic gas. Congelados de Navarra, a company based in northern Spain, uses nitrogen from Messer for this purpose. It is one of the European market leaders for frozen vegetables. 800 employees at four production facilities process the crops produced by 2,000 farmers under cultivation in the region on around 19,000 hectares of land under cultivation. Since it was founded in 1998, Congelados de Navarra has focussed on state-of-the-art technology and innovation and is now the European number one for frozen broccoli as well as grilled and pre-fried vegetables.

The freshly harvested produce is transported directly from the fields to the nearest processing facility. Some of it is blanched, pre-fried or grilled. Nitrogen comes into play for freezing product mixtures consisting of vegetables, rice or pasta, and sauces. The sauces and the liquid nitrogen are sprayed into the cooling drum alternately. This involves the components of the mixture being individually quick frozen and simultaneously coated with the sauce. This technique not only preserves the high quality of the products but also allows them to be individually quick frozen (IQF).



CO_2 and cryobath

Cryogenic freezing is also possible with carbon dioxide. With a storage temperature of around minus 20 degrees, it is not quite as cold as nitrogen, but it produces a comparable amount of cooling energy. If the CO_2 is conducted into the freezer as a pressurised liquid and expanded, the temperature suddenly drops to almost minus 80 degrees. This "expansion" of the gas therefore also absorbs a large amount of heat. About half the carbon dioxide is converted into dry ice. In this solid form, as in the gaseous state, it continues to extract heat from the product. To further speed up the process, you can put the product you wish to freeze through an immersion freezer containing liquid nitrogen at minus 196 degrees. It only takes a few seconds to freeze a substantial layer of the product in this way. This method can be combined with other freezing processes to optimise the overall efficiency of the operation. Johanna Mroch: "This level of freezing efficiency and quality is unattainable without gases."

Editorial Team

Healing fish for China

In South and East Asia, snakehead fish is very popular with chefs and gourmets. What is more, eating it has been shown to aid the healing of wounds. In China, this fish is therefore frequently served to patients before and after an operation as well as to mothers before and after giving birth. It is farmed predominantly in the south of the country, for example by the Yu Ge Zi fish farm cooperative in Zhongshan. The cooperative put a cryogenic cabinet freezer into operation at the beginning of the year. It is cooled with liquid nitrogen from Messer. The gas is sprayed into the freezer, where it evaporates. This phase transition to the gaseous state results in the sudden extraction of large amounts of heat energy from the fish products. Afterwards, the gas, which is still very cold, continues to cool the frozen products.

Jasmine Yan, Messer China

Photo: Siem Desmet

Triple Saver for inox sheets

France | Siem Desmet, the industrial installation specialist and machine builder located in Lambersart, northern France, uses the ternary mixture Inoxline He3 H1 from Messer following successful tests performed under operating conditions. It is used for welding stainless steel sheets. The Triple Saver mixture allows for narrower welds with deep penetration, and thus less distortion as well as a finely rippled weld surface that requires little rework.

Sylvie Demarque and Caroline Blauvac, Messer France

Economical nitrogen compression

Germany | Messer has recently begun supplying liquid nitrogen to Koblenz-based firm Stabilus, one of the world's leading suppliers of gas springs and dampers. Stabilus fills its gas springs with the gas, compressed up to 380 bar, from a ring network. The process of compressing the gas previously involved the use of powerful compressors – with correspondingly high energy consumption and large amounts of waste heat. The liquid gas being used now can be compressed by a pump prior to vaporisation. This is technically more straightforward and less energy-intensive. Electricity consumption is decreased, and maintenance costs are also expected to be reduced significantly.

Lisa-Marie Fierus, Messer Industriegase

Welding gases for metal hoses

Serbia | Turkish business Flex Academy operates automatic welding systems for the manufacture of metal hoses, hollow profiles, steel tubes and moulded parts. At the beginning of the year, Flex Academy opened a new facility in the Serbian town of Priboj. Messer is supplying argon, oxygen, acetylene and the Inoxline H5 and H1 gas mixtures in MegaPack-C6 bundles as well as liquid and gaseous nitrogen.

Branka Malidžan, Messer Tehnogas

Renáta Kozmová

Renáta Kozmová (54) is a welding engineer and a member of the Slovakian Welding Society's committee. She has been working as an application engineer for welding and cutting at Messer in Slovakia since 2006. In this capacity, she also has responsibility for the application of industrial gases.

1. What has been your greatest success at Messer?
I regularly enjoy the success of solving our customers' welding problems across different branches of industry. I am helped in this by my practical experience – I used to work for U.S. Steel – and Messer's wide range of industrial gases. The application of three-component gases has been a particular success.

2. What would you say is a must-see for anyone visiting your country?
Our scenery is very varied. I definitely recommend a visit to the historic city of Košice, the castles of Orava and Bojnice as well as the natural beauty of the High Tatra.

3. What three things would you miss least?
Envy, cigarettes and bleak autumn days.

4. Which famous person would you like to spend an evening with?
Since I am very interested in history, I would like to spend an evening with Queen Elizabeth II. She represents the history of England and links the past with the present.

5. What else would like to learn or study?
I would like to visit the Canaries and get to know the flora and fauna of these remarkable islands.

Citizen with responsibility
Hans Messer did not content himself with managing his company as an active and conscientious entrepreneur. As a professed Catholic and someone with a strong sense of civic responsibility, he was also extensively involved in social and cultural matters as well as issues relating to industrial policy. He was the President of the Frankfurt Chamber of Commerce (IHK) for ten years, helping it attain a new level of importance in the sphere of economic policy. According to the Frankfurter Allgemeine Zeitung newspaper, his work there was characterised by "unspectacular efficiency" and "no-nonsense cordiality".

For four years, he brought the same qualities to bear in his role as Vice-President of the Association of German Chambers of Commerce and Industry (DIHT). He also spent three years as President of the International Bureau of Chambers of Commerce. After the demise of the Eastern bloc, he made a major contribution to the development of economic exchange with the newly independent countries of Eastern Central Europe and was active in numerous bilateral chambers of commerce. He received several honours for his diverse activities, including the City of Frankfurt's Badge of Honour, the Wilhelm-Leuschner Medal and the Republic of Austria's Grand Decoration of Honour in Gold. He was appointed Honorary Senator of Darmstadt University of Technology and Honorary President of the Frankfurt Chamber of Commerce (IHK).

1945

Hans Messer takes his first steps in the family business after the Second World War and sets about the task of rebuilding the arc welding electrode department.

1946

Messer Schweißtechnik GmbH established.

1963

The shipbuilding industry becomes an important customer after the war. A fully automatic machine for simultaneous cutting of two uneven curves was designed for this sector.

Hans Messer.
From ruins to global firm

1945 marks one of the major turning points in world history: it saw the end of the Second World War and the beginnings of a completely new world order. Germany lay in ruins, having started and lost the war. In this fateful year, Hans Messer began his career in his father's company. By 1953, he was already running the business.

Reconstruction was followed by the economic miracle, which also saw Messer enjoy vigorous growth. The company's success was based in no small part on constant technical innovation. In order to secure the capital needed for dynamic international development, Hans Messer initiated the company's merger with the Hoechst Group. Even as a minority shareholder, he remained in charge of the business and ensured that the family had a key role in the new setup.

Continued on page 12

May 1964

On May 27th US Senator Edward Kennedy visits the Messer factory site. The year before, his brother, John F. Kennedy, had already driven along the same route past the factory site in the presidential limousine.

Sept. 1964

Basic agreement about friendly cooperation between Messer and Hoechst.

A wide variety of transport vehicles played an important role in rebuilding the industrial gases business in the 1950s.

Like many other young people of his generation, Hans Messer had to grow up very quickly. He did his school-leaving exams during the war in 1942, aged just 17. After studying chemistry for three terms and spending half a year at the Reichsarbeitsdienst labour service, he was called up and sent to the Eastern Front in the autumn of 1943. There he witnessed the retreat and collapse of the Wehrmacht. Thanks to fortunate circumstances, he managed to evade capture and make his way home on foot from the territory of the former Czechoslovakia. Although seriously ill when he arrived back in Königstein near Frankfurt, he started working in his father's business virtually straight away. In August 1945, at just 20 years of age, he took charge of the arc welding electrode department. The damaged factory buildings and facilities had to be restored and production built up again.

Every pair of hands was needed following the defeat, and with post-war reconstruction getting under way, business started to develop with a new dynamism. In the spring of 1946, Hans Messer became the founder and first managing director of Messer Schweißtechnik GmbH. Even though he probably had more than enough to do in that capacity, he

In 1956, Adolf Messer GmbH begins to capture the shipbuilding industry and the shipyards with its fully automatic Sicomat 1:1 flame cutting machines. The Double Sicomat (1960) even allows two metal plates to be cut at the same time.

1965

Merger of Adolf Messer GmbH with two Knapsack Griesheim AG businesses to form Messer Griesheim GmbH.

1971

Expansion of industrial gases division.

1973

Oil crisis has impact on Messer: annual surplus drops from 11.2 to 3.5 million deutschmarks.

By acquiring Burdett Oxygen Company, Messer Griesheim wants to open up the industrial gases market on the East Coast of the United States. Hans Messer and Gerd Grabhorn from the management team have their work cut out to persuade the board of directors of Hoechst to approve the deal.

simultaneously began a course of study in business management, which he completed in 1952 when he got his PhD. One year later, his father Adolf gave him overall management responsibility for the family business. Hans Messer was only 28 years old at the time. Just like when he had started working for the company, he was immediately confronted with considerable challenges.

Bottleneck with regard to liquidity and aluminium plates

The company was unable to complete four air separation units and deliver them as agreed. The aluminium plates for the heat exchangers were supposed to have been delivered from the USA, but Washington had imposed an export ban on strategic goods due to the Korean War. A creditor bank had gone into receivership and its loans were suddenly due. In the meantime, other capital injections with a short-term tie-up were running out, and to offset this, the management had to agree to a gas industry competitor's silent partnership, even if just temporarily.

Hans Messer managed to steer the company ship safely through these treacherous waters. He found a way to build the heat exchangers without American aluminium plates and keep the customers on board in spite of the late delivery. The liquidity bottleneck was cleared and the company was able to profit from the incipient economic miracle.

One of the most important customers was the resurgent steel industry. Messer further developed its cold scarfing systems for this sector, which allowed crude steel to be machined below the rolling temperature. New flame cutting machines were developed for cutting the flowing steel strand and dividing the steel ingots. The fact that the steelworkers were increasingly using oxygen instead of air to refine the liquid steel allowed Messer to sell ever greater quantities of this gas. In 1956, the first Sicomat flame cutting machine, which was controlled photoelectrically on the basis of design drawings, was delivered to a major shipyard. The introduction of perforated trays made air separation much more efficient, and at the same time, remote control systems for automatic process control were successfully designed for the first time. Technological advances were also made in gas separation. State-of-the-art facilities for liquid nitrogen scrubbing or for separating cracked methane were supplied to US chemical and oil companies among others.

Crystal chandelier becomes share capital

From 1950 to 1960, turnover increased threefold to almost 50 million deutschmarks. New foreign subsidiaries in Belgium, Denmark, India, Britain, Mexico and Spain also contributed to this growth. The setting up of a US subsidiary was hampered by protracted dollar-exchange approval procedures.

Continued on page 14

1975

Purchase of Burdett Oxygen Company forms the foundation for increasing market share gains on the East Coast of the USA.

1976

Foundation of a subsidiary in Venezuela.

1978

Foundation of Messer Griesheim Norsk Teknisk and of Nippon Messer Griesheim in Tokyo.

On 10 January 1997, in his last will and testament, Hans Messer bequeaths all the shares he still holds in Messer Industrie GmbH to his children prior to his death. He appoints his wife, Ria, as trustee.

Hans Messer solved the problem by packing two crystal chandeliers and a Leica camera when he travelled to New York in 1952. The proceeds from the sale of these items became the original share capital of the American Messer Corporation.

In the early 1960s, the economy cooled again – in Germany and around the world. This period became a phase of consolidation for Messer. However, it also showed the limits of the growth that can be achieved by one's own efforts. This gave rise to the idea of a merger with a strong partner. Thanks to technical cooperation in the manufacture of cutting nozzles, Messer had contacts with Knapsack Griesheim AG. With a similar setup to Messer in terms of product range and core activities, it was a subsidiary of Frankfurt-based Hoechst AG, one of the world's leading chemical and pharmaceutical companies at the time.

Messer as part of a group

The Hoechst Group's top management showed an interest in establishing a powerful gases division. Hans Messer and the CEO of Hoechst, Karl Winnacker, built up a trusting relationship. In September 1964, they signed the merger agreement that brought Messer Griesheim GmbH into being the following

1979

Hans and Ria Messer, along with their children, sign an agreement in which they undertake only to jointly exercise their voting rights in Messer Industrie GmbH.

Foundation of Messer Griesheim Belgium GmbH.

1980

Start of production of welding consumables in Brazil and opening of a new air separation unit in Pennsylvania.

Dec. 1980

Hans Messer appointed president of Frankfurt Chamber of Commerce.

January. The chemicals group held two thirds of the share capital, with the Messer family holding the other third. In spite of this clear distribution of mass, Hans Messer managed to secure himself and the family decisive influence within the joint venture. He became its first managing director and would remain in this position "as long as he himself wished to do so". Fundamental decisions regarding company policy would require a majority vote of 75 per cent, giving the family a de facto right of veto.

Against the background of a weak economy, turnover fell slightly in the first years of Messer Griesheim's existence. However, the company used this phase for rationalisation and modernisation. The level of investment even increased and the business was evidently well prepared for the next phase of growth. By 1970, turnover had already reached 485 million deutschmarks. A number of new on-site facilities – most of them still run under the name "Hüttensauerstoffwerk" (steelwork oxygen plant) back then – contributed to the positive result. One of them was delivered to the European Space Centre in French Guiana. At the same time, new areas of application for gases were being added to the company's portfolio: modified atmosphere packaging of food, cold grinding with cryogenic nitrogen, (waste-)water treatment with oxygen and ozone, and enhancing the efficiency of combustion processes by supplying oxygen. The first CO_2 gas laser cutting machines were put on the market. Geographical expansion also continued, with new subsidiaries in Brazil, Japan, Norway, Austria and Venezuela, as well as additional units in the USA.

Billion mark passed

In 1978, turnover exceeded a billion deutschmarks for the first time and even reached 1.7 billion deutschmarks in 1984. The main driver of growth was the gases business, accounting for 70 per cent of volume in the 1980s. New applications for the separated air components continued to emerge all the time, for instance in new technologies in the fields of electronics, lighting and measurement technology and medicine. For example, the first cryobanks for storing organic substances were set up. And at Messer Griesheim a process was developed for cleaning oil-contaminated soils using oxygen.

The management also saw the opportunities that presented themselves with the fall of the Iron Curtain in 1989. It took over former state-owned gas suppliers or acquired a stake in companies in the former East German states, Poland, Hungary, the Czech Republic and Slovakia, and later in Croatia and Slovenia as well. Within a short space of time, entire countries were thus gained as new sales territory. In this phase of European expansion, Hans Messer stepped back from management in 1993 at the age of 68, leaving his successor an enterprise in excellent shape.

Years before, he had ensured that the family spoke with one voice on any matter relating to the company. In 1979, all family members entitled to vote and the Adolf Messer Foundation signed an agreement that committed them to casting their votes jointly and designated Hans Messer as the principal voting member. He remained a member of the shareholders' committee and the supervisory board until his death in 1997. His work as an industrialist proved more enduring than the post-war order that was just emerging when he started out.

Editorial Team

1989

Acquisition of ODV in Hungary and foundation of Hungarian firm MG Hungarogáz, followed by eastward expansion of market in subsequent years.

1990

Establishment of Messer in the former GDR with the purchase of Technische Gase Leipzig plants at 14 operating sites.

1993

Hans Messer takes a step back from running the business and hands over the reins to a manager from outside the family.

Conserving cold

In a sense, cold is negative energy. But as anyone who owns a fridge will know, generating and conserving it consumes electricity. Conserving the inherent cold of liquid nitrogen helps cut costs and protect the environment.

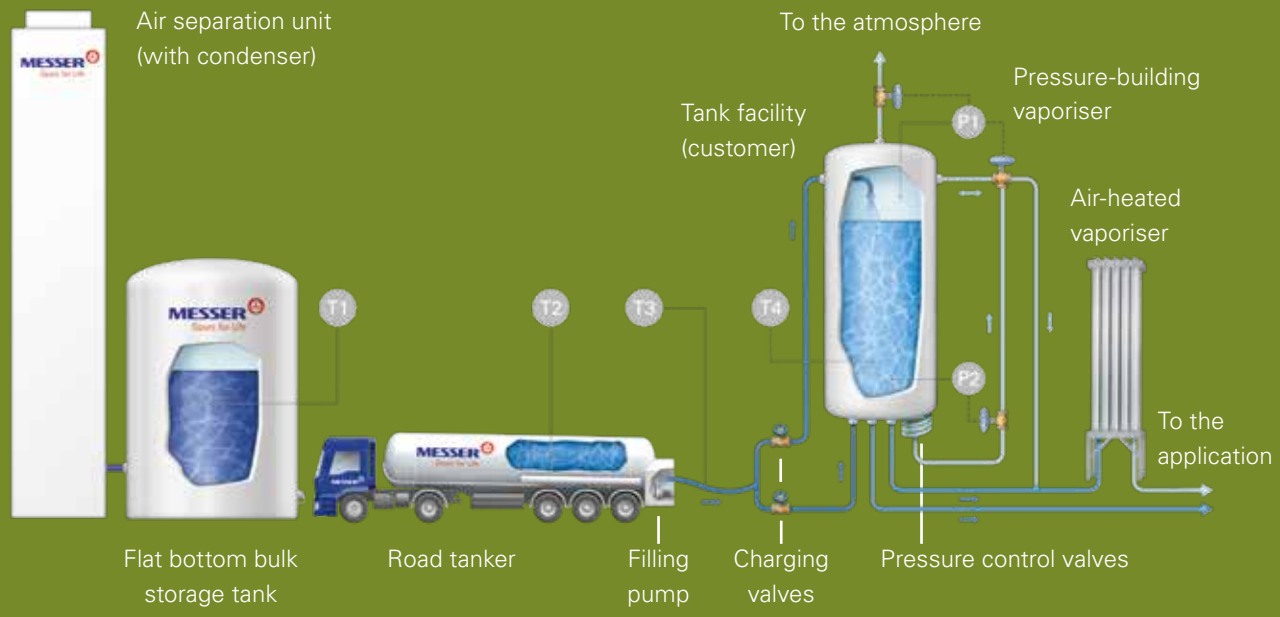
Nitrogen is predominantly produced in air separation units. The gas is cooled to minus 196 degrees Celsius and liquefied in these units, a process that consumes a significant amount of electricity. This energy input is not lost, however; it can be put to good use by harnessing the low temperatures to extract heat from other substances. Terms such as cooling energy and inherent cold are therefore also used in the world of gases, even though strictly speaking they are not quite correct in terms of the physics.

Many users require nitrogen in gaseous form. For them, it can therefore also be allowed to vaporise again straight away and used to fill steel cylinders, which is what actually happens with some of the gas. However, in the case of larger quantities, it is economically and ecologically much more efficient to deliver the nitrogen in liquid form – irrespective of the form in which it is used.

Unavoidable increase in temperature

If the temperature of the liquid nitrogen increases while it is being transported, transferred or stored, the cold loss often leads to a loss of gas as well. "Liquid gas vessels are designed for a relatively low pressure, normally between 6 and 18 bar," explains Stefan Terkatz, Head of Technical Service at Messer.

Cold and gas losses in liquid nitrogen logistics



- T1 Condensing temperature
- T2 Temperature increase through ingress of heat during transportation
- T3 Temperature increase through the filling pump
- T4 Temperature increase through pressure-building vaporiser and ingress of heat at the customer's tank
- P1 Nitrogen pressure in the headspace of the storage tank
- P2 Bottom pressure at the withdrawal point (input pressure for the application)

The inevitable cold loss that occurs during the transportation and storage of liquid gases can be reduced through optimised logistics. All the components shown here play an important role in this regard. The product transfer process at the customer's site offers the greatest optimisation potential.

"With each degree of increase in temperature, some of the nitrogen vaporises and the pressure inside the vessel increases. As soon as it reaches the limit value, the pressure relief valve opens and some gas is lost."

If it is specifically the nitrogen's inherent cold that is needed, for instance for concrete cooling or solvent recovery, then it must be supplied to the customer in liquid form, regardless of the quantity involved. It is then a question of not only preventing gas losses but also of making maximum use of the original inherent cold for the application in question. However, according to the laws of thermodynamics, a certain cold loss is inevitable during delivery and storage. In the extremely well insulated transport and storage vessels with their vacuum walls, this is already close to the minimum that is technically feasible. The critical point is the transfer of liquid nitrogen from the road tanker into the customer's tank. As a rule, this is where the greatest heat input occurs.

Ten per cent saving with thermodynamics

If a tank or vessel is charged with liquid nitrogen from the top, the liquid nitrogen first encounters gaseous nitrogen in the headspace. This gas "absorbs" some of the cold and becomes partly liquid again itself. To a certain extent, this is a desirable phenomenon: otherwise the pressure in the headspace would rise too much due to the process of topping up raising the fill level of the liquid gas. However, too much liquefaction is undesirable because it leads to the liquid fraction also being heated up, resulting in a loss of available cold. That is why the tank is simultaneously filled from the bottom as well.

"The crucial thing here is to find the optimal balance between top and bottom. The quantities of gas present in the tank and those to be added play a role in this, as do their temperatures and, in particular, the tank pressure," explains Dr Friedhelm Herzog, Specialist for Industrial Gases Applications at Messer. "We have developed a calculation program that allows the optimum settings to be determined and adjusted precisely." The right use of thermodynamics makes a big difference: compared to a standard supply, a finely-tuned system can lead to a saving of up to ten per cent in terms of cooling energy and, therefore, quantity consumed.

Editorial Team

Liquid gases for steel production

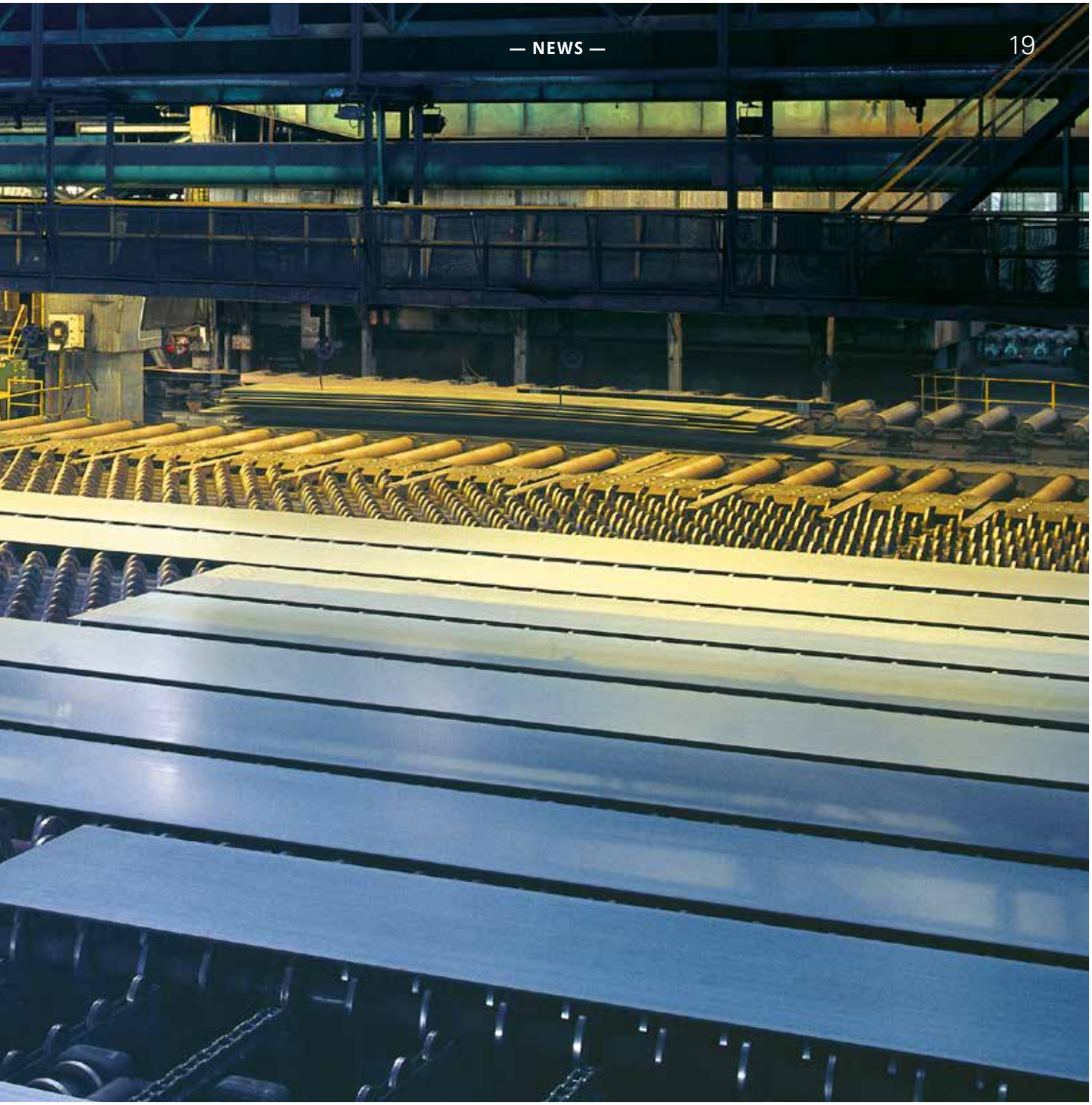
Czech Republic | Messer supplies liquid nitrogen and liquid oxygen to steel producer Vítkovice Steel. The company is a leading European manufacturer of rolled steel products and the largest manufacturer of steel plates in the Czech Republic. The 3.5-metre quarto rolling mill's main products include heavy plates and cut shapes, with a flame cutting centre available for their manufacture. In addition, stacked sheets and plates are produced, which are processed in a section rolling mill. Oxygen is used for the manufacture of flame-cut slabs, plates and shapes and for the surface treatment of slabs. Nitrogen is used in place of compressed air in the rolling line's pneumatic systems and in the hydraulic systems to protect the hydraulic fluids from oxidation.

Dana Köpplová, Messer Technogas

Powerful and flexible dry ice blasting

Switzerland | The new ASCOJET 2008 Combi Pro gives operators the choice between two types of blasting: pure dry ice blasting and combination blasting. In the case of the latter, an abrasive agent is added to the dry ice pellets. Another strong point of the new unit is that it lets you choose between single-hose blasting and particularly powerful double-hose blasting. "You can't get more flexibility and power than that in a dry ice blaster," says a confident Marco Pellegrino, ASCO Managing Director.

Simone Hirt, ASCO CARBON DIOXIDE



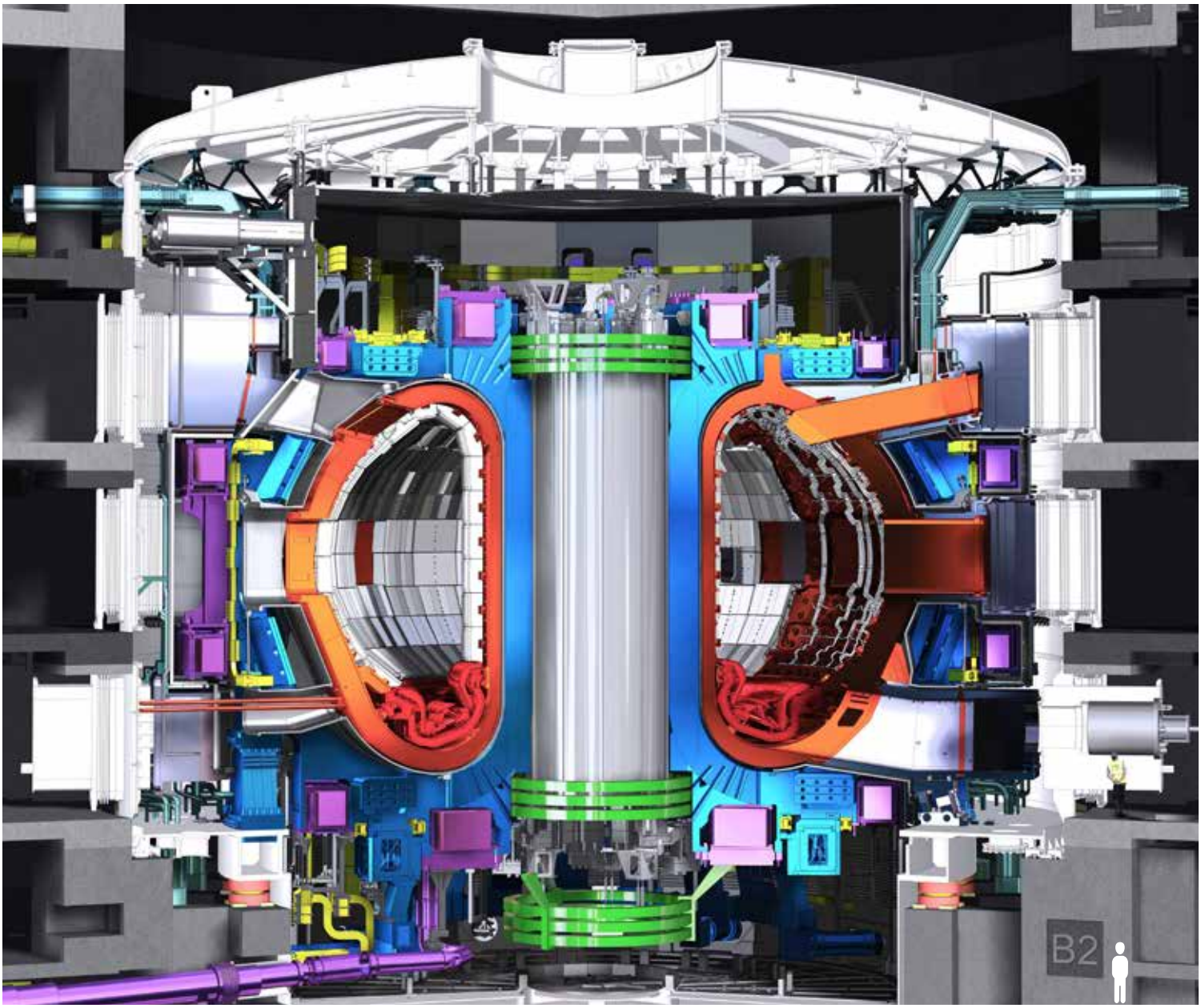
First laser welding robot in Slovenia

Slovenia | Klas metal d.o.o. has installed Slovenia's first laser welding robot in Kamnik. The machine, a Trumpf TruLaser Robot 5020, uses Messer's Argon 5.0 shielding gas. Laser welding of thin sheet metal produces at least the level of quality associated with TIG welding combined with greatly enhanced capacity. Klas metal d.o.o. uses the machine to weld high- and low-alloy steel, aluminium and titanium sheet metal. The laser welding facility significantly increases productivity.

Alenka Mekis and Edvard Bjelajac, Messer Slovenija

Cooling for mankind's dream

The ITER fusion reactor is meant to open the way to limitless energy production. Its superconducting magnetic coils are currently undergoing cold testing. The necessary cooling is provided by Messer gases and Messer technology.



ITER's magnetic coils weigh around 300 tonnes each with their housing. Next to them, a person (bottom right) appears tiny. Ten magnets are from Europe, nine from Japan. Testing of the European magnets will take approximately three years.

Self-sustaining nuclear fusion is one of modern mankind's dreams: When hydrogen atoms fuse to form helium, large quantities of energy are released, with absolutely no greenhouse gases and without highly problematic radioactive waste. The weak irradiation of metal parts resulting from neutron bombardment can be technically contained without any difficulty.

The use of this virtually inexhaustible energy source would solve global problems in one fell swoop. That is why the EU along with Switzerland, the USA, China, South Korea, Japan, Russia and India have got together in a rare example of worldwide cooperation. In Cadarache, in the South of France, they are jointly developing the International Thermonuclear Experimental Reactor (ITER), which is due to go into operation in 2025.

The contracts for the project are awarded by F4E (Fusion for Energy). F4E, based in Barcelona, is responsible for providing Europe's contribution to ITER.

Extreme heat and cold

Nuclear fusion takes place at temperatures of several million degrees Celsius, similar to the heat that is generated by the fusion reaction occurring inside the sun. Since no material on earth could withstand this, the deuterium/tritium plasma is kept suspended in an extremely strong magnetic field. The magnets are only capable of reaching the required field strength by means of superconductivity, which in turn necessitates a very low temperature.

Several tests to prove the low temperature suitability are currently being carried out on some of the magnetic coils using a cold test facility of Bilfinger Noell GmbH. The plant is operated by the Italian specialist plant manufacturer Simic. Simic has produced key components of the plant and provides the infrastructure for the tests. The cooling technology for the facility was supplied by Messer.

In order to protect the sensitive coils, they are inserted into a vacuum-insulated cryostat for the test and cooled very slowly and evenly by 0.5 degrees per hour. This takes a while, given that the target temperature is minus 193 degrees Celsius (80 Kelvin).

Patented cooling system

"We have developed and patented a process for precisely controlled cooling specifically for these tests," says Dr Friedhelm Herzog, Specialist for Industrial Gases Applications. "The coil itself is cooled with helium, the ideal coolant for this task. We use liquid nitrogen to cool the noble gas to the desired temperature. The nitrogen's evaporation pressure can be lowered by means of a vacuum pump. This allows us to further reduce the normal pressure boiling point of 77 Kelvin and create a bigger temperature difference for cooling when necessary. The cooling process is very efficient as both the evaporative cooling effect and the "perceptible cold" – the low temperature of the vaporised gas – are harnessed in the facility. The challenge here is to maintain the temperature reliably in an extremely narrow corridor."

This task involves a compressor and numerous sensors and valves as well as several heat exchangers, which are arranged in a cleverly thought-out system structure. The decisive factor in reaching the target temperature with the required cooling effect is the nitrogen's evaporation pressure.

The process of cooling the coils, the actual test, the equally careful process of reheating them as well as the necessary insertions and removals take three months per run. The entire test cycle will take three years from start to finish. Further coil modules are being tested in Japan. "When you look at the complexity of the cooling technology for the functional testing of these few modules alone, you can't help but have great respect for the sheer scale of the ITER project as a whole," says Dr Herzog. "We are proud to have been able to contribute to it."

Editorial Team

Patented cooling technology from Messer

Welding gases for storage equipment

Bosnia-Herzegovina | Messer has gained the Ferretto Group as a new customer for welding gases. The company's production site in Usora has also been equipped with a gas supply system featuring 50 welding stations. Ferretto is a leading Italian supplier of storage and intralogistics systems. Messer is also due to start supplying oxygen and nitrogen for new laser cutting machines by the end of the year. Ferretto plans to expand production significantly at its Usora site.

Ana Perić, Messer Mostar Plin

Interconnecting station in Arleux-en-Gohelle, where natural gas is analysed

Calibration gases to determine the calorific value

France/Belgium | GRTgaz operates one of the longest high-pressure natural gas transmission networks in Europe, with 32,414 kilometres of pipes. The composition of natural gas, which is a mixture of alkanes and inert compounds, may vary on an hourly basis depending on its origins. Hence, its Gross Calorific Value* (GCV) varies as well. As GCV is used for billing along with the volume of gas delivered, GRTgaz uses gas chromatographs at control points to accurately determine it. Calibration gases from Messer are used to calibrate these analysers. These gases are produced in the Messer specialty gas laboratory in Zwijndrecht, Belgium. Messer also provides high purity operating gases, mainly helium, for the functioning of these chromatographs.

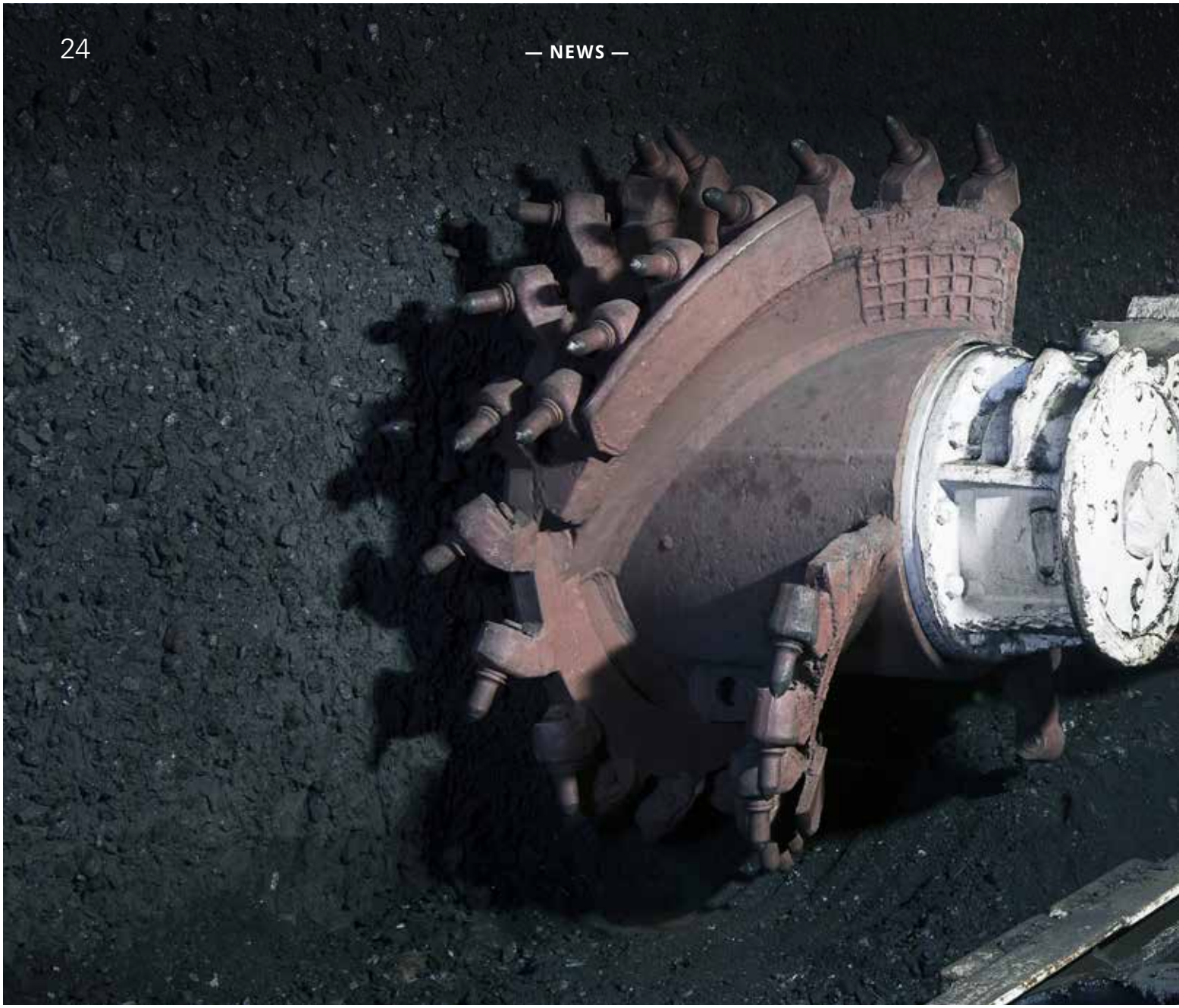
Caroline Blauvac and Eric Mariel, Messer France

**Gross Calorific Value is the amount of heat produced by the combustion of one cubic metre of gas at atmospheric pressure, the gas and air for the combustion being at a temperature of 0 degree Celsius and the by-products of combustion being brought to that temperature.*

Wide range of welding gases

Switzerland | Messer is installing a liquid nitrogen supply for A. Späni AG in Raron. Späni is a specialist in uncut metalworking and already procures the cylinder gases Inoxline He3 H1, forming gas, welding argon, oxygen and nitrogen from Messer. They are needed for, among other things, tungsten inert gas welding (TIG), gas metal arc welding (MIG/MAG), AC/DC welding, robot welding and longitudinal seam welding. Sheet metal and tubular constructions made of any alloy are welded with the aid of robots at Späni. The firm also runs a Messer gas depot, where other customers can collect their cylinder gases.

Reiner Knittel, Messer Schweiz



Energy balance improved by EcoVap

Germany | Messer has won the tender to supply nitrogen to special printing specialist Constantia Flexibles in competition with the previous supplier. The factors that swung the customer's decision in Messer's favour included the provision of expert advice as well as an energy-saving gas supply concept. Messer set up a secondary supply comprising a 50,000-litre gas tank and four vaporisers to ensure an uninterrupted gas supply during the changeover. A new 60,000-litre tank has now been installed at the factory site in Wangen im Allgäu. The liquid nitrogen is vaporised with the EcoVap process. This involves the nitrogen's inherent cold being fed into the existing cooling system, thereby reducing the refrigerating machine's electricity consumption. This improves the company's energy balance and reduces CO_2 emissions. The nitrogen is used to inert the drying process in UV-cured printing machines. It displaces the atmospheric oxygen that would disrupt the curing of synthetic paints by polymerisation. Constantia Flexibles is the world's fourth-largest manufacturer of flexible packaging solutions for the food and pharmaceutical sectors.

Lisa-Marie Fierus, Messer Industriegase

Nitrogen provides protection underground

Poland | Messer maintains eight pressure swing adsorption (PSA) units for nitrogen production at various coal-mining sites in Poland. The PSAs are integrated into sets that form part of the fire protection and rescue system. Some of the gaseous nitrogen is mixed with carbon dioxide. The gas is conducted via pipelines into the galleries, where it is used to render the active mining sites inert and extinguish endogenous fires. To ensure safety below ground, it is crucial that the PSA units operate reliably all the time and that the supply is guaranteed during maintenance as well. Messer provides an uninterrupted gas supply and ensures economically efficient operation of the units.

Dr Andrzej Ploch, Messer Polska

Integrated into the return line of a refrigerating installation, the EcoVap vaporiser transfers the cooling energy of the liquid gas to the circulating coolant.

Broad participation

Marta Pardo, Director of Communication and Institutional Relations at ATEGI, part of **MONDRAGON Corporación Cooperativa**

Could you give us a brief introduction to your company?
ATEGI is part of the MONDRAGON Group, a combine of 268 cooperatives and businesses operating in the industrial, financial and sales sectors. With 73,635 employees and a turnover of almost 12 billion euros, it is one of the largest companies in Spain. ATEGI was formed within the Group in 2001 as an initiative for joint buying. More than 300 businesses and groupings are now involved in ATEGI – including from outside the Group –, for whom we offer an international buying service.

What plans does ATEGI have?
Last year, we grew by 18 per cent globally and by 26 per cent in terms of international buying. In the process, we generated average savings of 15 per cent for our customers. By 2020, we want to achieve annual growth of ten per cent. We place particular emphasis on the continuous intensification of our customer focus, the provision of high value-added services and the expansion of our international activities. ATEGI is always open to other businesses that are interested in our buying process. We want to strengthen our position as a Spanish reference company in purchasing management.

Why did you choose Messer as your supplier of gases?
ATEGI was looking for a partner who would guarantee the best conditions for its customers within the Group. Apart from a competitive price, we consider aspects such as know-how and technical support, including the ability to offer alternative solutions. The service must be able to meet present and future requirements. We are convinced that Messer can do all of this, providing added value that enhances our customers' competitiveness.

What do you produce that involves the use of gases?
Among other things, our group produces steel, machine tools, car parts and electrical components.

What are the gases used for?
We have customers in more than 25 branches of industry. The gases are not only used for welding processes but also for a range of other applications such as oxyfuel and plasma welding, laser cutting, pressure application, metal contraction, heat treatment and metal casting, to name but a few.

Marion Riedel, Messer Ibérica

Win a delicious prize

Simply answer our question about this issue of "Gases for Life" and win a food hamper with seasonal specialities:

Who visited Messer in May 1964?

Please send the correct answer by e-mail with the subject line "Gases for Life Competition" to: **angela.bockstegers@messergroup.com**
The deadline is 16 November 2018. Please include your name and address. The competition is unfortunately not open to employees of the companies of the Messer Group and their families. In the event of multiple correct answers, a draw will determine the winner. The result of the draw is final and not subject to appeal. By registering to take part in this competition, you consent to your name (first name, surname) as well as your place of residence (town, country) being published in the next issue of Gases for Life, should you win. The participant is responsible for the accuracy of the information provided. No liability is assumed in connection with the publication of the name.

Congratulations!

The winner of the competition in our "Gases for Life Special Issue" is **Alexander Fuchs** from **Herbertingen, Germany.**
The correct answers were:
1. Argon; 2. Hydrogen;
3. Scheele; 4. Hydrogen;
5. Coffee house;
6. Three

Congratulations!

The winner of the competition in issue 24 is **Frank Giesert** from **Wolfsburg, Deutschland**.
The correct answer was:
"300"

The "Gases for Life" editorial team

From left to right:
Michael Holy, Dr Joachim Münzel, Marlen Schäfer, Reiner Knittel, Wan-Chien Wei, Dr Christoph Erdmann, Dr Bernd Hildebrandt, Annette Lippe, Diana Buss, Dr Milica Jaric, Roberto Talluto, Zsolt Pekker, Johanna Mroch und Angela Bockstegers (not pictured: Benjamin Auweiler, Lisa-Marie Fierus, Peter Laux, Kriszta Lovas and Marion Riedel)

PUBLISHED BY

Messer Group GmbH
Corporate Communications
Gahlingspfad 31, 47803 Krefeld, Germany

EDITORIAL TEAM

Angela Bockstegers – Editor-in-chief
Phone: +49 2151 7811-331
angela.bockstegers@messergroup.com
Diana Buss – Editor-in-chief
Phone: +49 2151 7811-251
diana.buss@messergroup.com
Benjamin Auweiler, Corporate Office
benjamin.auweiler@messergroup.com
Dr Christoph Erdmann, Engineering & Production
christoph.erdmann@messergroup.com
Lisa-Marie Fierus, Region Western Europe
lisa-marie.fierus@messergroup.com
Dr Bernd Hildebrandt, Application Technology
bernd.hildebrandt@messergroup.com
Michael Holy, Region Central Europe
michael.holy@messergroup.com
Dr Milica Jaric, Specialty Gases
milica.jaric@messergroup.com
Reiner Knittel, Region Western Europe
reiner.knittel@messergroup.com
Peter Laux, Corporate Office
peter.laux@messergroup.com
Annette Lippe, Engineering & Production
annette.lippe@messergroup.com
Kriszta Lovas, Region South Eastern Europe
krisztina.lovas@messer.hu
Johanna Mroch, Application Technology
johanna.mroch@messergroup.com
Dr Joachim Münzel, Patents & Trademarks
joachim.muenzel@messergroup.com
Marion Riedel, Region Western Europe
marion.riedel@messergroup.com
Marlen Schäfer, Corporate Office
marlen.schaefer@messergroup.com
Roberto Talluto, Application Technology
roberto.talluto@messergroup.com
Wan-Chien Wei, Medical Gases
wan-chien.wei@messergroup.com

CONCEPT AND REALISATION

Brinkmann GmbH
Mevissenstr. 64a, 47803 Krefeld, Germany

TEXT AND EDITING

Klartext: von Pekker!
Römerstr. 15, 79423 Heitersheim, Germany

TRANSLATION

Context GmbH
Elisenstraße 4 – 10, 50667 Cologne, Germany

Photo: Château Lafite Monteil

Argon protects Bordeaux flavor

The soil and the climate around Bordeaux are amongst the biggest friends of wine. They create the special drops that are sought-after by connoisseurs all over the world. The Château Lafite Monteil vineyard in the Bordeaux Supérieur region was first acquired in 1894 by the Eiffel family, whose most famous scion gave his name to the world-famous tower in Paris. Cellar Master, Edouard Le Grix de La Salle ensures that the wines succeed just as well as one of the most appreciated wine regions in France: "From the harvest to bottling, we want to fully control the process in order to get the most out of our grapes and preserve the incomparable character of Bordeaux wine." He relies on Messer Gourmet A80 to fight against one of the greatest enemies of wine, oxygen. This gas mixture, made of argon and carbon dioxide, is in the tanks and forms a blanket on top of the young wine. This prevents oxidation and protects the unique flavours.

Eric Theet and Jérémie Cohen, Messer France

www.messergroup.com