

RELY ON EXCELLENCE

## Industrial sealing expertise for pharmaceutical applications

Unique. Flexible. Always there for you.





## 30 years of pharmaceutical sealing expertise

To be successful, pharmaceutical production processes must be highly efficient and flexible at the same time. Both original manufacturers and toll manufacturers face extreme competition around the world. Yet they can never cut corners to reduce costs, as they must satisfy the strictest quality and safety requirements. The key to sustained success lies in the optimal cooperation of product and technology specialists. This cooperation makes it possible to create innovative solutions that enable shorter time-to-market cycles, continuous performance improvements and cost reductions. In-depth knowledge of sealing technology helps make these improvements reality.

EagleBurgmann makes it all possible, with local sealing technology experts around the world.

### Quality is our promise

#### Hands-on consulting and engineering

EagleBurgmann reliably delivers safe seal solutions. You start benefiting from our support and extensive expertise long before a seal is provided. Mastering the issues involved with "good manufacturing practice" is also part of our daily business. And our field service ranges from on-site commissioning to repair.

#### From standard to extraordinary

From our standardized, modular product range to complex, customer-specific designs, we offer outstanding sealing technology with a unique range of options. We are sure to meet your needs, too.

#### Conserving resources

Sustainability management is always part of our work. To protect the environment, EagleBurgmann goes beyond the legal minimum whenever possible. We always strive to minimize the impact of our production processes. At the same time, we improve the environmental handprint of our customers with our innovative products.

#### Driving innovation in seals

Extensive knowledge of sealing technology, machines, materials and media, as well as industrial processes, is the basis for impressive design solutions. We back up this promise to our customers with our own research centers in Germany and Japan, along with a global network of testing institutes and partnerships with universities, customers and suppliers.

#### Always close, always fast

With over 60 subsidiaries and 250 locations, EagleBurgmann is at home in all major world markets. Thanks to our production network with plants in Europe, Asia and North and South America, we can supply you reliably at any time. And with our dense network of sales and service centers, we are definitely in your area.

Day in, day out, our business consists of understanding the needs of our customers, answering their challenging technical questions and actively assisting them with implementation in a heavily regulated environment.

Thomas Boehm, Head of Engineering Processes & Support, EagleBurgmann

#### Technical and organizational conditions

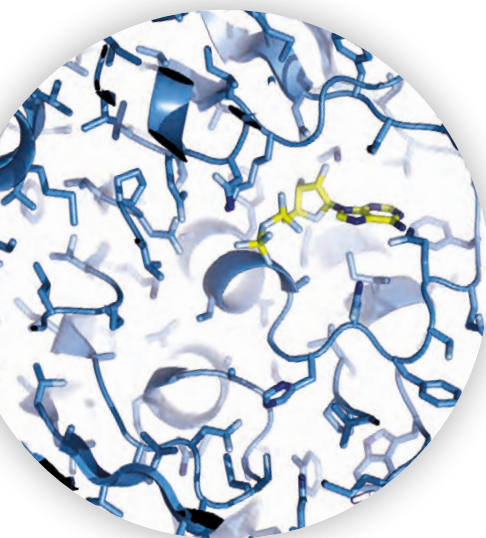
The rules of "good manufacturing practice" (GMP) lay out principles and guidelines for the manufacture of pharmaceutical products. However, they are not a fixed construct. Even the qualified and validated status allows for improvements in process and technology. EagleBurgmann has the know-how to directly support companies with continuous improvement. We work beside our customers on the design of solutions within the existing GMP framework, support them in tests and help create the necessary documentation of the change control process. Processes and components can be continuously optimized in line with the requirements in this way.

#### Good engineering practice

The foundation of GMP-compliant reliability is laid during the engineering stage at EagleBurgmann. We rely on proven methods and processes in accordance with "good engineering practice" (GEP). This means that we guarantee not only technically reliable seal solutions, but also the efficient and well-documented production of products, which simplifies the subsequent qualifications and validation.

#### Our hygiene classes for seals

Our hygiene classes for seals are unique on the market. They are derived from the respective hygiene risk of the product, as well as the existing risk minimization measures, and determine the scope of hygienic design – entirely adapted to the specific application.





**For every seal solution, we carry out a detailed assessment of the processes and technology: from product properties and machine requirements to cleaning and maintenance concepts. In this way, we ensure that our solution lives up to its promise and fits seamlessly into the required standards.**

Kerstin Birner, Product Management, EagleBurgmann

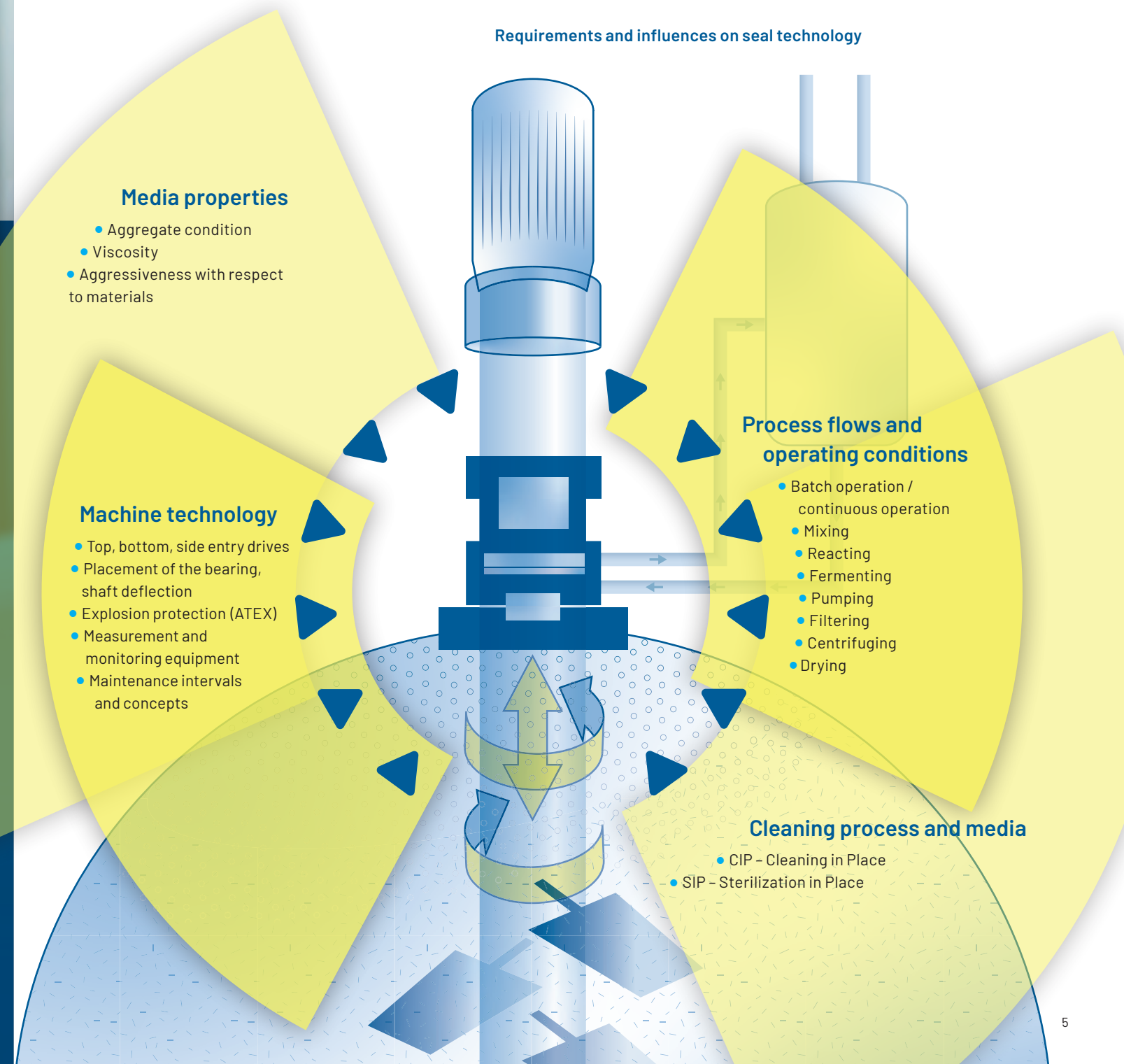
#### Design criteria for mechanical seals with high hygiene class

- Homogeneous surfaces
- Avoidance of gaps and deadspaces
- Rounding of corners and edges
- Roughness value for surfaces with product contact  $Ra \leq 0.8 \mu m$
- Suitability for cleaning via CIP/SIP
- Resistance to product and cleaning media by surfaces with product contact
- All materials that come into contact with products must pose no safety concerns in compliance with statutory requirements and applicable guidelines
- Threading in contact with product must be avoided or properly sealed to ensure a sterile environment
- Sealing on the product side using O-rings in special grooves or gap-free special profile rings
- Self-emptying
- Suitable supply media

## Multiple sealing options for every need

Industrial production systems simply cannot function without seals. The number of seal points and the variety of media handled is extensive. So many plant components need to be sealed: agitators, pumps, special machines, valves and flanges, as well as pipes and ducts. The reliability of the entire plant depends on the quality of many individual parts, such as seals. Seals should therefore be understood as extremely important key components. They protect the technical system and environment from contamination and help prevent emissions.

The selection of the right seal, its design, the material used and the way in which it is operated depends on many different factors: the substances to be processed, the operating conditions, the machine, the process flows and special aspects of the process. We know how these factors impact functionality, efficiency and reliability, and we employ our expertise to create reliable technical solutions.





# Industrial sealing options at a glance

Whatever the requirements, we can supply the right seal system thanks to the unique scope of our production portfolio. We deliver custom-tailored seal solutions according to your specific requirements with the help of standardized assemblies, components and functional extensions. For our customers, this means reliable technology, fast delivery times and maximum efficiency.



## DiamondFace: Innovative sliding surface technology for maximum operational performance of agitator and pump seals

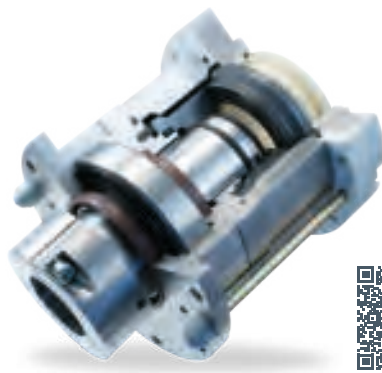
DiamondFace is an innovative microcrystalline diamond technology for mechanical seals. It is characterized by extreme hardness, high wear resistance, excellent thermal conductivity, maximum chemical resistance and low friction coefficients. The coating adhesion also exceeds all known practical requirements. For example, this makes partial dry running possible while increasing the lifespan of mechanical seals by many times, prolonging the maintenance intervals and significantly reducing the life cycle costs.



- Dry-running agitator seals**
- Standard and hygienic design
  - Steel and enameled containers
  - Single and double seals, with/without bearing
  - Series-manufactured seals or special designs



- Fluid-lubricated agitator seals**
- Standard and hygienic design
  - Steel and enameled containers
  - Single and double seals, with/without bearing
  - Series-manufactured seals or special designs



- Gas-lubricated agitator seals**
- Standard and hygienic design
  - Steel and enameled containers
  - Double seals, with/without bearing
  - Series-manufactured seals or special designs



- SeccoLip lip seals**
- Dry-running lip seal for agitators
  - Steel and enameled containers
  - Modular design
  - Rolling bearing optional



- Mechanical seals for pumps**
- Standard and hygienic design
  - Series-manufactured seals and special designs
  - Single and multiple seals



- Magnetic couplings**
- Standard and hygienic design
  - Hermetically sealed
  - Top and bottom entry drives



- Quench systems**
- Standard and hygienic design
  - Unpressurized supply of quench fluid
  - For single and multiple seals



- Thermosiphon and buffer/barrier fluid systems**
- Standard and hygienic design
  - Pressurized supply of barrier medium
  - For double seals



- Gas supply system**
- Standard and hygienic design
  - For double seals
  - For dry-running and gas-lubricated seals



- Gaskets and compression packings**
- Standard and hygienic design



- Expansion joints**
- Standard and hygienic design



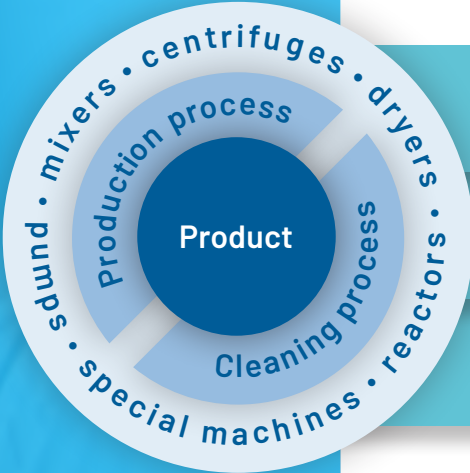


## 360° sealing expertise

EagleBurgmann offers more than technology. No matter what the question, we stand behind our customers in all their needs relating to the operation of their seals. From application consulting, testing and simulation to documentation, training, service and support – our consulting, engineering and customer services help increase system availability, make production processes more flexible and lower costs.

Whether for laboratory use, batch processes or series-scale production, every single project benefits from our expertise and extensive practical experience in the pharmaceutical industry thanks to consistent knowledge management.

Uwe Scherf, International Sales, EagleBurgmann



- Standardized models
- Engineered solutions
- Services

Application consulting	
Qualified offer creation	
Design adaptation	
Research & development	Basic research
Application technology & product design	Test & experimental setups
Simulation & calculations	Research collaboration
Acceptance testing & analysis	ExpressCenter
Approvals & certifications	EagleBurgmann Academy
Documentation	Installation & commissioning
24/7 repair	Replacement parts & warehouse management
Training	Predictive maintenance
Service programs	Standardization
	Field service
	Reliability engineering
	Service agreements





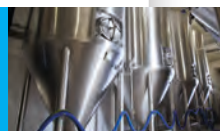
## Proven success around the world



**Avoidance of product contamination**  
thanks to the barrier medium: Conversion of paddle-through dryers to the dry-running seal SeccoMix R. Drug substance production, Great Britain.



**Hermetically sealed**  
and low-maintenance in operation: SMAK magnetic coupling for agitator tank with bottom entry drive. Drug substance production, France.



**Compensation of shaft deflection**  
with the engineered solution MR5S2T. Conical dryer for powdered drug substances, Switzerland.



**Significantly extended MTBF**  
despite inadequate lubrication and partial dry running: Conversion of fermenters to robust MR-D with DiamondFace technology. Production of biocultures, Singapore.



**High service-friendliness**  
by using the fully partitioned agitator seal TMS. Production of preliminary products for cosmetics, France.



**Mobile agitator tank**  
without a buffer/barrier fluid system thanks to the use of dry-running SeccoMix seals. Production of preliminary products for bio-pharmaceuticals, Belgium.



**Bad actor elimination**  
thanks to DiamondFace technology for Cartex pump seals with alternating operating conditions and dry running phases. Antibiotic production, Great Britain.



**Seal for enameled container**  
Successful operation of the M461 with buffer/barrier fluid system in a stirring reactor with top entry drive. Production of pharmaceutical intermediate products, Germany.



**Maximum pressure**  
Customer-specific design of the seal HSMR35 for paddle-through dryers for production under an explosive atmosphere. Production of silicic acid products, Germany.

## Value-adding and dependable

Close proximity ensures faster responses. And time is not a factor to be underestimated. No one can afford long downtimes for service work. Ballooning costs must also be avoided. With over 250 locations and more than 120 service centers, EagleBurgmann is located around the globe and always near you. 365 days a year, 7 days a week and 24 hours a day. Wherever and whenever you need us, we are there.

1

### Retrofits

- Modification
- Standardization concepts

2

### Repairs

- Wearing part reconditioning
- Fast-Lane and ExpressCenter

3

### Bad actor solutions

- Failure and damage analyses
- Diagnosis and support
- Test runs

4

### Service agreements

- Repair class, fixed fee and primary source programs, individual service agreements

We're closer than you think. Our experts are always nearby and happy to offer their sealing expertise. Get in touch:

[pharma@eagleburgmann.com](mailto:pharma@eagleburgmann.com)





## EagleBurgmann – at the leading edge of industrial sealing technology

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, energy, water, mining, paper, aviation and aerospace and many more. Over 5,600 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need.

### Wherever you need us

**Europe** • Austria • Belarus • Belgium • Bosnia-Herzegovina • Bulgaria • Cyprus • Czech Republic • Denmark • Estonia • Finland • France • Germany • Great Britain • Greece • Hungary • Ireland • Italy • Latvia • Lithuania • Netherlands • Norway • Poland • Portugal • Romania • Russia • Serbia • Slovak Republic • Slovenia • Spain • Sweden • Switzerland • Turkey • **Middle East** • Bahrain • Israel • Jordan • Kuwait • Lebanon • Oman • Qatar • Saudi Arabia • United Arab Emirates • Yemen • **Africa** • Angola • Botswana • Cameroon • Egypt • Gabon • Ghana • Kenya • Madagascar • Malawi • Mauritius • Mozambique • Namibia • Nigeria • South Africa • Sudan • Tunisia • Uganda • Zambia • Zimbabwe • **Americas** • Argentina • Brazil • Canada • Chile • Colombia • Ecuador • Mexico • Paraguay • Uruguay • United States • Venezuela • **Asia-Pacific** • Australia • Azerbaijan • Bangladesh • China • India • Indonesia • Japan • Kazakhstan • Korea • Malaysia • New Zealand • Pakistan • Philippines • Singapore • Sri Lanka • Taiwan • Thailand • Vietnam • [www.eagleburgmann.com/en/international](http://www.eagleburgmann.com/en/international)