No. 08 Issue 01 | February 2013

MESSER
Gases for Life

Gases for Life

The industrial gases magazine

Inerting and cooling with nitrogen

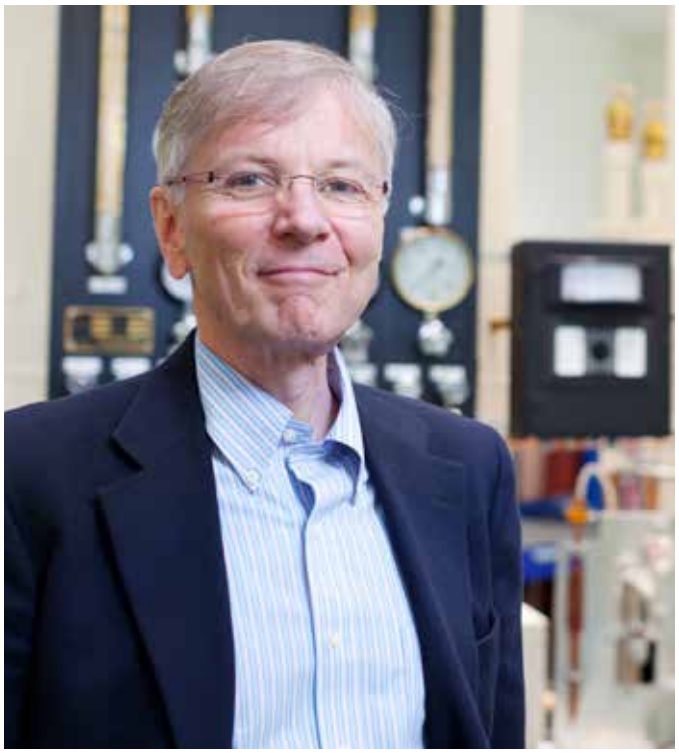
The protective gas

Stage technology:
Major roles

Engine cleaning:
Clean and measurable

Internet:
The online world of gases

Dear Readers,



Visible from afar: the "We make gases from air" mega poster can be seen on the Gasometer in Oberhausen from October 2012 to March 2013.

We can sum up our core competence in one short and simple sentence: "We make gases from air". And this is exactly what it says on a mega poster which has been displayed on the side of the Gasometer cultural monument in Oberhausen since the end of October. A huge window with a view of a glorious blue sky makes the poster suitably eye-catching; fluffy white cloud formations spell out the abbreviations O_2 and N_2, two of our most important industrial gases.

Measuring almost 1,500 square metres, which is roughly the equivalent of five and a half tennis courts, the mega poster is virtually impossible to miss, thereby bringing industrial gases to the attention of a broad target group. The background and reason behind this high-profile promotion is to Messer's sponsorship of the "Big Air Package", an installation by wrapping artist Christo which can be seen in the Gasometer from March 2013. In this installation, Christo will turn what he considers to be the most valuable substance on Earth, of air, into the subject of his art, wrapping it in a fabric envelope holding 177,000 cubic metres, which can be experienced both from the inside and the outside.

You can discover here and now how nitrogen, one of the "stars" of the mega poster, benefits us in our everyday lives. And if you would like to find out more about industrial gases and their applications in general, then I recommend that you take a look at our growing online information offer.
The "GaseWiki" section in this issue provides you with an overview.

I hope you enjoy reading this issue of "Gases for Life".

Stefan Messer

Contents

Cover photo:
Edgar Arens, Technical Director at Gerhardi Alutechnik, uses nitrogen to create particularly smooth surfaces

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.

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Hungary: CO_2 and nitrogen for beverages

Hellish energy

Hell Energy Magyarország Kft. is the largest supplier in Hungary's energy drinks market. Hell Energy Drink is produced, carbonated and filled into cans in Szikszó, from where it is delivered to customers across Hungary and exported to a further 28 countries. The company currently operates two modern filling plants for cans and PET bottles. The pressure of the PET bottles is stabilised using nitrogen. Hell Energy gets the gases from Messer.

Mónika Csere, Messer Hungarogáz

Refreshing as hell – Gabriella Újván at Messer in Hungary thinks so too.

France: Nitrogen cooling for food transportation

Quiet refrigerated truck

Conventional refrigerated trucks are noisy: the engine and cooling compressor make a considerable racket, which can cause a great deal of disturbance, especially in town centres and when making deliveries at night or early in the morning. Several European countries have therefore banned trucks with a noise level above 59 dB(A) from their city centres. This limit

Cool and quiet transportation: a truck operated by French supermarket chain Carrefour

is substantially exceeded by most conventional refrigerated trucks. A quiet alternative called "Silent Green" has been developed by French bodywork specialist Frappa on the basis of an articulated truck with a hybrid engine. When starting up and travelling at speeds of up to 20 kilometres per hour, it uses the electric part of the drive. The truck's cold box is cooled with liquid nitrogen without the need for a noisy compressor. At the SOLUTRANS exhibition in Lyon, the concept won the prize for technical innovation in industrial bodywork. Users of the Silent Green trucks include French supermarket chain Carrefour.

Angélique Renier and James Hennequin, Messer France

Czech Republic: Shielding gas system for steel constructor

Large formats

The Halex-Schauenberg plant in the Czech town of Príbram specialises in all kinds of steel structures, particularly in large-format ones. Steel is welded safely and to a high quality with a gas mixture consisting of argon and carbon dioxide. Messer in the Czech Republic installed carbon dioxide cylinders, an argon vaporiser station and a mixing system at the Halex site in November. Halex customers include energy producers as well as chemical and petrochemical companies.

Jan Kašpar, Messer Technogas

Argon and carbon dioxide facilitate high-quality welds.

Simulated weightlessness during a parabolic flight

France: Dry ice for space research

Mars 500 project

The Russian MARS 500 experiment, in which the European Space Agency (ESA) is also involved, aims to simulate the conditions of a 500-day manned flight to Mars. To this end, the French Space Agency is carrying out parabolic flights in the south west of France. Messer is supplying dry ice for the project: during these flights, experiments are carried out in conditions of weightlessness or when gravitational acceleration is enhanced by a factor of 1.8,. Blood, saliva and breath samples are taken from the test subjects. In order to safeguard the quality of the samples, they are fixed with dry ice before being sent to Munich University for analysis.

Angélique Renier and Eric Theet, Messer France

The two towers will dominate the Vienna skyline when they are finished – as shown in this artist's impression.

Austria: Concrete cooling

Vienna's new landmark

With the 220-metre-high Donau City Tower 1 (DC 1), Vienna has been given a dominant new landmark. The 60-storey tower designed by star architect Dominique Perrault is also the tallest building in Austria. As one of the first Austrian office towers, it was also constructed and fitted out in accordance with the EU Commission's energy and sustainability requirements for a "green building". In order to prevent cracks in the concrete of the load-bearing parts and the false ceilings, the concrete was cooled to exactly 21 degrees Celsius during construction using liquid nitrogen from Messer. This prevented any stress cracks from forming as the concrete cooled down and guaranteed the stability of the supporting structure and the ceilings. In the meantime, work has begun on the southern, 160-metre-high DC Tower 2.

Herbert Herzog and Heinz Amon, Messer Austria

Hungary: Direct supply expanded

Welding for cosy warmth

Viessmann is one of the leading international manufacturers of heating systems. At its production site in the southern Hungarian town of Dombóvár, gases are used for flame cutting and plasma cutting, for bending the fire tubes and for gas-shielded arc welding (TIG, MIG and MAG welding). In order to meet the increasing demand, Messer has installed new tanks for nitrogen and argon at the factory site. The shielding gas distribution system for the argon/carbon dioxide mixture has also been expanded.

Mónika Csere, Messer Hungarogáz

Major roles

When pop superstars appear in concert these days, the stages they perform on seem to be getting bigger and the equipment more and more elaborate every time. Huge spotlight arrays, massive banks of speakers, three-dimensional landscapes of ramps and catwalks – what all this needs first and foremost is structural stability. This is provided by trussing systems, which are also used at conferences, trade fairs and exhibitions as well as in building services engineering. Prolyte is one of the largest manufacturers of such supporting structures, which are welded together from aluminium tubes with the aid of gases.

The trusses are lattice-type structures made from aluminium tubes with different diameters. Their arrangement is based on the structural principle of latticework, and the aluminium material offers a high degree of strength combined with low weight. Furthermore, it is very corrosion-resistant and can be used without having to be painted. Frequent transportation and erection of the supporting structures means that the paint would soon get damaged anyway and would therefore not be able to serve its purpose in the long run.

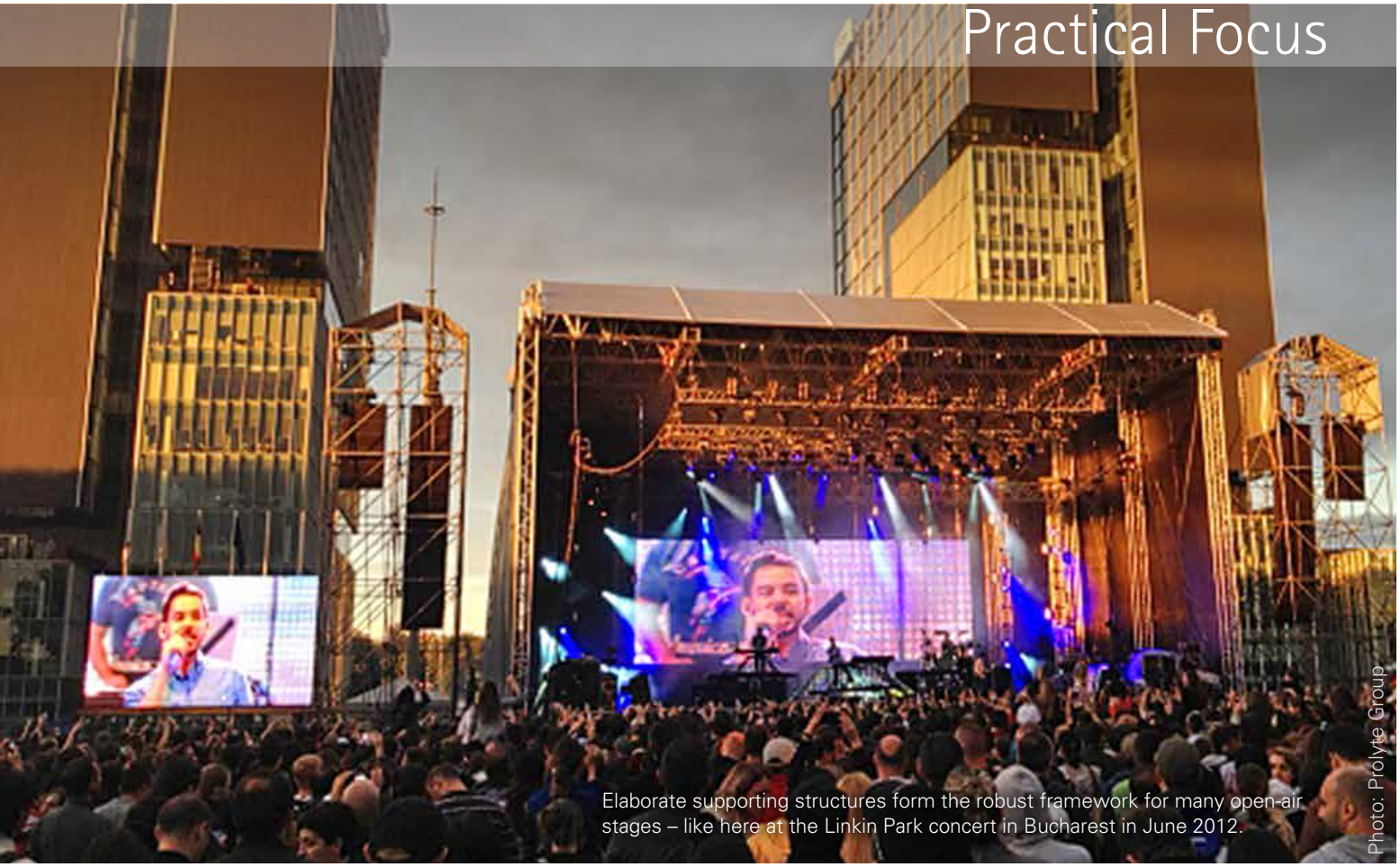
The aluminium tubes are sawn, drilled, turned and milled into the required shape before being welded together to make the trusses. It is vital that an expert job is made of the welding work. Depending on the system, there can be up to 20 welded tube joints in one metre of trussing. They are welded manually using the gas-shielded TIG welding process.

The Prolyte experts are given regular training to ensure that they are always kept up-to-date with the latest developments in welding. Messer in Romania contributes a vital part of the know-how to this training. At the customer's request, Messer experts deliver talks on fundamental metallurgical principles, special aspects of process engineering, choosing shielding gases for welding, and typical problems encountered when processing aluminium. They also provide practical training support.

The detailed discussions between Prolyte and Messer employees on the fringes of the training events have al-

Welding with the TIG process

Final inspection of finished trussing systems



Elaborate supporting structures form the robust framework for many open-air stages – like here at the Linkin Park concert in Bucharest in June 2012.

Photo: Prolyte Group

ready led to numerous measures aimed at optimising welding for fabrication.

Whether the Rolling Stones go on another farewell tour or Lady Gaga once again amazes her fans with her extraordinary ability to reinvent herself, the events will involve the creative use of light and colour, while giant video screens and a flotilla of acoustic gadgetry and equipment will ensure that even the audience at the very back can enjoy the performance. And sometimes it is not just the music that is transported but the performers themselves: individual musicians or entire orchestras are conjured out of the ground or float down from above – on cloud nine if so desired.

In the theatre, too, an elaborate supporting structure along with appropriate technology and equipment are essential when Tarzan is supposed to swing through the air or a trapdoor is used to raise the devil from his kingdom of darkness with hoists and winches. Cleverly thought-out and safely designed structures are needed to make all this possible. The trussing systems, which literally form the basis – and the superstructure – for such show stunts, are available from Prolyte in four versions: customers can choose between the Litestructures, ProlyteStructures, StageDex and ProLyft brands depending on the planned load.

Besides permanently installed or mobile stage equipment, the systems are also used at trade fairs and exhibitions, in industrial buildings or as interior design elements with a special flair. Here they can serve as substructures, as suspension structures for lighting or false ceilings, and as partitions and enclosures.

Michael Wolters, Messer Group and Doru Nastase, Messer Romania Gaz

Achim Wankum (2nd from left) trains the welders in the correct choice of shielding gases for welding.

The customer

Prolyte Group is one of the world's leading manufacturers of aluminium trussing, staging and structural solutions. Its manufacturing sites are located in Wakefield (UK), Leek (Netherlands) and Slatina (Romania). The company attaches particular importance to safety, education and training, and the dissemination of shared knowledge.

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It takes Zsuzsanna Polgár next to no time to pack the freshly cut fruit in a protective atmosphere.

Hungary: Protective gas for fruit cocktails

Fresh vitamins

Shopping can be a tiring business. At the Westend City Center shopping mall in Budapest, shoppers can replenish their vitamin levels with freshly squeezed fruit and vegetable cocktails. The fruit and vegetables are packed under a modified atmosphere.

The Westend City Center customers can buy the delicious cocktails at the Perk Café, where the vitamin boost they need is always available on demand, no matter how busy it gets. The fruit is precut and mixed during the quieter times of the day. To ensure that it retains its healthy freshness and above all its vitamin content, it is then packed into plastic bags with a CO_2-argon protective gas, which prevents oxidation and decomposition processes. Squeezing only takes place immediately before consumption. Each cocktail contains at least three different kinds of fruit or vegetable. The most popular mixtures include pineapple/mango/orange, red grape/apple/celery and carrot/apple/ginger. However, individual mixtures can also be prepared on request.

In response to growing demand, the Perk Café is now also supplying the prepacked fruit mixtures to other cafés as well as selling them to take home. In the modified atmosphere, they remain edible for up to five days if refrigerated.

Mónika Csere, Messer Hungarogáz

The fruit is carefully prepared for the fresh and vitamin-rich drinks.

Spain: Research into cardiovascular diseases

José Luis Muñoz, Armand Ramón, Juan Pascual and Núria Pérez (all Messer Ibérica) with the head of the CIC, Dr. Lina Badimon, and Joaquim Escobar, head of the Catalan Institute for Cardiovascular Diseases (from left to right)

In the service of medicine

Modern medicine is inconceivable without the use of gases. Among other things, they are used in anaesthesia and for artificial respiration. They are also indispensable for medical research. The Centre for Cardiovascular Diseases (CIC) in the Santa Creu i Sant Pau Hospital in Barcelona is an international leader in research into cardiovascular diseases – the most common cause of death in developed countries. The CIC needs nitrogen, carbon dioxide and argon for its laboratory work, and these gases are supplied to the CIC by Messer in Spain. They are used for working with cell cultures and preparing biological samples for biochemical analyses. They are also used in mass spectrometry screening as well as for storing samples. Besides the CIC, Messer also supplies several biotechnology research centres in Spain with specialty gases, for example at the universities in Tarragona, Barcelona, Lleida and Granada.

Armand Ramón and Marion Riedel, Messer Ibérica

At the CIC in Barcelona, samples are stored in cryogenic nitrogen.

Czech Republic: Ozone from liquid oxygen

Neutralised aromatic compounds

Aniline is an important raw material for paints and synthetic fibres. BorsodChem, a chemical company based in the Czech city of Ostrava, is one of the largest producers of aniline. The manufacturing process also produces aromatic nitrogen compounds, which have to be broken down before disposal of the industrial wastewater. In order to accelerate this process through oxidation, the company pipes ozone into the wastewater upstream of the biological treatment stage. Messer supplies liquid oxygen, from which the required ozone is produced on site at BorsodChem.

Ivo Vágner, Messer Technogas

6 questions for

Patricia Bautista

Patricia Bautista (51), IT Manager, has been working for Messer Gases del Peru S.A. since 1986. She lives in San Miguel, some 20 minutes from the centre of the Peruvian capital Lima, with her 89- and 90-year-old parents.

1. **My biggest professional challenge at Messer so far has been …**
…organising the introduction of SAP in October 1999 and the upgrade in April 2008.

2. **What typifies Messer for me is…**
…the fact that everyone is really close at Messer. Even though the head office is geographically very distant, we have a close relationship with our colleagues there and get all the support we need.

3. **My strengths …**
I enjoy taking on responsibility and have staying power. I am also a good organiser and project manager. Like most IT specialists, I love to innovate!!

4. **I have a weakness for …**
… desserts – I simply can't resist them.

5. **What fascinates you about gases and gas applications?**
The sheer number of applications alone is incredible. I am also fascinated by how gases are produced, supplied and used in so many different ways to make the world a better place.

6. **The most important invention of the last century is …**
…the PC.

The protective gas

Sixteen fire crews had to move in when a fire broke out at a feed company in Ebergassing near Vienna on 13 October. Grass and hemp pellets had spontaneously combusted in one of the huge silos. Extinguishing the fire with water was out of the question. A different extinguishing agent was needed here: nitrogen. This gas can smother fires – or prevent them from starting in the first place. "Inerting" refers to the creation of an atmosphere in which neither fire nor any other kind of oxidation can take place. Nitrogen is particularly suitable for this purpose. But the versatile gas also has other useful properties. Its boiling point of minus 196 degrees Celsius and its wide availability make it the ideal cooling agent in many applications.

Within just two hours, the first Messer tanker containing 20,000 cubic metres of nitrogen was at the scene of the fire in Ebergassing. A further three tankers were needed before the fire could finally be extinguished several days later. Paradoxically, moisture had been the cause of the blaze. The bone-dry animal feed had drawn moisture through the silo's concrete walls, triggering a process of decomposition. The heat that this generated ignited the contents of the silo. The risk that additional moisture would have posed to the adjoining silos meant that water could not be used as an extinguishing agent – so nitrogen was the ideal solution. It can be used not only to extinguish such fires but also to prevent them from starting in the first place. The air in the silo is replaced by the inert gas. Without oxygen, nothing can burn – even when heat and sparks come into play.

Can be prevented by inerting with nitrogen: Major fire in a silo.

Explosions prevented

The word *inert* comes from Latin, meaning inactive, passive, sluggish. In chemistry it is used to describe substances that only combine with other substances with difficulty, or not at all, especially not with oxygen, which is highly reactive.

In certain cases, occasional or regular inerting of silos is even stipulated. With some bulk goods such as coal, inert gas locks are used in order to prevent a dust explosion when filling a bulk container. Likewise, when handling highly flammable and explosion-prone liquids, the use of nitrogen is often the key safety measure. For instance, prior to maintenance work at oil refineries, the gas is used to purge hazardous vapours from the installations.

Continued on page 12 →

Inerting with nitrogen

- Permanent or temporary protection against fire and explosion in tank installations, silos, reactors and pipe systems
- Oxidation protection and enhanced quality in circuit board and assembly production in microelectronics (reflow and wave soldering)
- Delayed ripening during transportation and storage of fruit
- Protective gas in food packaging
- Oxidation protection for beverages in tanks and filling containers
- Fire-fighting, inter alia in the event of silo and gap fires
- Oxidation protection in metal processing

Cooling with nitrogen

- Rapid freezing of food
- Die cooling in aluminium extrusion
- Inner hose cooling in the manufacture of braided hoses
- Soil freezing for subsoil stabilisation during construction
- Concrete cooling to prevent cracking
- Hardening of steel
- Deflashing of rubber parts through embrittlement
- Shrink fitting to connect cylindrical metal parts
- Pipe freezing to freeze pipe contents when carrying out repairs

"Crust freezing" of cream gateaux is a typical nitrogen application, ensuring – as here – that the cherries don't sink into the cream when decorating a gateau.

→ *Continued from page 10*

Oxidation undesirable

But even when there is no immediate fire risk, a combination with oxygen may be highly undesirable. For example, the microelectronic components for our laptops, tablets and smartphones can only be built thanks to inerting. Just a few oxide molecules in the ultra-fine wiring of their processors and circuit boards could paralyse entire circuits. Soldering defect-free wires of this dimension is only possible in an inert atmosphere, which more often than not consists of nitrogen.

Modern microelectronics has become an integral part of our lives. Nitrogen ensures quality and reliability in microelectronics manufacturing.

In the metal industry, oxidation must be prevented for numerous processing steps, otherwise the strength of the alloys or the quality of their surfaces would suffer. The shielding gas that is used for welding consists for the most part of nitrogen. It prevents oxidation in the welds that are produced, thereby also ensuring their homogeneity as well as the mechanical stability of the joint. The gas can perform similar functions during metal alloy production in the smelting furnaces or when the alloys are being kept in a liquid state for processing: a nitrogen layer over the melt prevents unwanted oxidation. Other processes, aluminium extrusion for example, make use of both the inerting and cooling effect of nitrogen.

Cherry on the top

The latter also plays an important role in food processing. Here the speed of nitrogen cooling is a huge advantage compared with conventional cooling processes. In a standard freezer at minus 20 degrees Celsius, it takes ten hours to freeze a two-centimetre-thick steak to the core. With liquid nitrogen, this process takes barely 20 minutes. Cryogenic gas can therefore massively accelerate production processes or make them possible in the first place. To ensure that the cherries on top of the frozen Black Forest gateau do not sink into the cream, flash freezing is used to give it the necessary firmness.

Rapid freezing also protects the quality of the food. Slow freezing results in the formation of large ice crystals, which can damage the cell walls and have a very detrimental effect on the food's appearance and taste. By contrast, the very high freezing rates that are achieved with nitrogen cause the water in the cells to freeze so rapidly that predominantly harmless small ice crystals are formed. Products that have been frozen in this way will look appealing and appetising after defrosting.

The gas's inerting effect comes into play again when storing and packing food. Nitrogen is the main component of air – accounting for about 78 per cent – and as such it is completely safe to use with food. As a protective gas in storage tanks, storage vessels, packets and bottles, it prevents oxidation, germ formation and rotting.

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Interview with

Edgar Arens, Technical Director at Gerhardi Alutechnik GmbH & Co. KG:

"Productivity is up by as much as 15 per cent thanks to nitrogen."

Gases for Life: Why do you use nitrogen in your dies?

Edgar Arens: The aluminium ingots enter the extruder with a temperature of approximately 480 degrees Celsius. Here they are forced through an extrusion die, akin to toothpaste being squeezed through the tube opening, except that this process generates a great deal of heat as a result of the extrusion force of up to 33 meganewtons. Nitrogen is used to prevent the die from overheating, thereby facilitating higher extrusion rates.

Gases for Life: So the use of nitrogen is having a positive effect on your productivity?

Edgar Arens: Yes, I reckon that productivity is boosted by about 15 per cent at best. For me though, it is nitrogen's inerting effects that deliver much more clearly discernible advantages.

Gases for Life: And what are these advantages?

Edgar Arens: Without nitrogen in the extruder, oxide particles would form between the die's bearing surfaces and the aluminium profile during the extrusion process, and these would be deposited on the surface of the profile. The nitrogen's effectiveness in keeping atmospheric oxygen away means that there is no oxidation, giving us gleaming surfaces that are much smoother.

Gases for Life: What would they look like without nitrogen?

Edgar Arens: They would be much duller and less consistent in appearance. Moreover, wear and tear on the dies would be significantly greater. The gas therefore kills three birds with one stone, ensuring more efficient production, reduced wear and tear plus higher product quality.

Thomas Böckler, Messer Group

Gerhardi Alutechnik

Founded in 1796 as a button and buckle factory, Gerhardi Alutechnik GmbH & Co. KG in Lüdenscheid has been family-owned for five generations. Using the company's two modern extruders, the 100 staff can transform 16,000 tonnes of aluminium billets into extruded profiles annually. The company sells its products to customers in a range of industries, including the machine-building, construction, automotive and electronics industries.

Clean and measurable

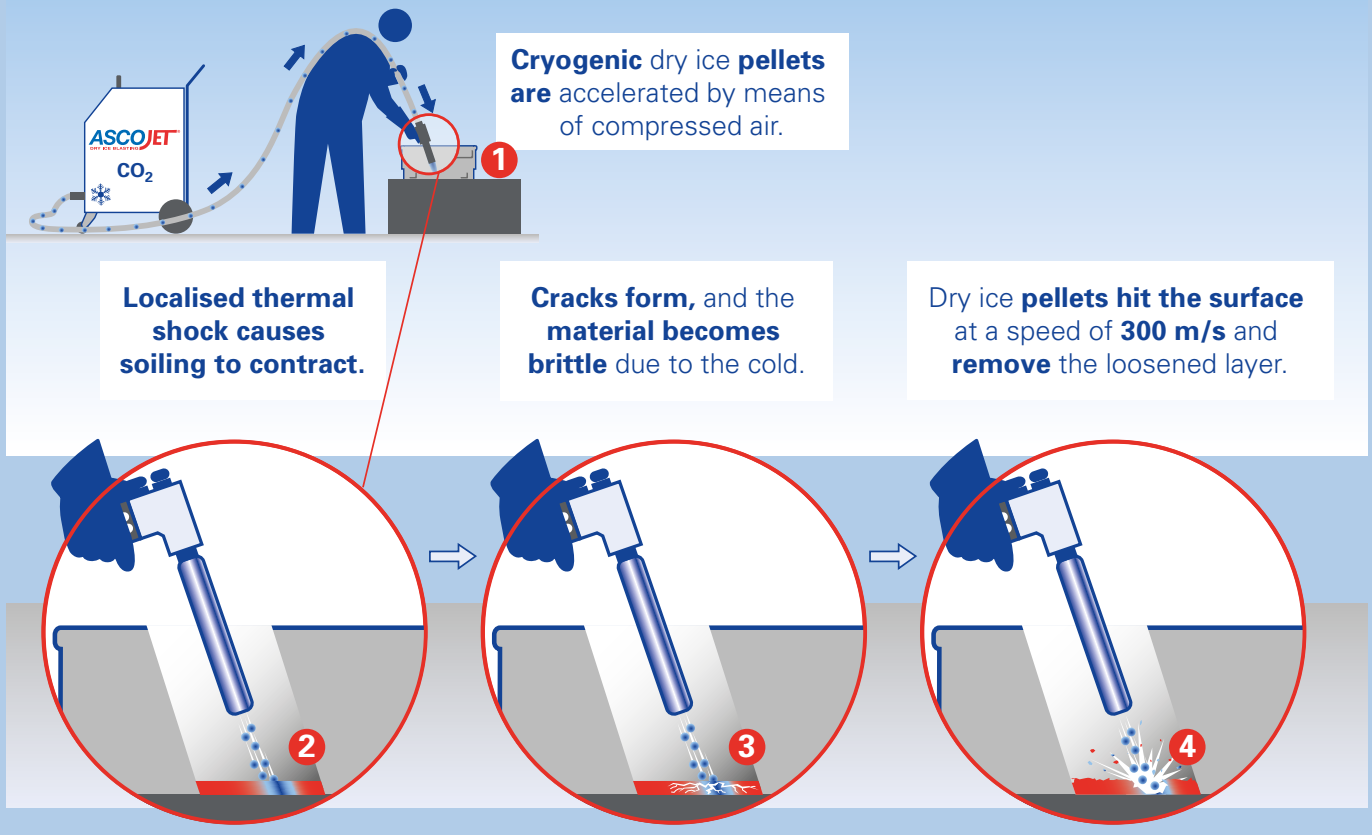
Daimler uses dry ice blasting technology from ASCO Carbon Dioxide in the car engine development department at its Mercedes-Benz plant in Untertürkheim. It is used to remove silicon residue, oil, grease, combustion residue and other soiling or sealants from various engine parts in a gentle cleaning process.

Cleaning an engine component with dry ice blasting technology from ASCO Carbon Dioxide

Since, for example, pistons, cylinder heads, sumps and crankcases are measured precisely in the geometric metrology department before and after testing, it is important that the parts are cleaned carefully and gently after testing so as not to end up with false readings as a result of abrasive cleaning.

Cleaning with dry ice offers the advantage of being a gentle process that does not damage the surfaces. The only possible alternatives are manual cleaning methods or cleaning with solvents, which would be more time-consuming. Even more important than the saving of time during the cleaning process itself is the certainty for the metrology department that a component has been reliably cleaned after a single clean. Any duplicate measurement and subsequent cleaning that has to take place as a result of parts not being completely clean means a loss of efficiency. Dry ice cleaning provides this certainty. Dry ice blast-

Gentle cleaning thanks to dry ice blasting technology



Dry ice blasting technology is used after testing in the engine development department to remove silicon residue, oil, grease, combustion residue and the like from engine components in a gentle cleaning process.

ing is therefore not only a simple, quick cleaning method that does not damage the components, but also a method that supports process planning.

The cleaning of pistons, the narrow annular groove of which even dry ice cannot get clean enough to measure, is a special case. A solution has been found for this as well: thanks to a gun light fitted to the gun, this annular groove can be pre-cleaned to such an extent that any remaining soiling can subsequently be removed in the ultrasonic bath.

ASCO and Daimler have been working together very closely in the field of dry ice blasting technology for a long time, thus ensuring an ongoing process of individual development and optimisation of dry ice blasting technology for the areas of application at Daimler based on continuous open dialogue.

Nicole Urweider, ASCO Carbon Dioxide

The gun light fitted to the gun illuminates the narrow annular groove during cleaning.

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Carbon dioxide is used in the production of the world-famous aspirin tablets.

Aspirin can be found in many medicine cupboards.

Spain: New customer Bayer

CO_2 for aspirin production

Bayer HealthCare produces some 15,000 kilograms of acetylsalicylic acid (ASA) a day at its plant in the Spanish town of La Felguera. This equates to approximately 85 per cent of the chemical and pharmaceutical group's global ASA requirement for aspirin production. Messer in Spain has been supplying Bayer HealthCare with the carbon dioxide needed for the production of ASA since March 2012. For several decades, Messer has supplied the Bayer MaterialScience plant in Tarragona with oxygen and nitrogen by pipeline. The Tarragona plant produces MDI for polyurethanes, which are used in the production of foams and sealants as well as paints.

Marion Riedel, Messer Ibérica

Italy: Variosol spray process for medicines

Extremely fine particles

Messer's patented Variosol technology attracted a lot of attention at two pharmaceutical conferences in Shenzhen (China) and Istanbul (Turkey). Scientists from partner company SiTec and from Piemonte Orientale University in Novara, Italy, presented papers on the new possibilities that this process opens up in drug manufacturing. The Variosol spray process uses CO_2 to produce extremely fine particles, the size and form of which can be varied very flexibly by means of adjustable nozzles. The technology achieves consistently high product quality in installations that are considerably smaller than conventional spray towers.

Leonardo Galli, Messer Italia, and Frank Gockel, Messer Group

The Variosol process facilitates the production of active substances in the form of extremely fine particles.

Use of oxygen in furnaces

Up to 80 per cent less flue gas

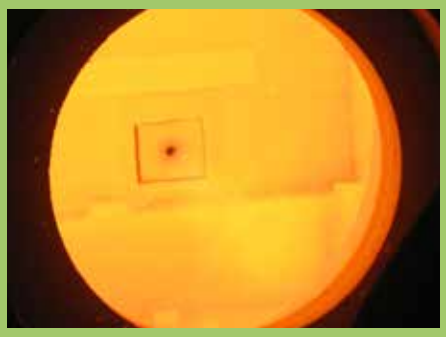
Fire needs oxygen (O_2). However, this gas only makes up just under 21 per cent of air. The main constituent of air – nitrogen (N_2), making up around 78 per cent – is inert, acts as ballast when using air firing, and limits the maximum flame temperature. This can be avoided by increasing the amount of oxygen. The result is much hotter combustion, and yet the fuel requirement is actually reduced. This saves energy and markedly reduces carbon dioxide and nitric oxide emissions.

With normal combustion, nitrogen swallows up a considerable amount of the heat, thus reducing the combustion efficiency of the process. Its partial oxidisation in extreme heat is also highly undesirable: nitric oxides (NOx) are harmful to the environment and contribute to the greenhouse effect.

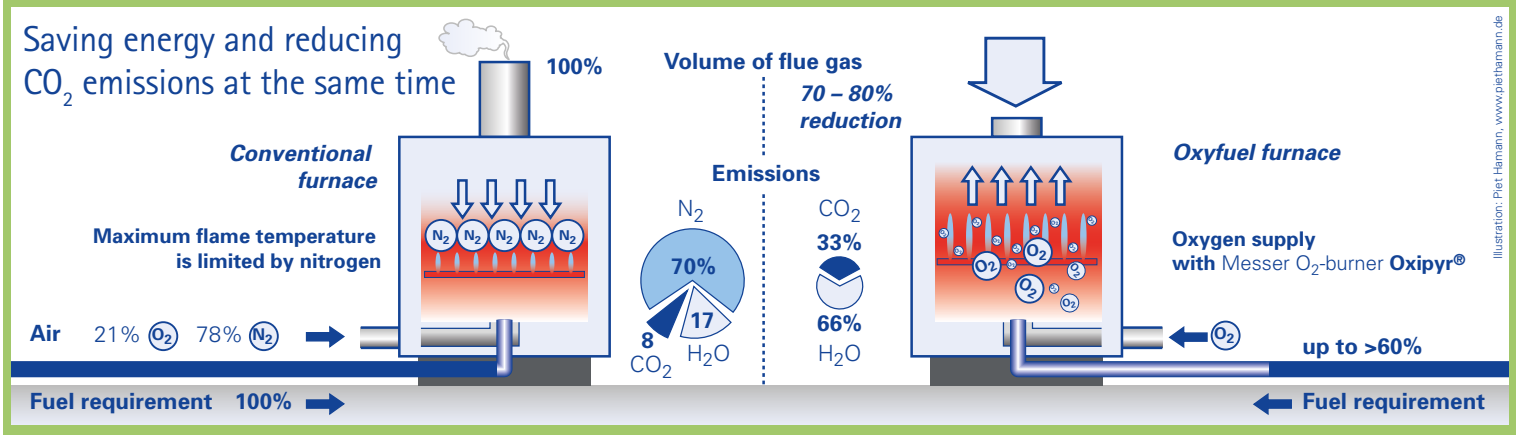
The supply of oxygen boosts efficiency and facilitates optimisation of melting and reheating processes. The gas can be introduced into a furnace using different methods, for instance by enriching the combustion air or by injecting the O_2 directly into the flame. Oxyfuel burners, in which the fuel enters the combustion chamber together with the oxygen (oxyfuel) and combusts there with virtually no undesirable side effects, are particularly advantageous. For the same burner output, the volume of flue gas is 70 to 80 per cent lower, while the fuel requirement is reduced by up to 60 per cent. Even low-grade fuels such as shredded materials, liquid waste or the waste gases from iron and steel production can thus be burned with energy and environmental gains.

Last but by no means least, the flue gas in an oxyfuel furnace consists entirely of water (H_2O, 66%) and carbon dioxide (CO_2, 33%). CO_2 emissions are significantly lower than with conventional air firing. Even taking account of the carbon footprint for the supply of the oxygen, a 30 per cent reduction in carbon dioxide is possible when melting glass for instance (1,500 degrees Celsius).

Davor Spoljaric, Messer Austria



The "flameless" Oxipyr burner from Messer – being heated up (top) and at 1,550 degrees Celsius (bottom) – achieves maximum combustion efficiency with pure oxygen.



The online world of gases

No fewer than three new websites offer comprehensive information on gases that are used in industry and technology. Their production as well as their chemical and physical properties are described in detail. Numerous examples illustrate areas of use and specific applications, supplemented by practical aids for day-to-day contact with gases.

In the case of carbonated beverages, we can see the gas as fizzy bubbles, and in the case of xenon headlights, the name tells us that they contain a gas. When it comes to salads that have been packed in a modified atmosphere, we don't even notice it any more. And hardly anyone knows that gases are also used in the manufacture of paper, ice cream or airbags. In fact, in many production processes, they play as important a role as water or electricity.

By way of an introduction to this hidden world, Messer has set up the website *www.Gasesforlife.de* to show how industrial gases are used in our everyday lives. The comprehensive image and text material on this site can be used free of charge for editorial texts and articles or for educational purposes in schools. If interest in chemistry and technology has been aroused, GaseWiki at *www.gase.de* provides the opportunity for active involvement. Modelled on Wikipedia, this encyclopaedia of gases is conceived as a collection of data and topics, the raison d'etre of which is the sharing and dissemination of information. It is also designed to encourage other producers of industrial gases to take part in this exchange.

A further website is entirely devoted to the subject of specialty gases and offers a wide range of information on the right fittings and gas supply systems for different areas of application. In addition to the characterisation of gas mixtures, the labelling of pressure vessels or the physical data of gases, the Infotheque section at *www.specialtygases.de* also offers the opportunity to convert gas units. This calculator is also available as an app for Android smartphones in the Google Play Store.

Benjamin Auweiler, Messer Group

- Gasesforlife.de http://www.gasesforlife.de
- GaseWiki http://www.gase.de
- Specialty gases http://www.specialtygases.de
  oder http://specialtygases.messergroup.com
- Messer Group http://www.messergroup.com
- Facebook http://de-de.facebook.com/messergroup
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- Xing http://www.xing.com/companies/MESSERGROUPGMBH

Imprint

Published by:

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Go to **www.messergroup.com** for comprehensive information about "Gases for Life".

"Gases for Life" is published four times a year in German, English, Hungarian and Czech.

The Gases for Life editorial team

We are ...

Clockwise from back left: Mónika Csere, Diana Buss, Michael Holy, Zsolt Pekker, Tim Evison, Monika Lammertz, Roberto Talluto, Benjamin Auweiler, Angela Bockstegers, Thomas Böckler, Dirk Kampffmeyer, Marlen Schäfer, Johanna Nickel

(Not pictured: Dr. Christoph Erdmann, Dr. Bernd Hildebrandt, Dr. Joachim Münzel, Angélique Renier and Nicole Urweider)

Competition

Delicious!

In this issue of the magazine, readers have the chance to win a hamper of products that are made using nitrogen, the gas featured in our cover story.

Which famous painkiller is produced with the aid of carbon dioxide?

	5			3			

Which gas has the element symbol N?

	4			7				

Which cleaning technology is used in the engine development department at Mercedes-Benz?

				1						6				

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 coloured boxes will give you the answer. Please send it by email with the subject line "Gases for Life competition" to: diana.buss@messergroup.com

The deadline is 15 March 2013. The competition is not open to employees of the Messer Group 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.

Congratulations!

The winner of the last competition was Christoph Kliem from Hamburg, Germany. The correct answer was "CHARDONNAY".

Answer:	1	2	3	4	5	6	7
		H					

Have fun and (with a bit of luck) enjoy the hamper of goodies!
Your Gases for Life team!

Deep discoveries

Vincent Gautron and Jean-Louis Maurette search for evidence of a lost age at a depth of 89 metres. The diving gases were supplied by Messer.

The Expédition Scyllias diving group explores virgin shipwrecks in order to then present its scientific findings to a broad public. The underwater archaeologists are presently exploring the wreck of the Isère off the coast of Brittany. This is the ship that took the Statue of Liberty from France to New York. They use diving gases from Messer, including helium, for their dives in what for the most part are particularly difficult waters.

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

www.Gases for Life.de