

# Sealing competence for the chemical industry



# As versatile as the requirements of the chemical industry: Sealing solutions from EagleBurgmann.

Eastman Chemical Co., USA

**Expansion joints in pipes carrying steam.**

Wacker Chemie, Germany

**Agitator seals with supply system for high-pressure reactors in the production of polymer dispersions.**

El Dorado Chemical Co., USA

**Metal expansion joints in a nitric acid plant.**

BASF, Shanghai

**Sealing of compressors in a synthesis gas plant with gas-lubricated mechanical seals.**

Yeochun NCC Company, Korea

**Sealing of a coolant compressor with multiple mechanical seals.**

Incitec Pivot Ltd., Australia

**Fertilizer production. Sealing of compressor bearings with Espey carbon floating ring seals.**



Teijin Aramid, The Netherlands

**High-efficiency magnetic coupling for sealing a heat transfer pump.**

BASF, Germany

**Stainless steel gaskets for centrifuge doors.**

Infracor GmbH, Germany

**Rotary kiln sealing system in an incineration unit for chemical residues.**

Polymer-Latex, Germany

**Cartex mechanical seals for pumps in latex production.**

## **The sealing specialist for all chemical processes**

EagleBurgmann is one of the world's leading system suppliers of sealing technology and has been a partner to the chemical industry for decades. Right from the start we brought our innovative approach to shaping the sealing technology in this demanding industry. Throughout the world, our products and solutions are successfully deployed in all primary and secondary chemical processes.

## **Comprehensive industry-specific knowledge**

We understand the requirements of the chemical industry and have in-depth knowledge of its many processes and the materials produced. With our application expertise and technical consultancy skills we are able to provide reliable and cost-effective solutions for every need: products and services, such as application and standardization concepts.

## **Full-service partner with a global presence**

Research and development, consulting, engineering, design, production and a broad range of modular services are competences that our customers use to their benefit. Our comprehensive network of production sites and sales and service centers means that we are always close to you, wherever you are in the world.

# Sealing technology: A key component in the operation of industrial plants.



## Reliably safe and most economical

No industrial production plant can be operated without seals. The number of sealing spots and media to be controlled is correspondingly large. So there are quite a number of plant components that need to be sealed: rotating equipment, such as pumps, agitators and compressors; fittings and flanges, not to mention pipes and ducts carrying gases and liquids.

The reliability of the entire plant depends on many individual parts. The seals, as key component, play an important role. During the process, they protect the chemical products against external influences and contamination and help prevent emissions. They thus increase process safety, availability and the economic viability of the plant.

Sealing technology also often offers considerable potential for reducing costs – through process-orientated design and standardization, for example. The right product portfolio and knowledge of the processes and standards used allows EagleBurgmann to implement solutions that are not only technically safe and reliable but economically first-rate as well.

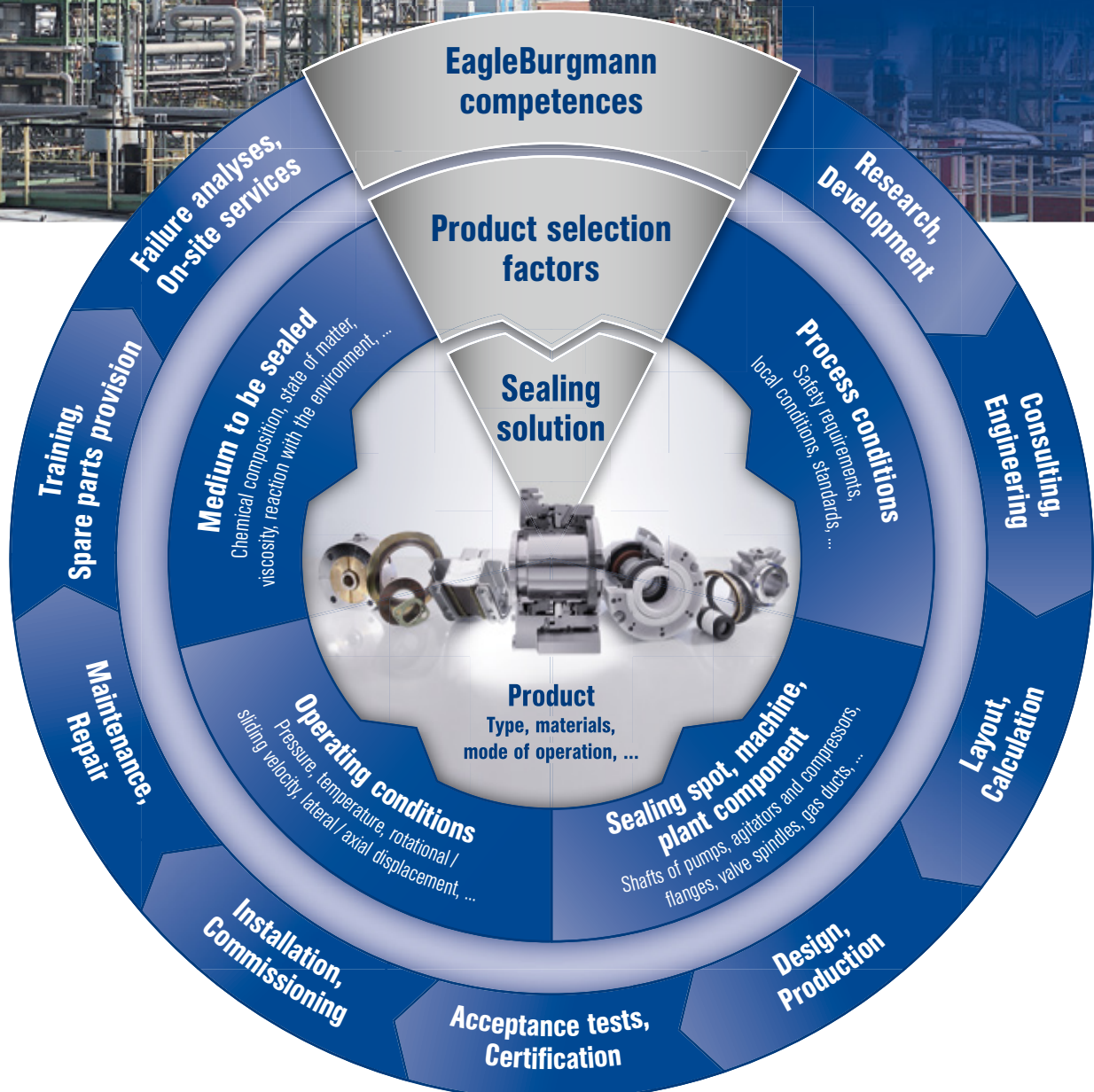




## Sealing solutions to meet any requirement

Several factors play a major role when choosing the product, the product type, the materials used and how it is operated: process conditions sealing spot, operating conditions and the medium to be sealed.

No matter what requirements our customers have: we know how these factors affect functionality and economic viability, so we convert this know-how flawlessly into long-term, reliable sealing solutions. EagleBurgmann has all the expertise needed to accompany and support the entire development, life and service cycle of its sealing solutions.



# Experience, demand and commitment: The building blocks for optimized sealing solutions.

## Reliable market partner with worldwide presence

With over 60 subsidiaries and 250 locations worldwide, we use our global focus to the benefit of our customers. Thus our production network, which has plants in Europe, Asia, North and South America, ensures that we are always in line with market requirements, produce on attractive terms and are able to supply regional markets.

We also have a comprehensive network of sales and service centers that covers every important economic region. Being close to our customers also means we are precisely acquainted with their processes and individual requirements.

EagleBurgmann is part of the German Freudenberg Group and the Japanese EKK Group. We have access to all the resources we need to offer optimum support to major customers at the international level and to become a long-term, reliable partner to them.

## Consulting and engineering with substance

Technical expertise grows from knowledge. This does not mean knowledge of sealing technology, but also takes in the machines, components and media to be sealed, the manufactured products and the industrial processes and process conditions.

Knowledge management helps us keep our comprehensive knowledge up to date and make it available to the entire company. We use databases, courses and training to develop our employees and bring together our industry expertise from all around the world.

Our dedicated and committed employees use this wide and varied know-how to give our customers well-founded advice on how to choose the best product from the technical and economic viewpoints and how to calculate and design according to need.

## High-level research and development

We invest a great deal in research and development in order to consistently improve the performance of our products. EagleBurgmann carries out publicly sponsored research projects and works together with institutes and universities. Joint projects with customers and suppliers are a regular source of new solutions.

Two large research and development centers in Germany and Japan, combined with a worldwide network of testing facilities allow us to respond flexibly to the requirements of our customers. We run acceptance test rigs for pump, agitator and compressor seals, development and testing laboratories for expansion joints and special test benches for acceptance tests and certification of seals to API 682.



### **Wide-ranging standard portfolio and tailored solutions**

Largely standardized and modular product series are an essential part of our portfolio. But we also offer individual solutions and provide the necessary development, engineering and production capacity for this purpose. Using the latest calculation and design methods, such as 3D-CAD, we adapt our products to customer-specific requirements or design new solutions. Worldwide design standards ensure that the most stringent technical requirements are met.

EagleBurgmann produces to the most demanding internal and external standards at various locations around the world. At all of these locations, we use ultra-modern equipment, optimized and standardized production processes and a great vertical production range – all building upon the reliable base of our excellent employees. Our quality management systems are certified to ISO 9001, for example.

### **Protection of humans, the environment and industrial plants**

Safety is an elementary requirement for industrial sealing technology. It is ultimately all about protecting humans, the environment, products and resources. A lot of what EagleBurgmann does goes far beyond the legal requirements. This sense of responsibility is part of the company culture and is firmly anchored in the guiding principles of the group.

Our environmental management system is certified to ISO 14001 and our work safety management system to OHSAS 18001. Regular audits and numerous training courses raise awareness in employees and management alike. This develops a culture in which everyone feels responsible for work safety, the environment and health protection within the company and on our customers' own premises.

### **Modular service concept ensures maximum flexibility**

Products and services are two sides of the same coin. Professional installation and commissioning, practical knowledge transfer, intelligent inventory management and regular servicing and maintenance extend service life and protect investments.

The need for services varies according to the operator and the system and is as diverse as the industry itself. Failure mode analysis, for example, or tailored on-site services, or engineering services related to sealing technology play an increasingly important role.

Be it for individual sealing systems, critical process elements, specific plant units, or a comprehensive service agreement for entire plants – our TotalSealCare modular service concept has the solution for every requirement. The individual service modules can be combined as needed to ensure maximum flexibility.



# Comprehensive product portfolio: Sealing solutions to meet any requirement.

## An overview of the EagleBurgmann product lines

Our comprehensive product portfolio covers all the needs of the chemical industry. From mechanical seals for pumps, agitators and compressors via magnetic couplings, carbon floating ring seals, seal supply systems, compression packings and gaskets through to single and multiple layered fabric, steel or rubber expansion joints.

Our decades-long partnership with the chemical industry has allowed us to develop a product range with high-level standardized solutions that covers many of their extremely varied requirements. We also design and manufacture special and one-off customer-specific solutions to suit individual applications.

This may mean a large series seal or an engineered one-off solution: EagleBurgmann products are always robust, reliable, easy to assemble and present a strong case due to their exemplary cost-benefit ratio. On the following pages, we set out our product portfolio. This is followed by a number of sample applications from real life, divided between the fields of: basic chemicals, fine chemicals, inorganic chemicals, industrial gases and infrastructure.

### Mechanical seals for pumps



The entire range of liquid and gas-lubricated seals. Available as standard seals or special versions, as single or multiple seals and for all categories and arrangements in accordance with API 682.

#### Successfully utilized in the chemical industry:

- Component seals:  
e.g. M3, M7, H7, LB500, EK700, HJ, H12
- Cartridge seals:  
e.g. Cartex, MA290, HRC, APitex
- Elastomer bellows seals:  
e.g. MG1, MG9, EA560, BT-AR
- Metal bellows seals:  
e.g. MFL, MBS, MF95, YE400
- Gas-lubricated:  
e.g. Cartex-GSDN, CGSH-K, GSO, HRGS, EM300

### Mechanical seals for agitators



For sealing shafts in mixers, kneaders, reactors, filters, dryers and special machines in normal and sterile processes. Robust, practice-oriented, economical. For steel and glass lined vessels.

#### Successfully utilized in the chemical industry:

- Dry running:  
e.g. SeccoMix, AD510/520
- Gas-lubricated:  
e.g. AGSZ, AGSR
- Liquid-lubricated:  
e.g. M481/M461, MR-D, HS-D, HSH-D, ERB

### Mechanical seals for compressors



The entire range of seals for process gas compressors. Robust, non-wearing and contact-free operation. Available as single and double seals, tandem seals and tandem seals with intermediate labyrinth versions.

#### Successfully utilized in the chemical industry:

- Compressor seals:  
e.g. DGS, PDGS, MDGS, TDGS, NF941
- Oil barrier seals:  
e.g. CobraSeal, CSR, CSE

### Magnetic couplings



For areas of application with very high requirements. Hermetically sealed, leak-free and maintenance-free pumping and mixing. Media are reliably kept in closed system circuits.

#### Successfully utilized in the chemical industry:

- Magnetic couplings:  
e.g. MAK66, MAK685, SMAK, RMAK, NMB High Efficiency

### DiamondFaces: Groundbreaking coating technology for sliding faces

EagleBurgmann created a landmark in mechanical seal technology with the introduction of DiamondFaces in 2007.

#### Innovative technology:

A microcrystalline layer with all the attributes of natural diamond is applied to the sliding faces by chemical vapor deposition (CVD) at 2,000 °C (3,632 °F) in a vacuum furnace. Thick layers coupled with extremely flat and uniform sealing surfaces characterize this procedure, which was developed together with the Fraunhofer Institute for Surface Engineering and Thin Films in Braunschweig, Germany.

#### Outstanding properties:

Seal faces with DiamondFaces are extremely hard and resistant to wear, offer excellent thermal conductivity and exhibit the highest chemical resistance. The layer adhesion exceeds all known practical requirements.

#### Convincing benefits:

For mechanical seals this means a considerably longer service life, with maintenance intervals extended accordingly and greatly reduced life cycle costs.



### Carbon floating ring seals



Carbon floating ring seals are supplied as maintenance free compact labyrinth cartridge seals with low leakage. The floating self-adjusting sealing rings provide radial sealing on the shaft with a very small gap. The seal requires no additional lubrication, and it is designed for dry running. Besides pure gas, carbon floating ring seals are also suitable for Atex applications, toxic media, media containing solids, flue gas, dust, powder, vapor, liquid mist, oil mist and penetrating oil.

#### Successfully utilized in the chemical industry:

- Carbon floating ring seals:  
e.g. Espey WKA3 / 300,  
Espey WD200 / 500,  
Espey WKA400 / 802,  
Espey WDKS-Eco

### Seal supply systems



Depending on the design, application and mode of operation, mechanical seals and magnetic couplings need supply units for flushing, cooling, pressurization and leakage compensation. EagleBurgmann supplies the entire range from a single source.

#### Successfully utilized in the chemical industry:

- Quench systems:  
e.g. QFT1000 / 2000 / 3000
- Thermosiphon systems:  
e.g. TS1000 / 2000 / 3016
- Closed buffer fluid circuit systems:  
e.g. SPO
- Buffer pressure systems:  
e.g. SPA
- Gas supply systems:  
e.g. GSS, SMS

### Compression packings



The economical and reliable method of sealing pump shafts and valve spindles. A broad product range, innovative materials, material combinations and special impregnating agents and lubricants allow us to provide solutions for even the most demanding requirements.

#### Successfully utilized in the chemical industry:

- Compression packings:  
e.g. Chemstar, Thermoflon,  
Buraflex, BuraTAL, TA-Luft  
sealing sets for valves

### Gaskets



Ready to install seals or sheet materials. State-of-the-art materials, material combinations and production methods allow us to supply a multitude of versions, variations and shapes.

#### Successfully utilized in the chemical industry:

- Graphite seals:  
e.g. Statotherm, Rotatherm
- PTFE gaskets and tapes:  
e.g. Burachem
- Metal gaskets:  
e.g. Buralloy, Spiraltherm

### Expansion joints



For ducts and pipe systems carrying gas – to reliably compensate for pressure and temperature fluctuations, vibrations and misaligned joints.

#### Successfully utilized in the chemical industry:

- Fabric expansion joints:  
e.g. Fluachem, KE-Flex,  
Fluaflex
- Metal expansion joints:  
e.g. Bredan, EJS
- Rubber expansion joints:  
e.g. KE-Masterflex

### Special products



Special applications require innovative and specific solutions. As well as special seals and sealing elements for marine technology and the aerospace industry, we also provide high-quality metal bellows and diaphragm couplings. Another area of expertise:

#### Sealing systems for rotary kilns

In the form of single and double seals used in drying, calcining, incineration and pyrolysis operations with extras adapted to specific requirements.

#### Successfully utilized in the chemical industry:

- DRO Rotary kiln sealing system

# Tried and tested the world over: Sealing systems by EagleBurgmann.

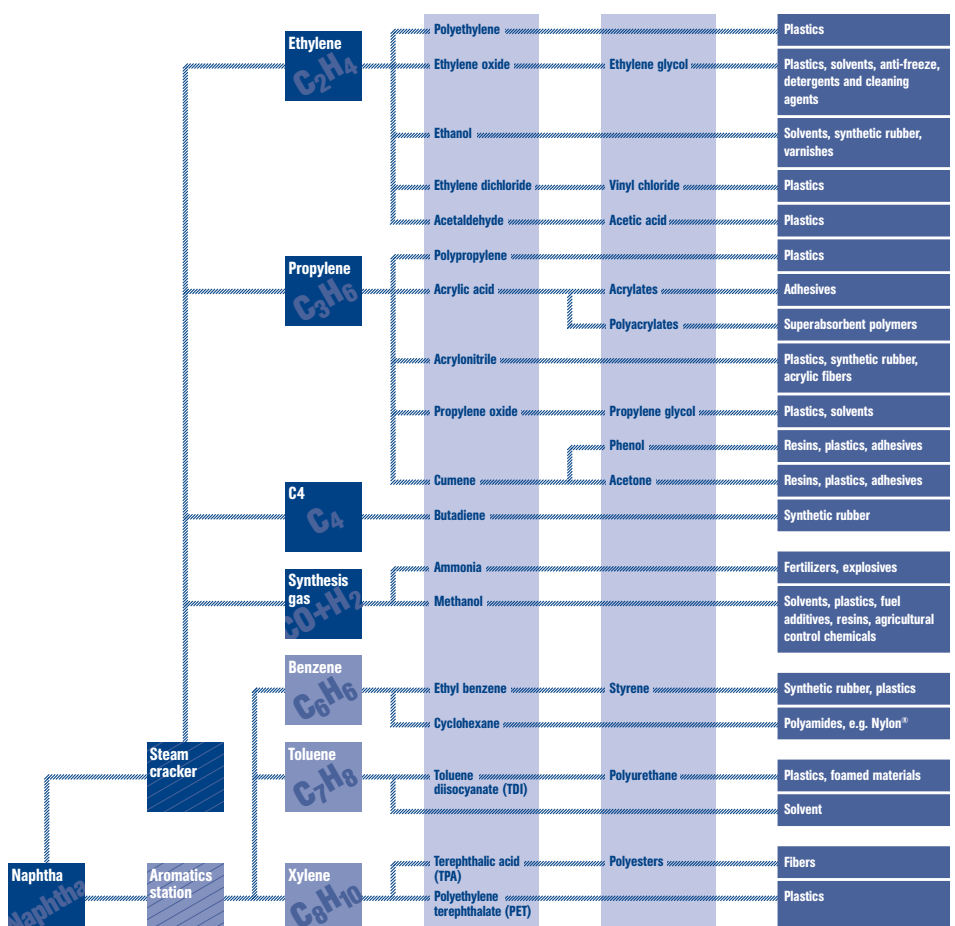


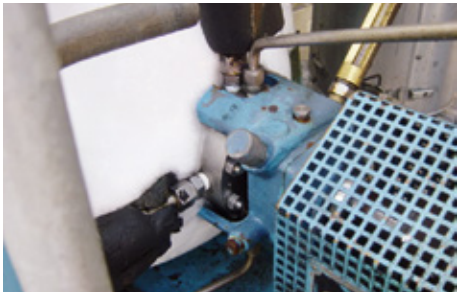
## Basic chemicals – Sealing solutions for continuous processes

In the field of organic basic chemicals, very large production volumes are processed in suitably-sized plants. Absorption, adsorption, rectification and distillation are just some of the methods used. The manufactured chemicals are used as the basis for a wide range of plastics and other end products.

The decisive criterion here is maximum reliability and availability of the plant components involved. The system components must be able to run for long periods without interruption. Hazardous, aggressive and corrosive media must be controlled securely.

Well-engineered and robust Cartex, SH, H75 and HR mechanical seals have proven to be best for the frequently applied process pumps. We fit compressors with DGS seals and employ Espey carbon floating ring seals in centrifuges. We supply resistant gaskets, sealing sets for flanges and valves as well as expansion joints for pipe and duct systems.

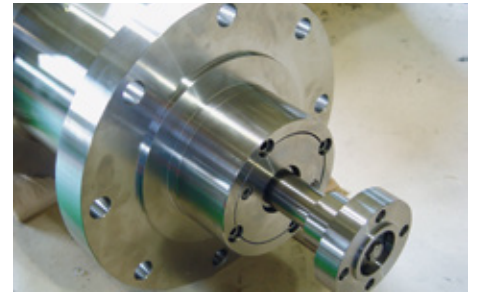




Liquid, high-purity ethylene is pumped in the cracker operated by the Dow Olefinverbund in Böhlen, Germany. The pump shaft is sealed by a **MFLCT80S1** type triple seal. The metal bellows seal has clear benefits at the temperatures down to  $-100\text{ }^{\circ}\text{C}$  ( $-148\text{ }^{\circ}\text{F}$ ) encountered in this environment. A **TS2000** type Thermosiphon system supplies the seal.



A type **DGS30** gas-lubricated mechanical seal is used to seal a compressor in BASF's synthesis gas plant in Shanghai, China. Nitrogen-buffered **Espey WD400** floating ring seals seal the bearings. The process medium is carbon dioxide. Operating conditions:  $p_1$  (dynam.) = 18.5 bar (268 PSI);  $t = 70\text{ }^{\circ}\text{C}$  ( $158\text{ }^{\circ}\text{F}$ );  $n = 25,750\text{ min}^{-1}$ .



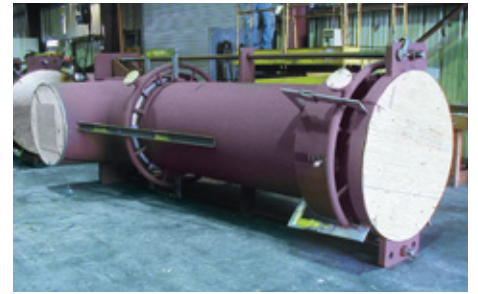
Bayer in Leverkusen, Germany, uses several screw spindle pumps to manufacture preproducts for polyurethane production that are sealed with **MAK66S3** type magnetic couplings. The process media are various polyethers with viscosities up to 3,500 mPas. Operating conditions:  $p = 6\text{ bar}$  (87 PSI);  $t = 20 \dots 80\text{ }^{\circ}\text{C}$  ( $68 \dots 176\text{ }^{\circ}\text{F}$ );  $n = 350 \dots 1,500\text{ min}^{-1}$ .



At the cumene alkylation plant operated by a German chemical company, a series of chemical standard pumps are sealed with **Cartex** type cartridge seals. The process medium is a mixture of aromatic hydrocarbons, so the TA-Luft (Technical Instructions on Air Quality Control) must be taken into account. A **TS2000** type Thermosiphon system is used to supply the seals.



Sealing of a centrifugal pump for the manufacture of aromatic compounds at Shell in the Netherlands. The high drive power of 75 kW makes it necessary to apply a high efficiency **NMB-22P-9R-35-ND** magnet coupling. This uniquely efficient magnetic coupling drastically reduces power losses and the associated heat generation. Operating conditions:  $p = 35\text{ bar}$  (508 PSI);  $t = 20\text{ }^{\circ}\text{C}$  ( $68\text{ }^{\circ}\text{F}$ );  $n = 990\text{ min}^{-1}$ .



Several **metal expansion joints** are employed in the ethylene cracker at Nova Chemicals in Sarnia Ontario, Canada. Operating conditions:  $p = 3.45\text{ bar}$  (50 PSI);  $t = 420\text{ }^{\circ}\text{C}$  ( $788\text{ }^{\circ}\text{F}$ ).



The El Dorado Chemical Co. in Arkansas, USA, uses **metal expansion joints** in the plant for manufacturing nitric acid. Operating conditions:  $p = 10\text{ bar}$  (145 PSI);  $t = 649\text{ }^{\circ}\text{C}$  ( $1,200\text{ }^{\circ}\text{F}$ ).

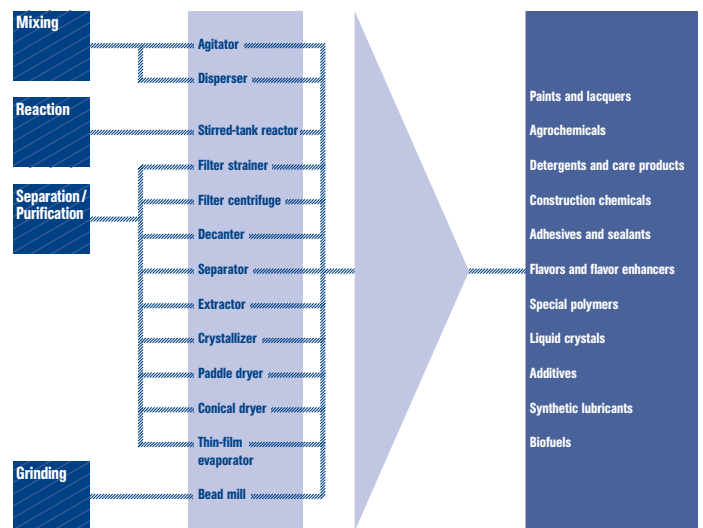


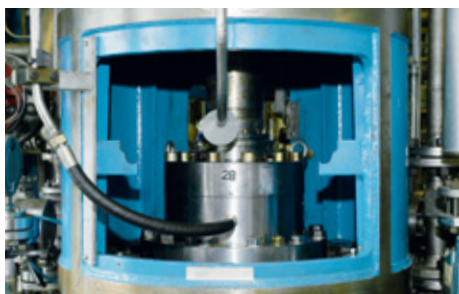
## Fine chemicals – Sealing solutions for flexible processes

Products in the fine chemical industry are manufactured in discontinuous processes. Successive production steps, such as mixing, reacting and separating are typical here. The processed batches are often relatively small and the processes are demanding. Very special chemical substances and products are often manufactured.

Flexible, multi-purpose systems, usually equipped with agitators, reactors, filters, dryers and other special equipment, are predominantly applied.

The particular challenge for sealing technology arises from the different manufacturing processes and the frequently crystallizing, paste-like, highly viscous or highly corrosive media under changing pressure and temperature conditions. The rugged EagleBurgmann agitator seals have become an established standard in the chemical industry.





Wacker Chemie AG in Burghausen, Germany, seals a number of top-drive high pressure reactors for polymer dispersion manufacturing with **HSHLV-D** type high pressure seals with cooling flange. A shared buffer system supplies all the seals. Operating conditions:  $p_1$  = vacuum ... 100 bar (1,450 PSI);  $t$  = ... 100 °C (212 °F);  $n$  = 25 ... 100 min<sup>-1</sup>.



Sealing of polymerization reactors with an **HSMR5L-D** in the manufacture of synthetic rubber at Lanxess Deutschland GmbH. The process medium – monomers, water and polymers – has a tendency to bond. So flushing is used to protect the seal. An **SPA4025** buffer pressure system is used as the supply system.



Centrifugal pumps at Polymer-Latex GmbH in Marl, Germany, are successfully sealed with **Cartex-DN** type seals. The process medium – a latex dispersion – represents a challenge for the seal. The **FLC200** flow rate control unit supplies and flushes the seal.



A Roth pump, sealed with a **MAK66** magnetic coupling, in use at a manufacturer of soap and cleaning agents in the US. Operating conditions:  $p$  = 22 bar (319 PSI);  $t$  = 50 °C (122 °F);  $n$  = 3,500 min<sup>-1</sup>.



Dupont de Nemours and Company in Pass Christian, USA, uses several **expansion joints** in steam / colored pigment production. Operating conditions:  $p$  = +0.48 ... -0.48 bar (+70 ... -70 PSI);  $t$  = 354 °C (669 °F).



Gas-lubricated **AGSR3L-D** agitator seals in vacuum paddle-wheel dryers for liquid crystal manufacturing at Merck KGaA in Darmstadt, Germany. The process medium – organic crystalline substances in various solvents such as toluene and methanol – has a pronounced tendency to form deposits, so a patented flushing process is used upstream of the dynamic sealing element on the product side to protect the seal and to improve the cleaning efficacy. A **GSS4012** is used as the buffer and flush gas system.



A Korean chemical company seals its Bühler bead mills for paint production with **MR1S1F-D24** type mechanical seals. The process medium – colored pigments with various solvents – is very abrasive.



Tytan Organics Chemical Co. in the United Arab Emirates uses glass-lined reactor vessels to manufacture concrete plasticizers. The flanges and covers are sealed with **Burachem multi-gaskets** made from pure PTFE. Medium: Naphthalene sulphonate formaldehyde. Operating conditions:  $p$  = 6 bar (87 PSI);  $t$  = 220 °C (428 °F).

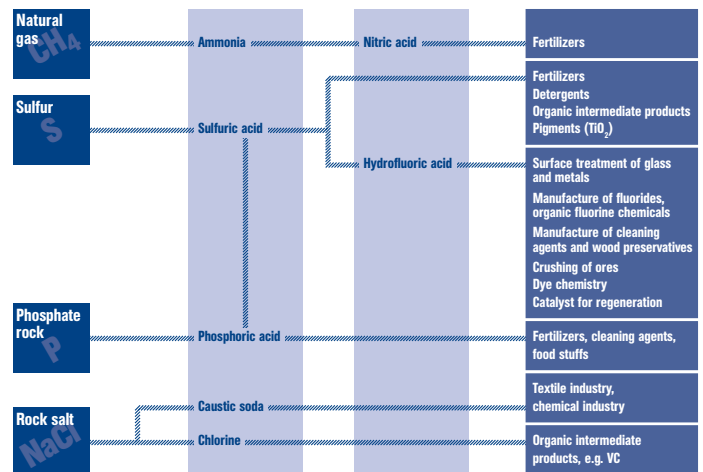


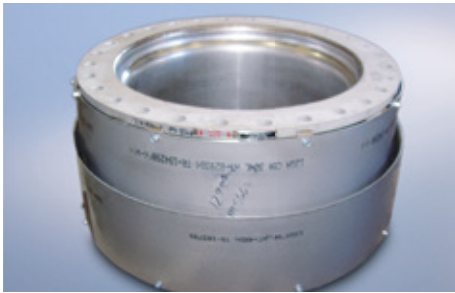
## Inorganic chemicals – Sealing solutions for critical media

Ammonia, chlorine, alkalis and acids are required in large volumes as the basic chemicals for fertilizers and cleaning agents, for example. Production is a continuous process, often in an interconnected system. Pumps and compressors are the predominant machines for these processes.

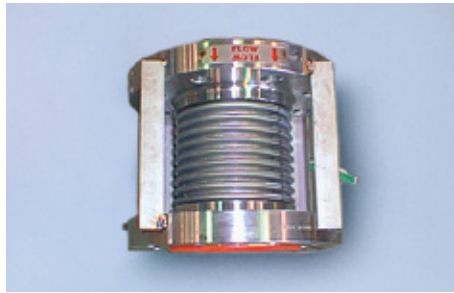
The sealing technology requirements for inorganic chemicals are greatly determined by the properties of the process media. A high solids content, a strongly corrosive effect, or a tendency to crystallize requires specific structural designs and measures to optimize the mode of operation, in addition to resistant materials.

EagleBurgmann has decades of experience with these applications and sensitive media and provides sealing systems specifically adapted to the prevalent conditions: from HR seals with high solids tolerance to innovative solutions such as completely metal-free mechanical seals for pumps.





The Columbian Chemicals production facilities in Centerville, USA have a number of **expansion joints** installed in the exhaust gas system. Operating conditions:  $p = 0.35 \text{ bar (5 PSI)}$ ;  $t = 760 \text{ °C (1,400 °F)}$ .



**Expansion joints** are applied in the processing of anhydrite at GBC Bayport Chemicals LP in Pasadena, USA. Operating conditions:  $p = 3.1 \text{ bar (45 PSI)}$ ;  $t = 260 \text{ °C (500 °F)}$ .



During the production of ammonia, carbon dioxide is removed from the process with Benfield solution – an aqueous potassium carbonate solution with diethanolamine. **HJS1** type mechanical seals have proven to be best for sealing the pumps in this area. Typical operating conditions:  $p = 2 \dots 4 \text{ bar (29 \dots 58 PSI)}$ ;  $t = 100 \dots 150 \text{ °C (212 \dots 302 °F)}$ ;  $n = 1,500 \text{ min}^{-1}$ .



The high-efficiency **NMB-16P-2R-45-SC** magnetic coupling as a hermetic seal in a vertical pump. The process medium – a mixture of ammonia and propane – has very poor lubricating properties. The low temperature ( $-45 \text{ °C (-49 °F)}$ ) plays a decisive role in the choice of materials.



A **DGS11.1** seals a compressor in the fertilizer manufacturing facility at Incitec Pivot Limited in Australia. **Espey WD400** nitrogen-buffered carbon floating ring seals are used to seal the bearings. The process medium is a mixture of hydrogen and nitrogen. The seal is designed for frequent slow roll operation when starting and stopping the machine.



## Industrial gases – Sealing solutions for more efficient processes

The group of industrially generated gases includes atmospheric gases such as nitrogen and oxygen, process gases such as hydrogen and carbon dioxide and various noble gases. They are mostly manufactured in continuous processes. Compressors are important system components after process pumps. The compressors liquefy air, for example, which is then separated into its components by rectification.

The sealing technology requirements are quite high. Extreme temperatures and pressures, the gaseous or liquid states of the media as well as the flammability of the gases and the hazard they present to the environment require uncompromising technology and sealing.

Our DGS compressor seals have been proven worldwide a hundredfold for critical gases such as oxygen, hydrogen, or carbon dioxide and have advanced to become the standard solution.



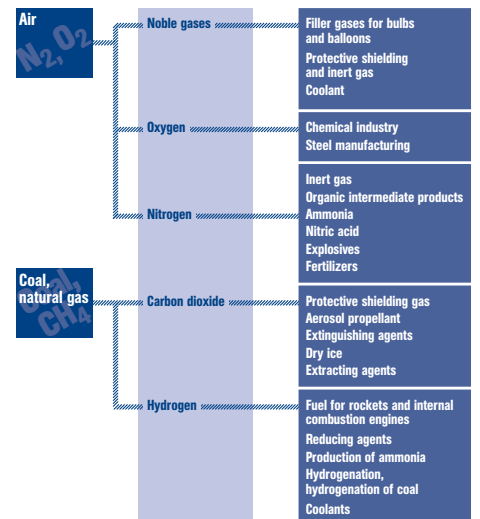
In an air separation plant in Austria, the compressor for production of technical gases is sealed by a gas-lubricated **DGS20** mechanical seal. Operating conditions:  $p = 7 \dots 30 \text{ bar}$  (102 ... 435 PSI);  $t = 40 \dots 70 \text{ °C}$  (104 ... 158 °F);  $n = 10,000 \dots 20,250 \text{ min}^{-1}$ .



Gas-lubricated **MFLC-GS** metal bellows seals as single or double seals for the shafts of process pumps in air separation plants. Typical process media are liquefied gases such as nitrogen. The low temperatures require special materials for the secondary seals, such as the proven **Statotherm** graphite seals. Operating conditions:  $p = \dots 25 \text{ bar}$  (363 PSI);  $t = \dots -199 \text{ °C}$  (-326 °F);  $n = 6,000 \dots 8,000 \text{ min}^{-1}$ .



Sealing of tank loading and unloading pumps with **MFLS12** metal bellows seal. The low temperatures demand the application of special seal face and secondary sealing materials with BAM approval. Typical operating conditions:  $p = 5 \text{ bar}$  (73 PSI);  $t = -190 \text{ °C}$  (-310 °F);  $n = 6,000 \dots 8,000 \text{ min}^{-1}$ .







## Utilities – Sealing solutions for the infrastructure

The production processes in chemical plants rely on the infrastructure running smoothly. Processes, such as the supply of fresh and cooling water, generation of vacuum, steam and compressed air, waste water treatment and waste incineration, sometimes require complex technology with many different dynamic or static spots to be sealed.

Many demands are made of the sealing specialist. The operating conditions, media and sealing spots to be controlled are incredibly diverse, which demands a comprehensive range of products. As system supplier for sealing technology, EagleBurgmann is able to supply the right sealing solution for any application.



The right sealing systems for any field

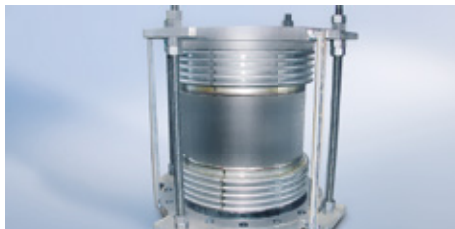
Process water	Cooling water	Wastewater
Compressed air	Vacuum	Exhaust air
Pipelines	Steam condensate system	Residue incineration



Sealing a coolant compressor at the Yeochun NCC Company in Korea with a **PDGS10** – a gas-lubricated multiple mechanical seal in tandem arrangement. The medium to be sealed is ethylene. Heat tracing at temperatures down to  $-100\text{ }^{\circ}\text{C}$  ( $-148\text{ }^{\circ}\text{F}$ ) is unnecessary due to the application of a special dynamic secondary sealing element.



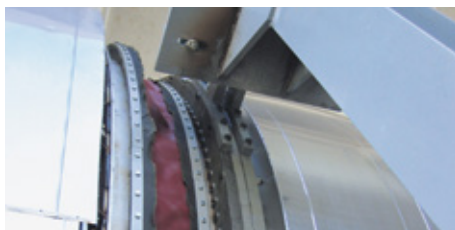
At the synthetic fiber manufacturing facility at Teijin Aramid, the Netherlands, a heat transfer pump is sealed with a high-efficiency **NMB-22P-6R-65-00** magnetic coupling. The heat transfer oil can reach temperatures of up to  $315\text{ }^{\circ}\text{C}$  ( $599\text{ }^{\circ}\text{F}$ ). The patented low eddy current gap trap keeps the power losses – and heat generation – down despite the high drive power of 45 kW.



**Expansion joints** are used in pipes carrying steam at Eastman Chemical Co. in Kingsport, USA. Operating conditions:  $p = 0.55\text{ bar}$  (8 PSI);  $t = 427\text{ }^{\circ}\text{C}$  ( $800\text{ }^{\circ}\text{F}$ ).



**BuraTAL 9650T3** sealing sets have proven their worth for sealing valves in accordance with the TA-Luft (Technical Instructions on Air Quality Control) in various chemical production plants. Even at high temperatures, the **9650HT** sealing sets guarantee very low leakage rates right up to helium-tightness.



**DRO** Rotary kiln sealing system in a plant for incinerating chemical residues at Infracor GmbH at the Chemiapark in Marl, Germany.

# Service made to measure: TotalSealCare.



## Our seven service modules

Optimized services are major contributors to making sure that plants function smoothly – and that doesn't just begin with maintenance. With TotalSealCare, our modular service concept, we are able to cover all individual service requirements very flexibly. The individual modules can be combined as required.

### 1 Consulting & Engineering

After establishing and analyzing all of the installed seals in a system, we develop standardization concepts based on the as-is status. The results we strive for are to reduce the number of seal types, sizes and materials used and to improve the plant performance of the system. We advise you on codes of practice and statutory regulations and indicate what actions need to be taken.

### 2 Maintenance

In the plant or in the service center, qualified fitters and technicians look after all the aspects of seal maintenance – installation, start-up, servicing, conversion, overhaul and repair. We record and document functionally relevant data (failure reasons and related costs). This means it is possible to evaluate seal operating times and maintenance costs on a continuous basis, thereby defining measures for extending service intervals.

### 3 On-site Service

Our on-site service includes the components of an overhaul service, conversions and service container. We deploy a service unit directly to your premises: equipped with the basic range of seals or a stock of seals discussed with you in advance and staffed by qualified personnel. On-site, we assure production of the necessary gaskets, ensure that the documentation is complete and advise our customers on the selection and installation of seals. Our range of services also includes complete conversions (e.g. acc. to TA-Luft).

### 4 Inventory Management

Based on your individual requirements and the applicable quality regulations, we develop a concept for inventory management of complete seals and spare parts. Furthermore, we optimize stocking on site or in the EagleBurgmann service center. In this way, you reduce your administration overhead and concentrate on your key operations.

### 5 Seminars & Training

We offer an extensive range of continuing education programs in sealing technology. Developed for service and maintenance personnel and skilled staff and engineers from various branches of industry including refining, chemicals, power generation, foodstuffs, paper and pharmaceuticals. Our program includes group seminars, individual training and seminars specifically tailored to your requirements. At our premises or at a location of your choice.

### 6 Technical Analysis & Support

A team of seal specialists is responsible for rectifying process malfunctions or "bad actors". The latest methods such as thermography or data logging are used for diagnosing critical items for the operation of the plant and for defining measures to resolve them. In our research and development centers, we perform realistic tests on test rigs or in original pumps. The objective is to extend the MTBF and to increase system reliability by individual and constructive solutions.

### 7 Service Agreements

We offer our customers specific agreements that are combined from the six service modules. Whether for individual seal systems, critical process elements, specific plant units or an extensive seal service for complete plants, the modular structure of our service makes it possible to satisfy individual requirements. With our well established monitoring instrument, SEPRO, we can also record all seal-related data for documentation and evaluation purposes.

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EagleBurgmann is one of the internationally leading companies for industrial sealing technology. Our products are used everywhere where safety and reliability are important: in the oil and gas industry, refining technology, the petrochemical, chemical and pharmaceutical industries, food processing, power, water, mining, pulp & paper, aerospace and many other spheres. Every day, more than 6,000 employees contribute their ideas, solutions and commitment towards ensuring that customers all over the world can rely on our seals. Our modular TotalSealCare service underlines our strong customer orientation and offers tailor-made services for every application.

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