

Systematic Success

The fine art of controlling high pressures.

MEDIUM AND HIGH-PRESSURE COMPRESSORS

AIR AND GAS PROCESSING

SCREW COMPRESSORS





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> Foreword



***No-one places trust without reason.
It's something that has to be earned.***

For six decades, customers and friends have known and valued us as manufacturer of screw-type and high-pressure compressors for breathing air and industrial applications.

We are also a recognised partner for customised solutions in the industrial, research and scientific sectors. Our systems can be found in power stations, in large manufacturing industry projects and also in the aviation and aerospace industries, to name but a few examples.

Our experience is a decisive advantage. A further advantage lies in our strategy. Because we wish to offer the highest quality from a single source, we are the only company with a command of the decisive system steps associated with compressed media:

| Compressing | Conditioning | Storing | Distributing

Therefore, as BAUER customer, you receive precisely what you actually need to enable optimal working. Absolute perfection, from a single source. Your concerns are our concerns, your requirements and vision are our motivation. Your praise pleases us, your criticism spurs us on.

In the past 60 years, in the coming 60 years and beyond. I believe that, only in this way, can trust be earned and that it is well placed.

H. Bauer

Heinz Bauer
Proprietor and CEO

➤ The three columns of the BAUER GROUP.

EXEMPLARY IN EVERY FIELD

The common denominator of all BAUER products is pressure. We put gases under pressure, with pressures ranging between 7 and 500 bar.

It all began 60 years ago with compressors for air. Today BAUER compressors also compress natural gas, nitrogen and inert gases. We have not yet reached our limits. In fact we expand them every year.

Many gases have to be treated before they can be compressed by removing carbon dioxide or nitrogen, for example. Most gases are also purified after compression. They then have to be stored and distributed.

BAUER has mastered these areas creating complete systems. BAUER stands for turnkey, customer-oriented and functional systems, with the most durable components, intelligent parts solutions, the highest standard of product quality and the best service.



MEDIUM- AND HIGH-PRESSURE COMPRESSORS

These work with pressures of between 35 bar/500 psig and 500 bar/7400 psig. These compressors are used in diving, for fire brigades, in medicine and in research as well as in a wide variety of industry sectors, such as power stations, testing equipment, gas recovery, seismology and the processing of plastics.

Another BAUER field that is of great interest and is also growing rapidly is the compression of natural gas, particularly in the form of turnkey natural gas filling stations for refuelling all types of vehicles.



SCREW COMPRESSORS

Screw compressors can be found wherever air and gases need to be compressed continuously and with pressures ranging between 7 bar/100 psig and 40 bar/600 psig. As an original equipment manufacturer with ROTORCOMP, BAUER has specialized in the technology of screw compressors since 1980. At ROTORCOMP, compressor blocks, compact compressor modules, special assemblies and components are developed, constructed, manufactured and sold worldwide exclusively to plant construction companies. Strict compliance with quality assurance according to ISO 9001 and innovative technical solutions ensure our leading market position.



AIR AND GAS PROCESSING

Oil, moisture and other impurities have to be removed from the gas before or after compression. This is the only way to ensure that every compressor unit supplies a constant air and gas quality – even over the long term. BAUER regularly exceeds the legal requirements, and is usually considerably below the maximum permissible values.

Diaphragm systems, cartridge filters or regeneration filters are available. Intelligent new developments, such as BAUER's AERO-GUARD system, which brings the CO₂ content of breathing air well below the strict limiting values of DIN EN 12021, helps operators to work safely, economically and in a way that is acceptable for their customers.

> Into the deep.

“From the very beginning, which is now over two decades ago, BAUER has been on board. In the shop we use two powerful sound-insulated compressors with SECURUS breathing air monitoring and CO₂ removal. Our filling installation is equipped with everything that ensures good breathing air quality. We also have four mobile BAUER diving compressors for events, diving trips and diving holidays. The B-TROX PACKAGE solution for the safe production of nitrox will soon be installed. Moreover, with a chip card our customers can fill their Scuba tanks 24 hours a day using a modern outside filling installation, regardless of the shop’s opening hours. You could almost say that we live on the air that BAUER produces. We have only had positive experience, for us any other manufacturer would be out of the question.”

Marcus Paul, owner of Paulis Tauchshop, Senden





IN THE LONG RUN BAUER IS BETTER

If breathing air compressors are to run reliably around the clock or if absolutely perfect air supply is required for diving events, this is when the BAUER installations are in their element. They gain acceptance through their reliability and also through a second, major criterion: through the high quality of the breathing air they provide. To guarantee this, all the stops are pulled out in the compressor itself, as well as for the pre- and post-treatment of the air. In the compressor block, for example, all the cylinder sliding surfaces are machined in such a way that they require very little oil, or in extreme cases no oil at all for lubrication. This reduces the amount of oil entering the air. Also used are durable, economic BAUER filter, diaphragm and separation systems that free the air of impurities. Cleaner and more reliable operation is ensured with BAUER. It is no coincidence that BAUER is the first compressor manufacturer that can offer a TÜV-certified system for producing oxygen-enriched breathing air, Nitrox, and filling it into tanks.



To ensure everything runs smoothly: the defined smoothing of the sliding surfaces, which is achieved in the final operation step through the high-end honing of the sliding surfaces

WHY BAUER COMPRESSORS HAVE A LONGER SERVICE LIFE

Using numerous complex processes, the tempered cylinder sliding surfaces in BAUER compressors are machined to be so precise and even that wear and abrasion are minimal even after decades of operation. This is a crucial factor for the low oil consumption and the high quality of the breathing air.

➤ Any risk is one risk too many.



“The dedicated members of the Bavarian Fire and Emergency Planning Service are the focus of our training and of our efforts. Each year, we train about 3,000. What matters to us? Among other things, the quickest, best, safest systems for the treatment of breathing air. That is not a luxury, that is a standard which is a matter of survival. We are not concerned with money, but rather with things that money just cannot buy.”

Dr. rer. nat. Christian Schwarz, Head of the Fire Service School in Geretsried

A JOB FOR THE BEST PEOPLE

Powerful compressors and equally powerful huge storage banks characterise BAUER applications for fire services worldwide. In addition, there are automatic switching systems and quick-filling devices, which help to minimise the time for each filled breathing cylinder. The partnership with Dräger, the world-leading manufacturer of respiratory systems, which has lasted for over 50 years, has made BAUER compressors renowned with almost all fire services throughout the globe.

The requirements include optimal functional safety and ease of operation, in addition to that for generous air reserves. Systems required for fire-fighting applications must be simple, robust and capable of correct operation by anyone, even in stress situations.

Furthermore, several interesting special applications are available, such as the so-called Comboost systems which supply down to the last litre of stored breathing air, independent of the outside world – in shafts or tunnels, for example. Again, it is no coincidence that BAUER compressors have established themselves in this area.



MORE STRINGENT THAN ANY LEGISLATOR

In the eyes of BAUER, it is no luxury to, for example, record the origin and quality of every single aluminium bar, from which a pressure vessel will later be manufactured. The material stamp reveals the whole history of the blank. Without this stamp, it would not be accepted by the BAUER production. Variations between 330 bar/ 4700 psig operating pressure and ambient pressure will demand the highest performance from this piece of aluminium. Later, no-one will be able to detect from the outside, whether the component is OK or not. For this reason, BAUER has set its own standard. For BAUER beside quality safety has top priority.

> Working at the limits every day.

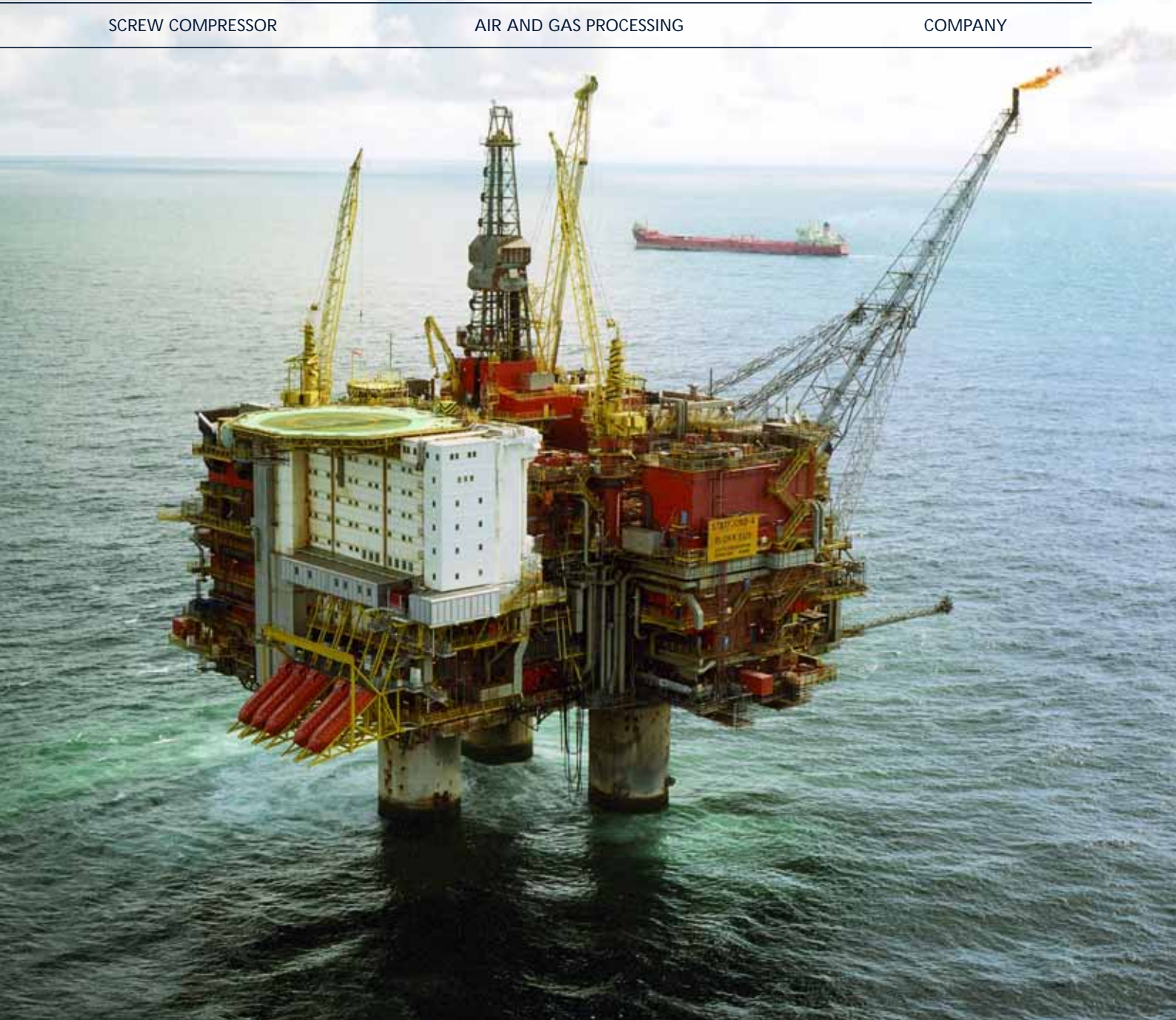


“We develop and manufacture seals for sensitive areas and applications. You could say that we are custom producers for complex high-performance seals. Whatever we supply, it must function one hundred per cent, otherwise it will cost money and may even be dangerous. BAUER compressors are in use here every day to expose our seals to extreme loads. Our knowledge and success is due in part to BAUER compressors.”

On left: Alois Eckert, Technical Employee
On right: Dr. Andreas Schrufer, Head of Development,
Burgmann Industries GmbH & Co. KG

BOUND BY PROFESSIONALISM

Defective seals may bring large systems, such as oil drilling platforms, to a standstill. Manufacturers that demand a high standard of quality use BAUER compressors to check the function of their products extensively and meticulously at an early stage – often in the presence of the customer. The systems used here must be operated perfectly and function smoothly. BAUER not only delivers the turnkey installations, it also provides the training for the employees. If a task cannot be solved by one of the company's own employees, then the BAUER service team will be onsite in no time.



THE FORMULA 1 OF COMPRESSORS

In the test laboratory and during research, compressors are loaded to the limits. It is this area in particular that demonstrates time and again the outstanding quality of BAUER products. The large market share in this segment is also a positive sign for our "normal" users: anyone producing 500 bar of positive pressure for long periods of time every day, knows what he is doing. Perhaps it is also just as important that the BAUER compressor blocks, the core of the top performers, are usually identical to the "very normal" standard production parts. Every laboratory has the reserves at its disposal that benefit everyday use.



➤ Shaping ideas.

"I have been involved in the field of gas injection moulding since the 1980s. Currently I have been advising Vlaams Kunststoffcentrum. Valuable fundamental work with regard to improving injection moulding processes is being carried out here. Our equipment includes a gas injection unit from BAUER compressors. Particular features that should be highlighted are the simple and precise control of parameters and the reliability. Another advantage is the option of being able to move the control console and the valves very close to the injection mould."

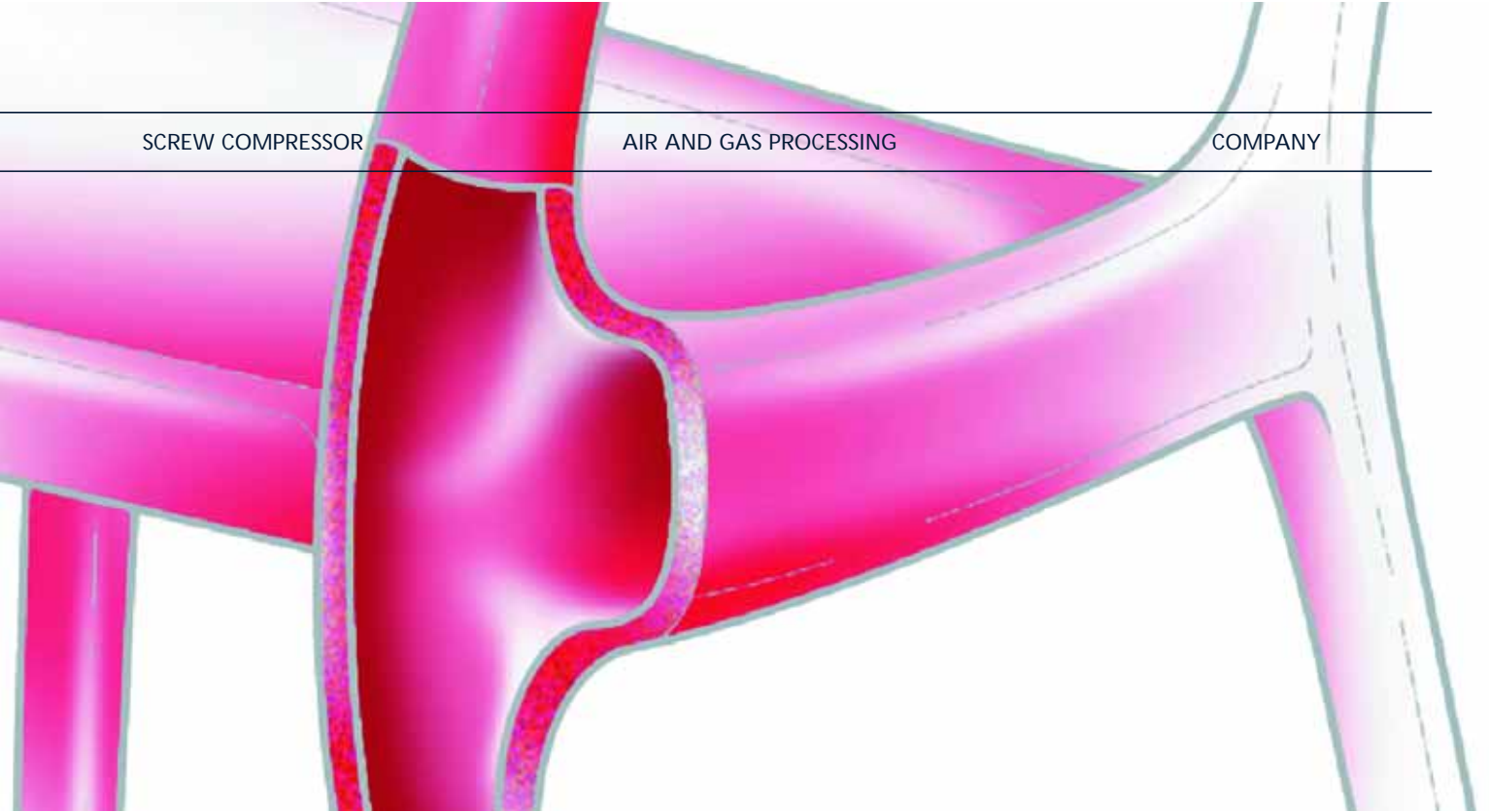


Willy van der Hoyer
Consultant for Vlaams
Kunststoffcentrum,
Belgium

LESS IS MORE

Less use of resources – more stability: an ideal that has also had a decisive influence on automotive engineering. The interior fittings of vehicles, such as instrument panel brackets, door trim and armrests, but also exterior components, for example bumpers acquire greater stability through the gas injection moulding process. It is also quicker and more cost-effective to produce parts in this way. After the plastic has been injected into a mould, compressed nitrogen or water is injected into the plastic in this process. This forms a cavity and the plastic is pressed against the wall of the mould. BAUER compressors units compress nitrogen up to 400 bar and inject it into the hot plastic. Parameters for time and pressure that have already been programmed are set with precision.

Elements for improving the process, such as mass-flow meters or bypass valves, round off the range of products and once again demonstrate that BAUER compressors is a manufacturer clearly focused on practical applications.



FLOWING FREELY: INJECTION MOULDING USING WATER

The new system from BAUER compressors for injection moulding using water is based on experience gained from four generations of gas injection moulding solutions. BAUER compressors offers a compact unit that can be connected to any injection moulding machine. The parameters for water pressure, water injection volume, water injection rate and water temperature are constantly monitored and regulated both during the dynamic phase and in the static phase. The electronic controller permits the parameters to be adapted to customer and part-specific requirements through a self-explanatory and easy-to-operate user interface.

Easy to operate, ready to install on delivery: WIT units from BAUER

> Cleanliness at the highest level.

“Natural gas burns more cleanly than diesel. This is particularly relevant for snow cats. Our one-year test with the world’s first gas-powered snow cat and the snowmobile has been a success. We are working in Saalbach-Hinterglemm at an altitude of 1,200 metres. Here we are testing the handling of the vehicles on a 2.5 km route and are preparing an area covering 25,000 square metres. The advantages include lower emissions, better cold starting, and quieter engine operation. Plus the mobile natural gas trailer system means we are self-sufficient. We are convinced that this will become the norm.”

Engineer Johann Schmidhuber, Salzburg AG for Energy, Transport and Telecommunications



OVER A DECADE AHEAD OF THE TIMES

Since the mid-90s, BAUER has been making system solutions for the fuelling of natural gas powered vehicles. Long before the realisation of finite oil reserves finally appeared on the public radar, we were supplying sophisticated, reliable and safe natural gas supply systems. There are more than 300 BAUER natural gas filling stations across Europe, with a further 300 in the USA. We are currently experiencing unprecedented demand. When it comes to CNG filling stations, we know what we are talking about and what we are installing. Others are only starting to think about.



THE PERFECT BALANCE

A natural gas filling station is a balanced system consisting of a storage bank which holds CNG (= compressed natural gas) and a compressor which keeps topping up this bank. The compressor uses the breaks between fuelling to top up the storage bank. Even getting the dimensions of the compressor and the storage system right and choosing a filling strategy is a question of experience. Each BAUER CNG filling station is a finely tuned system consisting of a BAUER compressor, a BAUER gas dryer system, a BAUER storage unit, BAUER priority and sequence controls and a BAUER fuelling device. The complete system, which is TÜV-certified, is only available from BAUER.



> Where the air is too thin for many.



“The Quingzang railway crosses the Tibetan plateau. Here, at an altitude of 3,000 to 5,000 metres above sea level, the climate is harsh. In places, the amount of oxygen in the air is only half that at sea level. In order to prevent altitude sickness and headaches among passengers, we compress the ambient air, feed it into a membrane generator and thus supply more oxygen to the compartments. The resulting oxygen content is similar to that on board a passenger plane. The Linghein air compressors that are suspended beneath the carriages are based on ROTORCOMP screw compressors. The system is maintenance-free. We have a lot of confidence in the technology we are using and expect it to operate smoothly for decades to come.”

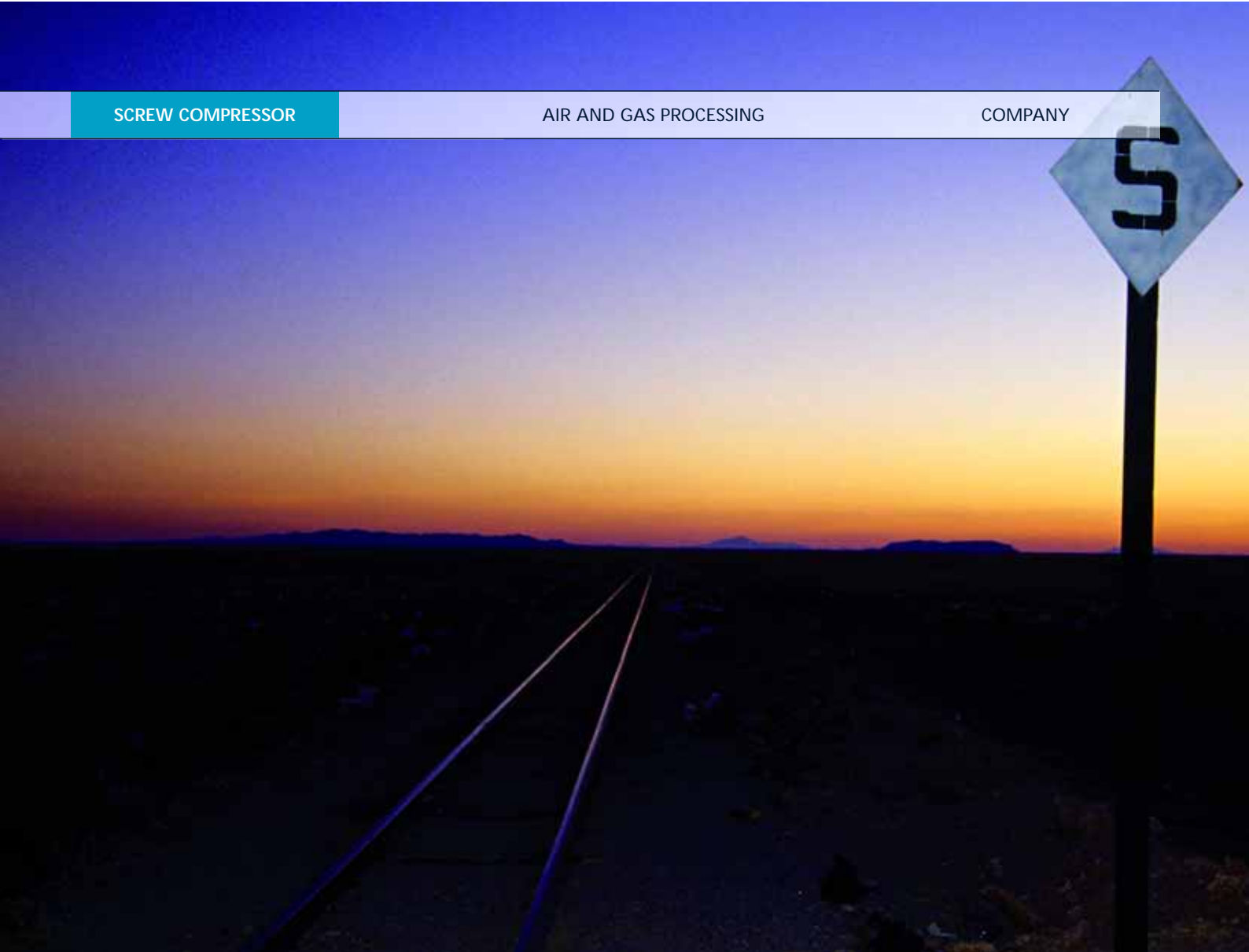
Wang Kaituan, Manager of the Technical Department,
BOMBARDIER SIFANG Power (Qingdao) Transportation Ltd.

THERE'S POWER IN A NAME

With this project, as with many other mega projects, ROTORCOMP compressors are literally as important as the air we breathe. The high level of effectiveness as well as the high quality and reliability of the units are no coincidence; instead, they are the result of continuous work. The company is part of the BAUER GROUP, which has been a pioneer of screw compressors, among other things, since the 60s. BAUER has been making screw compressors since 1965, and since 1980 this area has been the responsibility of its subsidiary ROTORCOMP.

ROTORCOMP develops and produces compressor blocks, compact compressor modules, special units, components and accessories and sells these to plant engineering firms around the world.

Meticulous development and production, intensive collaboration with customers and innovative technology make ROTORCOMP a world leader in this sector.



ENDURANCE TEST ON THE ROOF OF THE WORLD

The screw compressors on the carriages of the Qingzang railway are exposed to extreme temperature fluctuations (-45° to $+35^{\circ}\text{C}$). Add to this sandstorms and the low ambient pressure of 0.5 to 0.7 bar. Notwithstanding this, the 22 kW screw compressors are performing excellently and reliably.

> Clean air is the key ingredient.

“We produce top quality baking mixes that are among the best known in Europe. Truly clean compressed air is an important ingredient. Because oil and germ-free air is an essential prerequisite for the consistent quality of our products. In this sensitive area, we have opted for the EcoTec Converter because it meets our requirements optimally, both in technical and financial terms. After over 18,000 operating hours, we have been consistently happy with the results. Not to mention the savings we are achieving as a result of not having to dispose of the condensate. Innovation, efficiency, sustainability and real environmental benefits: EcoTec is our kind of solution.”

Helmut Mayerhofer, Technical Director, Backaldrin Österreich GmbH

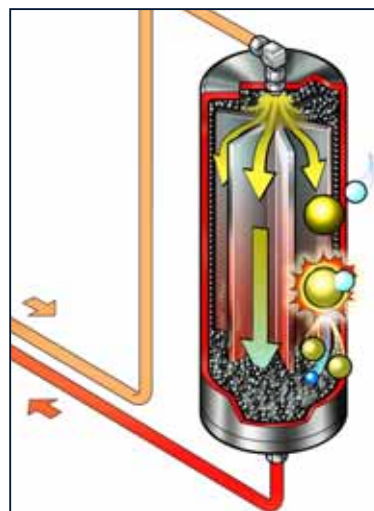


ECOTEC: OIL-FREE COMPRESSED AIR – PURE WATER AS CONDENSATE

For most applications – such as breathing air, food and drink industry or chemicals industry – compressed air has to be treated, i.e. purified prior to use. Oil and particle residues have to be removed in particular. The innovative EcoTec Converter, developed and produced by the BAUER GROUP, is the quintessence of over 60 years' experience in air treatment.

Through catalyst technology, oil and other hydrocarbons are converted into water and harmless air components. The quality of the resulting compressed air is significantly better than what is stipulated for oil in the ISO 8573-1 standard (Class 1). The high standard is maintained throughout the entire operational life of the converter.

Guaranteed process reliability, oil-free compressed air, an oil-free condensate, low energy consumption: EcoTec sets completely new standards.



The heart of the EcoTec Converter: The catalyst that converts hydrocarbons into water and carbon dioxide.

SECCANT, SECURUS AND P-SYSTEM, MILESTONES OF TREATMENT TECHNOLOGY

For many decades, BAUER has been supplying reliable and efficient systems for the treatment of air and gases. Regeneration dryers like the BAUER SECCANT series are a byword for the efficient treatment of high pressure air and gases around the world, particularly in industry. The patented SECURUS safety system monitors the saturation of the filter cartridge during day-to-day operation. P-Systems from BAUER Kompressoren supply divers and firefighters with high-purity breathing air whose quality exceeds that required by the strict limits of the DIN EN 12021 standard. And AERO-GUARD is helping filling station operators to comply with the statutory CO₂ limits. BAUER is thus setting the benchmark in filter technology.

> Nucleus for quality.



Highest level of process reliability through latest assembly technology



The ideal situation for every production: in "green pastures"

THE HEARTBEAT

In 2002 BAUER brought into service the UNICCOMP GmbH production site located to the south of Munich, which was developed using the latest production concepts. The compressor blocks, the "heart" as it were of each compressor, and most of the associated components are produced here for the BAUER GROUP.

The overriding principle here is: to produce quality. Quality control starts with purchasing. In the goods inwards inspection, dimensions, materials, hardness, densities etc. are checked.

In production, there is a 100% final inspection in defined test departments. The main tasks of UNICCOMP include the continuous improvement of cost structures, a reduction in delivery times and an increase in quality.



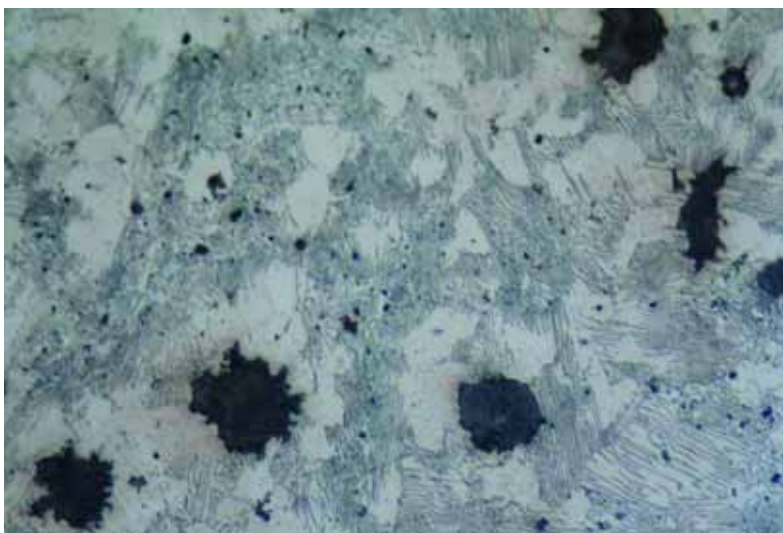
Assembly of a IK 18.1 compressor block

DONE AND DUSTED

On a production area of around 6,000 square metres, the following products are manufactured in the UNICOMP factory:

- High- and medium-pressure piston blocks (breathing air, industry, gas)
- High-, medium- and low-pressure components
- Low-pressure screw compressors: blocks and compact modules
- Filter cartridges and replacement parts

➤ Only rule: no exception.



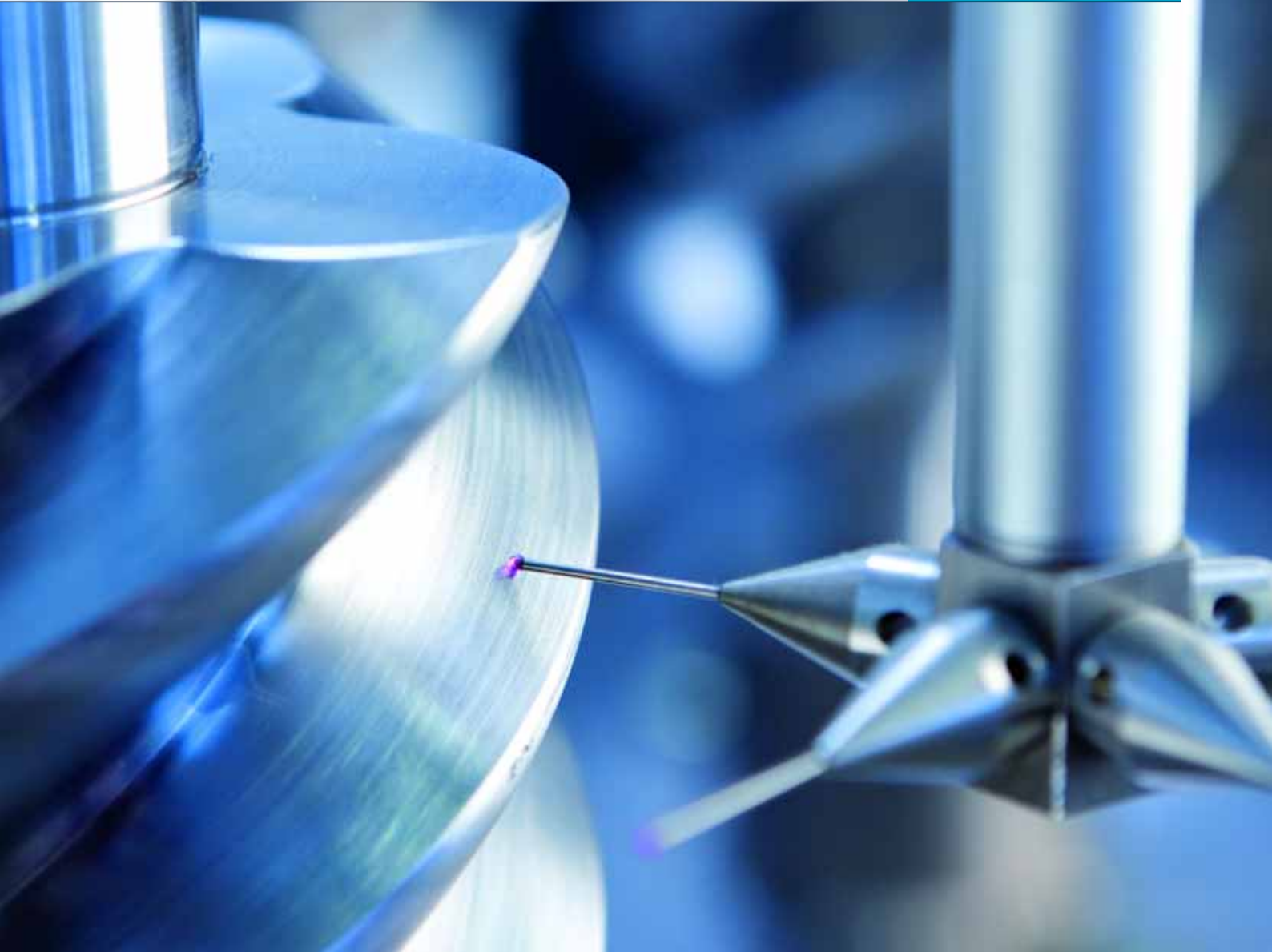
"The microscope at the BAUER incoming goods department makes hardness visible: The material structure image shows inclusions of pearlite, ferrite and graphite, allowing conclusions to be drawn on the degree of hardness."

QUALITY IN ALL PHASES

Quality is BAUER's leitmotif and the reason for satisfied customers the world over. The quality requirement is not just something written down on paper, it is part of our self-image. It determines our choice of suppliers, our receiving inspection system, and our manufacturing process through to final inspection. All the necessary documents – from test log to quality control documentation – are drawn up by our highly trained and qualified staff. They constantly monitor the quality improvement processes within the company.

OUR OWN TESTING CENTRE

The technical testing centre tests all BAUER prototypes and subsequent standard products to see if they are suitable for series production. This includes extensive endurance testing, detailed checks and, finally, complete documentation of the results. In close collaboration with the technical and design departments, the testing centre tests procedures, parts and components for compressor systems. Visits to customers and regular analysis of complaints allow potential weaknesses in BAUER products and services to be identified, and any corrective or preventive measures are then defined and implemented without delay.



Every BAUER compressor undergoes a rigorous and comprehensive operational test



➤ Service from BAUER: The power is in the movement.



THE PERFECT ADDITIONAL RANGE

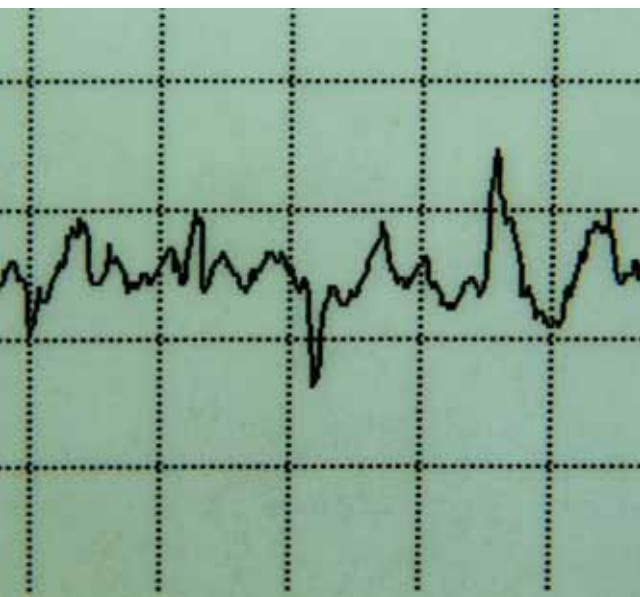
Every system is of course supplied with extensive printed documentation that contains operating and maintenance instructions as well as spare parts lists. In addition, documentation is also available to order in electronic form on DVD, and some is also available via the internet. Parts can be ordered from anywhere in the world via our sales network with more than 50 national representative offices and their extensive service network. On request, parts that have been ordered can be dispatched from the BAUER factory the next day. In Germany, BAUER also offers an overnight service. Anything ordered before 2 pm will be delivered the following day.

For electronic components, such as controls, BAUER compressors offers a replacement service: the part to be replaced is sent in and replaced by an equivalent, tested component. This does away with the usual waiting times for a repair.

The BAUER direct service is promptly available throughout Germany when needed, 24 hours a day even on weekends and public holidays. As an additional service, BAUER offers customised, tiered maintenance contracts – from an inspection contract to complete maintenance. Inter-

IS THE PRODUCT EVERYTHING? ALMOST!

“Quality” at BAUER does not end with the production and delivery of the system. The customer profits from an outstanding and comprehensive after-sales service, regardless of the location of the unit: replacement parts for all the latest models and wearing parts for all models dating back to a year of manufacture of 1980 are always in stock and can be dispatched immediately. Replacement parts for older models can also be procured within a short period of time.



Test records make test results apparent to every service customer on request



Included in the service as an option: installation plus TÜV approval

national certification, such as "Germanischer Lloyd", "Det Norske Veritas" and "Lloyds Register of Shipping" as well as TÜV approvals will also be implemented as a service for customers as required. Another component in the service portfolio is our practical training programme. In the BAUER factory or at qualified service partners customers are perfectly prepared

for operating the units. The programme includes one-day operator courses for diving units to several-day training courses for the maintenance and operation of complex fuel gas systems.

➤ Employees: Quality comes from the head.



BAUER sees itself as a service company, both with regard to the customer and internally in terms of team-oriented co-operation

PEOPLE, NOT MACHINES, MAKE THE DIFFERENCE

The quality of the machines and systems used in BAUER production is extraordinarily high. A quick tour of the modern, strictly organised UNICCOMP production site is a "who's who" of machine construction. From chip removal, surface machining, assembly technology to measuring technology – you will always come across the leading manufacturing brands in their particular sectors.

However, only the people at the machines can take responsibility for and produce the BAUER quality. Their motivation and qualifications make the difference. The high standard of quality is ensured by the continuous training and further training of all employees. From the assembly worker to the skilled worker at the machine tools and the engineer, all employees are involved in the company's decision-making processes and contribute their skills accordingly.

At the centre is the desire to satisfy the customer's needs, which they achieve every day through the high level of flexibility, motivation and the will to solve problems.



www.baugroup.com

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SCREW COMPRESSORS

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