

Gases for Life

The industrial gases magazine

Transport refrigeration with dry ice for optimum logistics

Freshness which goes down well

Forensic technology:

CSI Budapest

Water treatment:

Disinfection and partial softening of drinking water

Textile production:

Dry ice for strong and beautiful textiles



Dear Readers,

Life's merry-go-round sometimes spins at a breathtaking speed. We even feel the effects when it comes to cooking and eating. When did you last visit a market in order to buy fresh produce? When is there time to cook a leisurely meal for the family?

For a long time, this lack of time also meant a loss of gastronomic culture. But there is a culinary trend that seeks to combine speedy preparation with considerable dining enjoyment. I am talking about convenience food, in other words ready-to-serve meals that only require you to add the "finishing touches" at home.

The good thing about these meals is that they are often made up of fresh products, which means that in terms of quality and taste they can satisfy even demanding palates. Gases and refrigeration processes play an important role in this by helping to ensure an unbroken cold chain which keeps the convenience food fresh until it is eventually offered for sale in the refrigerated display units in shops and supermarkets. You can read more about this subject from page 10 onwards.

Close links between gases and food are found elsewhere too: for example in the inerting of beverage bottles with liquid nitrogen, in the treatment of drinking water with ozone and carbon dioxide, or in fish-farming.

Best wishes

A handwritten signature in blue ink, appearing to read 'Stefan Messer'.

Stefan Messer



Cover Story

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Freshness which goes down well

Cover photo:
Nicole Pichler,
Employee Technical
Sales at Messer in
Austria, chooses
convenience food from
the chiller cabinet.
A Siber container that
is cooled with dry ice
keeps it fresh during
delivery.

The convenience food that is sold in shops today covers a wide variety of small ready meals, ranging from gourmet sandwiches to organic ravioli to mixed salads. An unbroken chain of cold temperatures is needed to ensure that the meals – which are actually very healthy when combined in a balanced way – retain their quality between preparation and consumption. Given the variety of products and customers, this is a technical and logistical challenge, but one which can be ideally mastered with gases.



Practical Focus

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CSI Budapest

The techniques used by the Crime Scene Investigators (CSI) in the popular TV series have also been mastered by the experts at the Hungarian Forensic Institute (BSzKI). They use state-of-the-art technology and gases in a variety of applications for their criminal investigations.



Using Gases

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Gentle efficiency in softening process

The public utilities in Rottenburg am Neckar meet 60 per cent of the town's drinking water demand from their own wells – with the help of ozone and carbon dioxide.

Good for you and the environment

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"This is not a game" by Lorenzo Quinn, exhibited at the 2011 Biennale in Venice

Spain: Gases for artistic metal sculptures

Not a game

Numerous artists and sculptors have their works made in the Vilà art forge in Valls, Catalonia. One of them is Lorenzo Quinn, the son of Hollywood star Anthony Quinn. His installation, "This is not a game", caused a sensation at the 2011 Biennale in Venice. The gas that is needed to weld such sculptures is

supplied to Valls by Messer Ibérica. Works of art from the renowned workshop can be seen in many Spanish cities as well as in other European countries. Its creations include doors and sculptures for the famous "Sagrada Familia" cathedral in Barcelona.

Marion Riedel, Messer Ibérica

Austria: Gases for demolition work



The oxygen lance even gets to grips with heavy steel plate.

Lances help to cut up steel

When thick sheet metal has to be cut up, the material is first pierced using an oxygen lance and the flame cutting method. This makes subsequent flame cutting easier.

MAGES Günter used this method in the demolition of the autobahn bridge near Kasern in Austria: oxygen lances were used to pierce holes 10 to 15

centimetres in size into the 20-centimetre-thick bearing surfaces. These supports were then cut up into six-metre-long sections with oxyacetylene cutting torches and thus readied for transportation off site.

A total of 100 oxygen lances were used and some 450 tonnes of steel was transported off site on eleven low-loaders. Messer in Austria supplied the necessary oxygen and acetylene bundles.

Herbert Herzog, Messer Austria

Switzerland: Dry ice in catering

On-board freshness

People's Viennaline has been operating three flights a day from St. Gallen-Altenrhein airport in Switzerland to Vienna for over a year now. To ensure that food and drinks are always fresh on board, the catering trolleys are filled with dry ice slices. The dry ice is produced not far from the airport at ASCO in Roman-

shorn and delivered twice a week to Altenrhein Airport Catering GmbH.

Nicole Urweider, ASCO Carbon Dioxide



Hungary: Oxygen for fish-farming



Gyula Borbély (left), owner and managing director of fish-farming business Jászakiséri Halas, and András Paszera (right), application engineer from Messer Hungarogáz, with a Barramundi fish.

Australians in thermal bath

Barramundi means “fish with large scales”. The word comes from an Aboriginal language of Queensland. The giant bass, which can grow up to two metres in length, is regarded as one of the tastiest fish on the fifth continent. Jászakiséri Halas, a fish-farming business based in Jászakisér, Hungary, uses a local thermal spring to ensure the warm water temperature (28 degrees Celsius) that these tropical aquatic creatures are used to. Thanks to constant purification as well as sterilisation with ozone every five hours, only ten per cent of fresh water per day is needed for the nine ponds, which each hold 54 cubic metres. The oxygen for the ozone installation and for water aeration is supplied in liquid form by Messer.

Krisztina Lovas, Messer Hungarogáz

Germany: High-purity nitrogen for surfaces

Hardening atmosphere

Hauck-Gruppe specialises in the thermal and thermochemical treatment of metal surfaces. It uses its proprietary NITAI® nitriding and nitrocarburising process to optimise the mechanical properties of components. Nitriding requires a temperature of 450 to 550 degrees Celsius. In this process, the nitrogen diffuses from the process atmosphere into the surface of the workpiece, producing a

very hard layer of iron nitrides. Nitrocarburising, which takes place at between 550 and 580 degrees Celsius, involves the addition of carbon. Messer supplies nitrogen to six Hauck-Gruppe locations in Germany. The company, which has a long tradition dating back to 1936, when it was founded by Franz Hauck in Remscheid, now belongs to Dutch company Aalberts Industries.

Peter Greiner, Messer Industriegase

Spain: Ten-year gas supply contract

O₂ directly via pipeline

Industrias Químicas Asociadas (IQA) is the only Spanish producer of ethylene oxide, a gas that is produced through the conversion of ethylene and oxygen. As the elemental substance of a variety of chemicals, it is needed for the manufacture of a large number of products, ranging from PET to detergents, from food emulsifying agents to plasticizers, and from lacquers and paints through to waxes and foam materials. IQA is Messer Ibérica's largest oxygen customer: some 100,000 tonnes of oxygen and nitrogen a year are supplied directly to the company via a dedicated pipeline. IQA and Messer have now contractually agreed continued supply on this scale for a further ten years. The quantity equates to 15 deliveries with a 20-tonne tanker

per day. IQA was Messer's first customer in Spain at the beginning of the 1970s.

Marion Riedel, Messer Ibérica

France: Nitrogen in the beverage industry

Protection and stabilisation

Air does not do wine, beer and fruit juices any good in the long run. Contact with oxygen can cause the beverages to become cloudy and flat or to start to ferment. This can be prevented by inerting the bottle with a gas after filling. Messer has teamed up with the Belgian company VBS Europe to offer a flexible process for automatic inerting in bottling plants. The process involves liquid nitrogen being injected into the bottle before sealing. It quickly evaporates, forming a protective layer above the liquid.

Nitrogen also gives PET bottles additional mechanical stability thanks to the pressure of the gas. The process allows the use of particularly thin-walled PET bottles, thus conserving raw materials and saving energy

Angélique Renier, Messer France



Protects and stabilises: liquid nitrogen in the bottling process

CSI Budapest

It only takes a bit of fluff or a grain of sand to put even the most cunning of criminals behind bars. Because the CSI experts can turn even the tiniest of clues into incriminating evidence thanks to their sophisticated scientific methods. The techniques used by the "Crime Scene Investigators" in the popular TV dramas that are shown on our screens every night have also been mastered by the experts at the Hungarian Forensic Institute (BSzKI). They make daily use of state-of-the-art technology and gases in a variety of applications for their criminological investigative work.



The inside of the infrared photometer, which is used to analyse microparticles, is cleaned with nitrogen.

The TV series are very realistic in many respects, finds Dr. János Földi, although not all the time: "No single individual can master all the forensic methods," explains the deputy scientific director of the institute, which employs 269 staff, including doctors, engineers, biologists, chemists, physicists and specialist technicians. The institute even has separate

departments which deal with material traces of non-biological origin and with the organic-chemical analysis of intoxicants.

"In our day-to-day work there is a clear division of labour between the actual criminal investigation department, the scene-of-crime team and the forensic experts. Our staff con-

sists almost exclusively of experts. Only in exceptional cases are they required to provide assistance at a crime scene. And things don't always happen as quickly as on television – for example, as a rule, a DNA analysis takes at least a month to complete. However, in very urgent cases, the specialists can deal with it in two days."

While the BSzKI experts therefore can't quite keep up with their CSI counterparts in dramatic terms, their technical expertise is of a comparable standard. For example, they use a scanning electron microscope to analyse inorganic particles. "Its X-ray semiconductor detector is cooled with liquid nitrogen," explains Zsolt Szoldán, a geology expert in the physical-chemical department. "We clean the sample chamber by purging it with gaseous nitrogen in order to prevent any impairment of the sample."



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The drug laboratory can detect up to 260 compounds that are on the list of prohibited narcotics.

Among other things, the experts thus analyse filaments from car headlights or the traces of powder that are produced when a firearm is discharged.

"The device tells us whether the car's lights were on or off at the time of the accident, or who fired the gun in the case of several suspects." The spectrophotometry laboratory analyses microparticles that have been found on items of evidence. This includes all textile fibres, tiny pieces of rubber, plastic or, for example, nail varnish, which can provide clues about possible perpetrators. The inside of the infrared photometer used here is cleaned with gaseous nitrogen.

The department for organic-chemical analysis examines traces that come from petroleum products, fire accelerants or narcotic substances. In the drug laboratory, the primary task is to detect compounds that are on the list of prohibited narcotics and new psychoactive substances. "The distribution of carbon isotopes in a sample also allows conclusions to be drawn about its origin as well as the channels of distribution," says head

of narcotic analysis Tamás Csesztergi, explaining one of the methods used.

The organic chemists, too, use state-of-the-art analytical methods and technologies that can only deliver detailed results with the aid of gases. When required, samples are first dried with nitrogen. In gas chromatography, nitrogen, hydrogen, helium and compressed air are used as purge, carrier, or process gases for mass spectrometers, gas chromatographs and flame

ionisation detectors. In addition, high-purity calibration gases are used as a reference.

Messer in Hungary has been supplying the gases for the work of the Hungarian forensic experts for many decades.

Krisztina Lovas, Messer Hungarogáz



The customer

The Hungarian police service's Institute for Forensic Technology and Research (Bűnügyi Szakértői és Kutatóintézet, BSZKI) has over ten departments. They analyse crime-related traces with the aid of state-of-the-art technology, ranging from computer-based fingerprint matching to spectroscopic material characterisation through to DNA analysis. The use of gases for cooling, cleaning, as a reference or as a high-purity carrier material is indispensable with many of these methods.

"As a rule, a DNA analysis takes at least a month to complete," says Dr. János Földi, the forensic institute's deputy scientific director.

Drinking water in karst Three reasons to celebrate



Underwater research work would not be possible without a breathing gas mixture consisting of nitrogen and oxygen.

The Messer subsidiaries in Poland, Czech Republic and Slovakia turned 20 this year! They celebrated their anniversary with staff, business partners and friends.

In 1990, Messer Griesheim GmbH, as it was called at the time, first expanded its business activities in Central Europe before going on to do the same in the markets of Southeast Europe. This laid the foundations for successful long-term development in this region.



Air separation unit in Rybnik, Poland

The team from “Geokarst Aventure”, a French-Romanian organisation, has dedicated itself to carrying out a detailed exploration of caves around the globe – on dry land as well as under water, because research dives in underground waters are their speciality.

In March of this year, Geokarst undertook a research trip in the northern Vietnamese province of Cao Bang, home to one of the most expansive karst regions in Southeast Asia. One of the aims of the trip was to investigate the quantities of water available to the inhabitants of several remote

villages on the area’s Dong-Mu plateau during the dry season. To this end, two Romanian scientists from the Geokarst team analysed water samples and dated dripstones and sediments in collaboration with the Vietnam Institute of Geosciences and Mineral Resources.

The researchers used rebreather diving equipment filled with a breathing gas mixture consisting of nitrogen and oxygen. Messer France and Messer Vietnam supplied Geokarst with the oxygen for this in Vietnam.

*Angélique Renier/Natalie Reiter,
Messer France*

Much has happened since then: in Poland, Messer produces air gases such as oxygen and nitrogen in an air separation unit in Rybnik, and the local product portfolio is rounded off by a CO₂ production facility in Kędzierzyn-Koźle as well as two acetylene plants in Chorzów and Police. In the Czech Republic, Messer produces air gases in Vratimov and acetylene in Ostrava. Nationwide, Messer supplies its customers and 140 sales partners in the Czech Republic via 23 on-site facilities which produce the required gases directly at the customer’s premises. In Slovakia, Messer provides a reliable supply to its customers through a hydrogen plant and an air separation unit as well as 62 sales partners.

Editorial Team

6 questions for

Qing Xu



Qing Xu joined Messer in 2000 and is the Chief Financial Officer of Messer Griesheim (China) Investment Co., Ltd. He lives in Shanghai with his wife Youna Zhang and son Tianchun Xu.

1. **My biggest professional challenge at Messer so far has been ...**
... the restructuring of the company's legal form in China between 2007 and 2009. We had to go through complicated approval processes in order to turn Messer Consulting into a China-based holding company. Today it bundles all of the company's investments in the Chinese gas business.
2. **What typifies Messer for me is ...**
... the fact that 90 per cent of executives at Messer in China came from the company itself. This is rare at big companies here.
3. **My strong point ...**
... is my full commitment to my work.
4. **I have a weakness for ...**
... my wife and son, good food and fine wine.
5. **What fascinates you about gases and gas applications?**
The fact that they play a role in all the things we use in our daily lives, be it food, ballpoint pens, light bulbs, plastic bottles or cars.
6. **The most important invention of the last century is ...**
... the internet.

Dry ice blasting in the textile industry

Dry ice for strong and beautiful textiles

Dry ice is indirectly linked to many clothes as it is often used to maintain textile manufacturing machinery.

Swiss company Schoeller Textil AG manufactures high-performance fabrics for the sportswear, workwear and lifestyle segments, with uses including elastic ski pants, riding breeches, clothing for motorcyclists, breathable sportswear and much more besides. In fabric manufacturing, the machines need to be cleaned gently yet quickly on a regular basis. ASCOJET dry ice blasting technology from ASCO provides the fast alternative to costly cleaning methods with chemicals and hot water. The material residues that stem from the textile finishing process for these high-quality fabrics presented a particular challenge for the company. It was possible to remove these residues from the machines efficiently with dry ice.

Bischoff Textil AG, the world's leading embroidery manufacturer for underwear and ladies' wear, also uses ASCOJET dry ice blasting technology. Copper needles that burn out the beautiful patterns are cleaned with an ASCOJET 908K dry ice blasting unit which removes the tulle residues. Here, too, it is important that the cleaning process does not damage any surfaces, yet takes up little time. In comparison with the laborious manual cleaning methods used before, the dry ice blasting process is kind to both employee and material.

Nicole Urweider, ASCO Carbon Dioxide



Cool: dry ice blasting is also used in the manufacture of fabrics for the "Rokker" label.



Residues in the textile machines can be removed gently and thoroughly with the ASCOJET 908K.

Freshness which goes down well

Having a quick bite to eat no longer means a sandwich and an apple, nor necessarily a burger or curried sausage. A diverse fast-food industry caters to the need for quick meals. The convenience food that is now also offered by supermarkets and convenience stores covers a wide range of ready small meals for instant consumption or quick preparation. The delicious range that is available covers gourmet sandwiches, organic maultaschen (pasta pockets) and a variety of mixed salads. And because fresh products are used, the food is also very healthy when combined in a balanced way. An unbroken cold chain is needed to ensure that the perishable products retain their quality between preparation and consumption. This is a technical and logistical challenge given the variety of products and customers.

Enjoyable food for busy lives

There is much talk about slow food in the media. The deliberate “slowing down” of food is being propagated and no doubt practised by many – in the evenings, at weekends and on holiday. However, during the week, most of us prefer a slightly faster pace that meets the requirements of our busy everyday lives. At least that is what the constantly rising sales figures for fast-food restaurants tell us, as does the constantly growing retail space dedicated to the sale of convenience food in grocery stores. Such convenience products live up to their name and give consumers what they want: they are convenient and quick to consume. However, the distinction between fast and fine has long since ceased to apply. Many convenience foods are produced to high standards of quality and freshness.

Of course, the cold chain must also satisfy these standards in order to

ensure that the high-quality products reach the customer at peak quality. This is basically not a problem – chilled and frozen food has been transported from producer to market in refrigerated trucks or cool boxes for decades.

Limits of conventional cooling

Conventional cool boxes are kept cool by precooled elements and can also be transported in non-refrigerated vehicles. But they have to be precooled and are not as flexible to use.

These disadvantages do not apply to the Siber system, which Messer developed in collaboration with Olivo, a leading manufacturer of refrigerated containers. The Siber containers on wheels are cooled by a dry ice charge with a temperature of minus 78 degrees Celsius. The low temperature is generated when liquid carbon dioxide under high pressure is filled into the refrigerated container's reservoir.



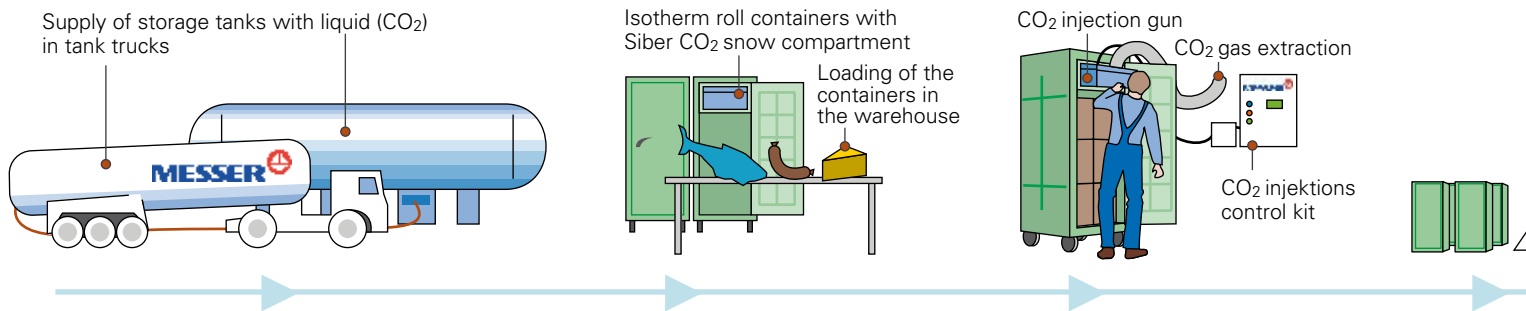
Continued on page 12 →



Nicole Pichler holding freshly packed salads (left), which are delivered to supermarket chiller cabinets (right) in Siber containers (top and center).



Unbroken cold chain due to the Siber system



→ continued from page 10

Overview of the system's advantages

- Automatic calculation of the required quantity of CO₂
- Precise dosing of dry ice charge
- Unloading of roll container right next to the refrigerated display unit
- Suitable for chilled and frozen products thanks to dual container
- Data loggers facilitate full traceability in accordance with food legislation / HACCP
- Refrigeration guaranteed for at least 24 hours

Under normal pressure, the liquid gas expands and turns into dry ice, which has a very large refrigeration capacity. Depending on the specifications, the Siber containers also feature an additional compartment for frozen products. This allows refrigerated and frozen food logistics to be combined flexibly. The necessary refrigeration capacity is always guaranteed for a transport duration of at least 24 hours.

Precise logging

The CO₂ is dosed precisely for each container according to requirements. For example, in the Austrian food retail giant SPAR's central warehouse in St. Pölten, the dry ice injection station is fed with data from the company's ERP system. The quantity of CO₂ to be injected into the reservoirs is calculated on the basis of a number of factors: the refrigeration temperature (0 to +2

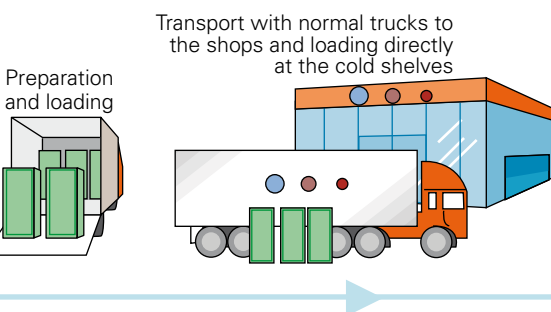
degrees Celsius for fresh products, -25 degrees Celsius for frozen food), the ambient temperature, the transport duration including loading time and the container model are taken into account in each case. This precise dosing makes the system highly energy-efficient. The gaseous carbon dioxide that is also produced during expansion is immediately extracted in its entirety and removed from the ambient air. This means that the injection unit can also be operated safely in the enclosed workspace of a cold store.

The Siber containers, which have a capacity ranging from 300 to 1,200 litres, can be transported in a normal truck alongside non-refrigerated goods. This reduces the number of delivery trips. No cold room is required for temporary storage at the delivery location. The roll containers can simply be wheeled

Interview with

Alexander Grill, Head of Central Warehouse Logistics at SPAR Österreichische Warenhandels-AG

"Dry ice ensures that the required temperature range is maintained."



directly to the shop's refrigerated display units and unloaded straight onto the shelves. This not only maintains the cold chain, but also provides guaranteed proof of an even temperature throughout. The Siber containers can be fitted with commonly used data loggers that log all the relevant events from carbon dioxide injection through to door release.

All the food-related legal regulations are thus satisfied for even the most sensitive products, as are the demands of the most discriminating consumers of convenience food.

Nicole Pichler, Messer Austria



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Gases for Life: What kind of food products do you transport with the Siber system?

Alexander Grill: We use it for our convenience products, i.e. fresh, ready-to-eat food such as sandwiches, salads or desserts. They are prepared without preservatives, and their minimum shelf life is very short. That is why an unbroken cold chain is particularly important for quality.

Gases for Life: Why did you opt for this system?

Alexander Grill: The dry ice ensures that the required temperature range is maintained during every stage of transportation. This evenness of refrigeration cannot be achieved with the conventional method – a eutectic plate in the refrigerated container. Another advantage is that our employees can wheel the container directly to the point of sale, i.e. the appropriate refrigerated display unit.

There is an unbroken cold chain right up to the point of sale.

Gases for Life: How do you determine the coolant dosage?

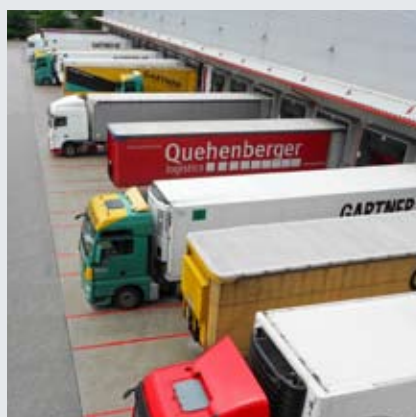
Alexander Grill: We took the decision to link our ERP system and the Siber system. The quantity of dry ice required is calculated and dosed precisely on the basis of the container load and the route distance. This reduces costs and is also very efficient from an environmental perspective.

Gases for Life: That sounds like a sophisticated software system.

Alexander Grill: Messer had to do a bit of programming, and so did we. But linking the two systems was not a problem, and everything is running smoothly now.

Editorial Team

SPAR Österreichische Warenhandels-AG



SPAR is one of the leading food retailers in Austria and its neighbouring countries (Northern Italy, Slovenia, Hungary, Czech Republic, and Croatia). The company is also active in specialist sports retailing and real estate development. It offers a wide range of high-quality convenience products under the "SPAR Enjoy" brand. In 2011, the Group, which employs around 70,000 staff, achieved sales of 12 billion euros.

www.spar.at



Photo: Andreas Lill

Fresh drinking water with the Carix® process

Gentle efficiency in softening process

The town of Rottenburg in the Southwest of Germany not only enjoys an idyllic location on the River Neckar – it is very attached to the water in other respects too. For the public utility company operates top-quality wells which provide 60 per cent of the drinking water to the town's inhabitants via 400 kilometres of supply mains.

17 districts, more than 11,000 households and 42,000 people in this medium-sized Swabian town have to be supplied with water. They consume almost two million cubic metres per year, and their supply is of very good quality indeed, because the public utility company, Stadtwerke Rottenburg am Neckar GmbH (SWR), makes every effort to keep the wells, waterworks and supply grid in tiptop condition. They also test the quality of the water in Rottenburg on

a daily basis in order to make sure that it always meets the high standards stipulated in the drinking water regulations.

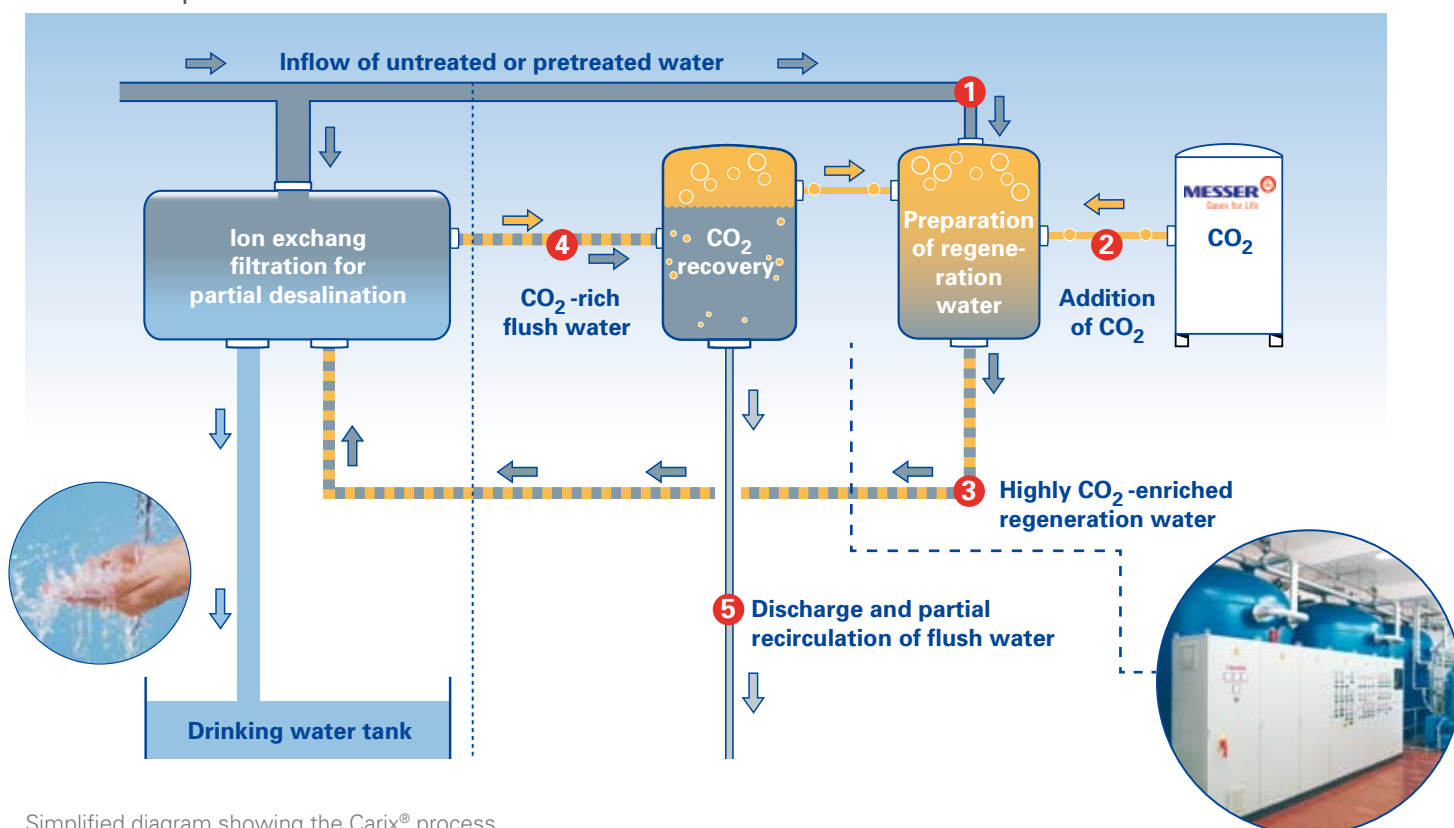
In order to comply with these stipulations and achieve excellent water quality, the untreated water has to be treated in several stages. It is filtered, disinfected with ozone and softened with the Carix® process¹. This involves removing salts dissolved in the water with what is known as an ion exchange process.

Around 700,000 kilograms of carbon dioxide a year is needed for this. SWR has decided to work with Messer as the supply partner for the required gases.

The Carix® process is based on the combination of two ion exchangers. The mildly acidic cation exchanger removes amongst others, calcium and magnesium and thus lowers the hardness of the water.

¹ Carix® is a registered trademark of VA TECH WABAG

The Carix® process



Simplified diagram showing the Carix® process

The anion exchanger extracts sulphate, chloride and nitrate. Both ion exchangers are located in a reactor vessel. Once they are fully laden with these ions and have thus reached their capacity limits, they are jointly and simultaneously regenerated by the introduction of carbon dioxide. Unlike in other processes, no additional salts are required for regeneration of the ion exchangers. Carbon dioxide suffices in order to dissolve the removed ions from the exchangers again. The flushed water from the regeneration process therefore only contains the salts separated from the untreated water. Most op-

erators of Carix® installations in Germany can therefore discharge their flushed water into surface waters. The fact that the majority of the carbon dioxide that is used can be recovered and reused in the process also contributes to the environmental friendliness of the process.

The most important advantage of the process is that the degree of hardness and the sulphate, chloride and nitrate content are simultaneously lowered to the desired level in one step. This makes the process particularly simple and increases its efficiency. Partial desalination

with the Carix® process also has less of an impact on the materials of which the drinking water plant is constructed. Since not only are bicarbonates reduced, as with rapid decarbonisation, but sulphates and chlorides as well, the water reaches a better value in terms of the corrosion index and therefore causes much less corrosion to the equipment and pipes. The mixture ratio between anion and cation exchangers can even be adjusted as required so that the emphasis of partial softening is shifted towards an anti-corrosive effect.

Silke Römer, Messer Industrial Gases



The employees of the public utility company in Rottenburg are very familiar with the process.



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Food

Chemical Industry

► **Transportation**

Pharmaceuticals

Medicine



Belgium: Maintenance of container ships

Mussels and machines

The Mediterranean Shipping Company (MSC) is the second-largest container shipping company in the world. The MSC subsidiaries Medrepair and Engine Deck Repair are responsible for the maintenance and repair of the company's 455 container ships (as at April 2012) as well as its countless containers. The two subsidiaries are based in the port of Antwerp, where MSC is the largest employer. Medrepair undertakes the repair of any damage to containers and refrigerated containers, while Engine Deck Repair specialises in the maintenance of the entire fleet of vessels. The maintenance work ranges from the removal of mussels and algae from the skin of the ship to the repair of piping, machinery and steering gears. This work also requires gases in significant quantities: Messer supplies MSC with acetylene and oxygen for cutting, heating and straightening, as well as with Ferroline shielding gas mixtures for welding.

Frank Vanbaeden / Marina De Ridder, Messer Benelux

Chief Engineer Joseph Nielek inspects damage and corrosion on an MSC container ship.



Hungary: Welding gases for track vehicles

Comfort on rails

The twin-wheelset bogies in modern trains play a crucial role in terms of their safety, durability and ride comfort. Bombardier, the global market leader in track vehicle technology, builds several thousand Flexx bogies of this kind per year. One of the production centres for these bogies is Mátránovák in Hungary. Messer supplies the factory with the

gases that are required for the laser, plasma and flame cutting machines as well as the welding robots. Besides liquid oxygen, argon and CO₂, the plant also uses acetylene in cylinders. The factory's gas supply system was also designed and installed by Messer.

Krisztina Lovas, Messer Hungarogáz



A Bombardier Flexx bogie

Hungary: Vehicles with compressed-air drives

Whizzing off without emissions


The "Windriders" from the University of Debrecen can get their vehicle to travel more than ten kilometres on ten litres of compressed air at 200 bars. This performance ensured that they came first in last year's long-distance trials at the Pneumobile Race in Eger in eastern Hungary. The annual competition featuring the best pneumatic motors was jointly launched in 2008 by Bosch Rexroth Pneumatika Kft. (Eger) and

Bosch Rexroth Kft. (Budapest). It is open to students from technological universities and universities of applied sciences. The companies, which are part of the Bosch Group, provide them with the necessary drive and control technology. The cylinders of compressed air and the necessary pressure regulators are supplied by Messer. Twenty-eight Hungarian and 15 foreign teams took part in this year's race in May.

Krisztina Lovas, Messer Hungarogáz



Compressed-air-powered motors are emission-free.



Environmentally friendly recycling of refrigerators

Deep freeze beats climate killer

Just one old refrigerator that is not disposed of correctly causes the same amount of damage to the climate as driving 14,000 kilometres in a car. This is because of the chlorofluorocarbons (CFCs) in appliances which date from the time before these ozone-layer and climate killers were banned. The technically correct way of recycling refrigerators involves the use of nitrogen to collect the harmful CFCs so that they do not escape into the atmosphere.

CFCs are gaseous in normal conditions and rise or evaporate very easily as far as the stratosphere, where they contribute significantly to the depletion of the ozone layer. They also absorb much more thermal radiation than CO₂ and act as dangerous greenhouse gases. They were used in refrigerators until 1995 for two purposes: as a coolant in the cooling circuit and as a foaming agent for the insulating layer. Since the ratification of the Montreal Protocol, they may no longer be used for either, but many old appliances are still in use or being stored

at waste disposal sites to this day. The real environmental hazard is associated with any escape of the harmful gases into the atmosphere during disposal of the refrigerators.

This makes professional recycling all the more important. Collecting the CFCs from the cooling circuits of the appliances is not a problem as long as the pipes are still intact. The cooling compressors are removed and the oil and coolant contained in them simply sucked out. It gets more difficult with the subsequent shredding of

the appliances in a shredder, whereby the CFCs can escape from the foam insulating material. Messer has developed the Duo-Condex process to facilitate maximum recovery of these gases as well. In this process, the waste gas from the shredder flows through condensers that are cooled with liquid nitrogen at a temperature of minus 196 degrees Celsius. In these extremely cold temperatures, the harmful substances freeze to the inner walls of the condensers like rime and are thus removed in a targeted manner.

Dr. Friedhelm Herzog, Messer Group

	The emission of 2,000 kg of CO₂ corresponds to:	Financial cost:
CFC content of a refrigerator	500 grams (compressor + insulating foam)	Recycling costs per refrigerator = approx. 10 to 15 euros
Domestic electricity	2,900 kWh	Annual requirement of a small household = 600 euros
Private car	14,000 km	Fuel costs = 1,200 euros

A photovoltaic installation on the roof of a detached house would have to generate electricity for a year in order to compensate for the greenhouse effect caused by the emissions from a single CFC refrigerator that has not been disposed of correctly.

Xenon – No longer strange, but rare

Profile: Xenon [Xe]

Element symbol	Xe
Occurrence	Mainly in the atmosphere, with a concentration of approximately 0.09 ppm. The oceans, some rocks and natural gas deposits also contain small quantities of xenon.
Melting point	–111,7°C
Boiling point	–108,0°C
Chemical properties	Colourless, inert like all noble gases, but the most reactive element in this group along with radon. It even reacts directly with fluorine, however most xenon compounds are unstable or only occur under unusual conditions.
Production	Air separation
Uses	Component in lamp filling gases, lasers and plasma screens, inhalation anaesthetic, means of propulsion in ion engines



Noble gases are rare, and this is particularly true for xenon. On Earth, it is the rarest stable element of them all.

William Ramsey had isolated helium for the first time in 1895 and realised that, according to the laws of the periodic table, there had to be other noble gases. However, he only found xenon when he analysed the newly discovered element krypton in greater detail with Morris William Travers. They were able to isolate another gas through fractional distillation. The two researchers named the substance, which had defied discovery, as it were, after the ancient Greek word for strange – xenos.

Today, xenon is obtained from air in air separation units. Due to the low concentration of xenon in the atmosphere, this is only economical in very large plants. For example, if 24,000 kilograms of atmospheric oxygen is produced per hour in a special air separation unit, then even theoretically, the quantity of xenon produced will only be one kilogram per day. Nowadays, xenon is extracted from liquid oxygen in an air separation process. Some 24,000 kilograms of oxygen is needed in order to produce about 9.4 kilograms of xenon a day in what is a complex process involving a special air separation unit.

The cost and effort involved is so great that it is rarely used even in medicine, although xenon is one of the best tolerated and most environmentally friendly anaesthetics. Among other things, it is used as a filling gas for gas discharge lamps because xenon lamps are two and a half times brighter than halogen lamps and because the light they emit is very similar to daylight. The uses for these lamps include car headlights, film projectors, flashlights and airport runway lights. By the way, humans are putting xenon into space too: as the means of propulsion in ion engines, where the gas is keeping satellites in their desired position.

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We are ...



From left to right: Zsolt Pekker, Thomas Böckler, Tim Evison, Diana Buss, Marlen Schäfer, Dr. Christoph Erdmann, Nicole Urweider, Dirk Kampfmeier, Monika Lammertz, Dr. Joachim Münzel, Michael Holy, Krisztina Lovas, Benjamin Auweiler, Angela Bockstegers

(Not pictured: Angélique Renier and Dr. Bernd Hildebrandt)

Competition

Delicious!

In this issue of the magazine, readers have the chance to win a gourmet hamper filled with things that are perfect for hot days and mild evenings.

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 27 July 2012.

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 Christian Wölfleider from Ried/Innkreis in Austria. The correct answer was "VARIETY".

What is the name of the second-largest container shipping company in the world?

4																			
1																			
			3																

What is the name of Messer's refrigerator recycling process?

	2							5		
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Which process purifies drinking water in an environmentally friendly way using ozone?

		6			
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Answer:

1	2	3	4	5	6

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

Party fog effect



In fantasy films, it is the unmistakable sign of a dubious witches' brew when there is thick white fog rising from a nasty-looking concoction. At a party, however, you can enjoy this ultra-cool kick without fear: Mistystix drink stir sticks have a securely sealable compartment for a dry ice pellet. The CO₂ has a temperature of minus 78 degrees Celsius and cools your drink without diluting it. Moreover, it creates a cool fog effect and remains securely enclosed until it has dissipated entirely.

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

www.GasesforLife.de

