Food, beverage and pharmaceutical industries

Customised machined seals

ECONOMOS

Contents

The SKF brand now stands for more than ever before, and means more to you as a valued customer.

While SKF maintains its leadership as the hallmark of quality bearings throughout the world, new dimensions in technical advances, product support and services have evolved SKF into a truly solutions-oriented supplier, creating greater value for customers.

These solutions encompass ways to bring greater productivity to customers, not only with breakthrough application-specific products, but also through leading-edge design simulation tools and consultancy services, plant asset efficiency maintenance programmes, and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but it now stands for much more.

SKF – the knowledge engineering company

Sealing solutions for the food, beverage and pharmaceutical industries

As a supplier of high-quality, highly reliable products to the food, beverage (F&B) and pharmaceutical industries, our customers benefit from our comprehensive field experience and extensive knowledge in the sealing technology.

Our optimised sealing solutions enable our customers to achieve their strategic goals

- Improved safety at work
- Increased productivity
- Reduced effects of contamination
- Increased durability
- Reduced maintenance and downtime
- Media and energy savings

SKF Economos solutions provide the best option for the entire food and beverage production process: seals and plastic parts for wet, abrasive and contaminating environments/Cleaning.

SKF Economos competences

- Application engineering
- Extensive list of success stories
- Material technology
- Standard and custom engineered sealing solutions
- Advanced engineered plastic parts (AEPP)

SKF Economos performance

- On-site solution analysis
- Innovative custom engineered solutions
- Immediate availability of machined standard seals and customised sealing solutions
- Injection moulded seals for higher volume orders

SKF Economos is the leading supplier for standard and custom engineered sealing solutions. Our extensive knowledge in the food, beverage and pharmaceutical industries is based on having successfully met the industries requirements over many years. Our customers benefit from our flexibility and our short delivery times for customised seals. SKF Economos products are always made from high-performance materials.

- Hydraulic and pneumatic sealing systems
- Rotary distributor seals (rotary joint)
- Flat seals for flange connections
- Static seals and O-rings
- Advanced engineered plastic parts

Finding the most suitable sealing solution is a complex and specialist task. Our experts know there is always potential for optimisation.


Entl. Filtration

SKF Economos – your flexible partner

SKF Economos is the leading player in the global custom-made machined seals market. Specialised in providing a complete sealing service to food, beverage and pharmaceutical industries, its subsidiaries and partners serve many countries around the world.

Standard seals

- seals in standard dimensions
- machined or injection moulded seals
- immediate availability
- extensive range of materials

Customised seals

- standard seals modified to your specific requirements
- flexible material and dimensions
- machined seals
- shortest possible delivery time (availability permitting, from 24 hours)

Custom engineered sealing solutions

- application engineering service
- flexible machined sealing solutions
- shortest possible delivery time

Due to the flexibility of our production processes, we can supply standard and special seals in customised dimensions and various heavy duty sealing materials. Our manufacturing concept provides a truly local service and is located close to the end customer. Additionally our customer service includes:

Engineered and advanced engineered plastic products

Turned, milled and moulded parts, made of in-house developed materials or materials from qualified suppliers.

Other business and services

Maintenance and repair of cylinders and products using water-jet cutting technology.

Selecting the right seal or plastic part for special conditions

Whenever reduced maintenance costs, increased productivity or process reliability matter – SKF Economos is there with improved sealing solutions.

Points to be considered when selecting the right seal or plastic parts for special operating conditions in the food, beverage (F&B) and pharmaceutical industries.

Sealing purpose

The purpose of sealing is to keep operating media or lubricants in, or environmental contamination out of the sealed system.

Environment

Aggressive environmental **contamination** can be a concern. Abrasive scale, cooling water or emulsions may affect a seal.

Media

Media may affect seals and interfere with selaing properties. Therefore, the sealing material must be selected carefully and **resistant** to the sealed media. This could be a lubricant, an operating media in hydraulic systems, auxiliary cleaning or assembly media and may even be the food material which is being processed itself.

Operating parameters

Type, speed and duration of motion at the sealing lip are important factors. The motion can be continuous, interrupted or pivoting. All occuring **pressures** must be considered, not just operating pressures, but also possible system and application related pressure peaks.

Elevated **temperature** levels can also affect seals. In most cases, lubricant or hydraulic media temperature determine the actual temperature around the seal, but an elevated ambient temperature may also affect wipers.

Cleaning procedures

The type of **cleaning process determines the material** used for the seal. In the F&B and pharmaceutical industries the cleaning process is extremely important. The seals must be designed to secure the removal of all food particles during cleaning procedures. Also the **seal housing design** and surrounding conditions are relevant.

Closed housings provide a perfect fit for elastic seals. SKF Economos also produces customised seals for non-standard housing dimensions.

Lubrication in abrasive conditions

Seals are affected by the **type of lubrication** chosen for use in abrasive conditions. SKF Economos can provide special materials like H-ECOPUR with improved wear characteristics for special applications. Our R&D department can develop materials for every specific need. We have a range of **food grade materials** which meet the requirements of various food regulations like FDA, NSF and various others.

Improvement potentials

The most important indicators for potential improvement in durability is the reason for a seal failure, or the existing performance.

The seal's performance may affect productivity, process reliability, mean time between failure (MTBF) and maintenance schedules. Optimising a sealing solution can be a complex task. Our experience indicates the high cost saving potential of optimised sealing solutions.

Preparation

Seals for meat processing units (Cutters)

Meat processing often involves cutting and therefore machines with fast moving cutters and spindles are required.

To keep the processed product where it should be and to prevent contamination, sealing systems have to do their job at high sliding speeds combined with high pressure. Special rotary seals have been designed to meet these requirements. Next to the tightness of the fit, other important features are media, abrasion resistance, compactness and ease of installation.

Special solution for tablet pressing machines

The production of pharmaceuticals is done under the strictest conditions and cleanliness regulations. A clean room environment is a must. In order to prevent contamination, the lubrication has to be done on a very low level, yet friction and wear have to be controlled and particulate loss must be minimised, especially for fast moving parts. In the case of an underlubricated tablet pressing machine, which is working at a very high process frequency, standard elements would fail.

Therefore SKF Economos has designed and provided a system with the highest level of friction performance and wear resistance on the one hand and an extraordinary sealing performance for the residual lubricant on the other. A special double acting seal/wiper element combined with an additional drip tray has been designed to satisfy the strictest regulations of the production process. This solution can be engineered and installed in existing housings, so no modification of the system is required.

Heating

Seals for ultra high pressure pasteurisation

To pasteurise food with high pressure is becoming a common way to reduce the use of temperature during food processing. The result is less spoilage and increased food safety without affecting the original flavour characteristics. To implement this process, high pressure systems up to 5 000 bar are necessary and therefore the sealing system becomes a very important consideration. This applies to static seals for the tank as well as for the dynamic seals of the pressurizing system itself.

A specially designed sealing element for this ultra high pressure has been developed. The use of additional back-up rings made of stainless steel and bronze are necessary to compensate for irregularities of the housing configuration.

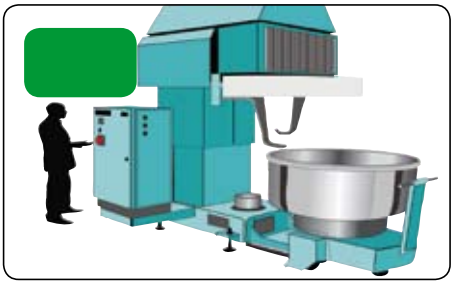
Extensive segmentation

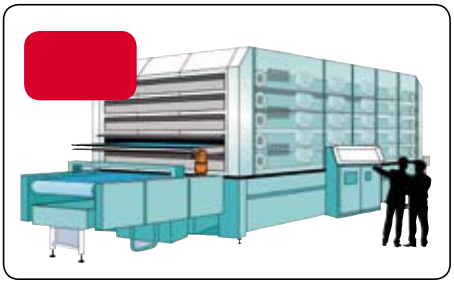
Sealing solution for waffle production units

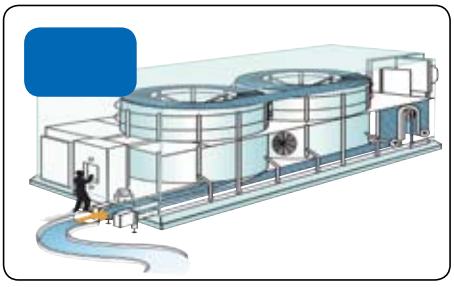
Baking tins give the waffles their specific shape. Unlike a typical household unit, pressurised injection systems are used in the food industry to force the dough into the tins.

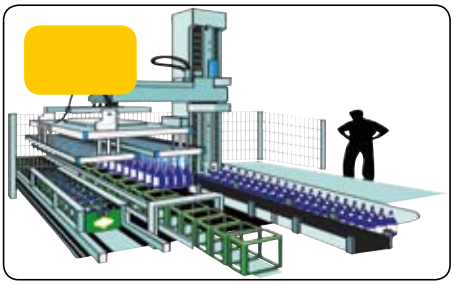
Special seals are required in this pressurised system. To manage the combination of heat resistance, thermal expansion and injection pressure, sealing systems have to be selected very carefully to provide perfect functionality and a long service life.

In such applications it is important that not only the material but also the correct design is specified. The use of silicone as a replacement for PTFE, combined with a high seal compression, eliminates the influence of thermal expansion during the baking process. The softness of the material also protects the seal from mechanical damage during manipulation and cleaning of the tins.









Removal of Heat / Freezing

Special developed sealing material for cold and harsh environments

The food industry uses many different technologies to remove heat from food products. The sub-zero temperatures of freezing, chilling and cooling processes demand frequent maintenance. During clean-up periods, temperatures can move quickly from sub-zero to 40 °C, causing air expansion combined with increased humidity. These temperature changes can cause water or moisture to enter the food processing line, often resulting in corrosion and shortening the lifetime of materials.

Post processing

SKF Economos sealing materials can cope with sudden temperature shifts and prevent the ingress of aggressive media into different mechanical parts in the production line. The sealing material can be used in freezing lines for the production of frozen food or ice cream as well as in chilling areas for removing heat.

The SKF Economos materials are specially developed to fulfil the requirements and perform under these harsh environments.

Advanced Engineered Plastic Parts (AEPP) for bottle filling machines

To fill different designed bottles in one station requires a variation of the filling adaptor. The faster this can be done the higher the efficiency and output of the line. Different centring parts for the various bottles have been designed. Uniform for all parts is the connection system – a screw joint. A stainless insert has been bonded into the original holder and a thread is cut into the centring parts.

The screw joint solution allows different bottle designs to be filled in a very short time.

Seals for toothpaste filling machines

It is hard to believe that something that is used to care for the human body can be so abrasive, but toothpaste can be like sand – a perfect grinding material.

Therefore the reduction of wear is a high priority. The answer lies in the selection of material, limited by the strict requirements of the food and pharmaceutical industry. To find the right material for such an application was not too difficult for us. H-ECOPUR with its outstanding wear resistance, excellent hydrolysis resistance and food standards compliance, meets the challenge for elasticity and reliable performance in numerous applications around the world.

Our standard range of AEPP materials allows us to fit the optimum plastic part in your application, not only to combat wear resistance, but also to meet additional requirements such as heat, chemical resistance, mechanical strength or friction performance. Whatever your process needs – SKF Economos has the right solution.

Proven to optimise system performance

For many years SKF Economos has been providing technically advanced solutions to meet the needs of applications and processes in the F&B and pharmaceutical industries. This focus has led to the development of products and materials specifically engineered, designed and proven to optimise system performance.

After a detailed study of your operation and needs, we will check our comprehensive list of standard products to find a suitable solution. Should the application demand a non-standard product, we can provide a customised solution.

The unique SKF Economos "total service" capability can manufacture (on demand – without tooling costs or delays) a solution which will provide considerable advantages over conventional arrangements.

Materials in the food, beverage and pharmaceutical industries

SKF Economos has developed a vast range of high quality sealing materials.

Polyurethanes

Polyurethane offers particularly outstanding mechanical properties which outperform all other elastomeric sealing materials (like rubbers). Possible application limits are chemical resistance and in some cases very high temperatures.

Elastomers

High quality rubber standard grades with well known features of elastomeric materials, good chemical resistance but limitations in mechanical properties.

Thermoplastics and special materials

Special hard grade materials with outstanding wear resistance for mechanical applications.

PTFE and its compounds

Top performance PTFE compound materials with highest chemical and temperature resistance, optimised for sealing applications.

FDA approved materials

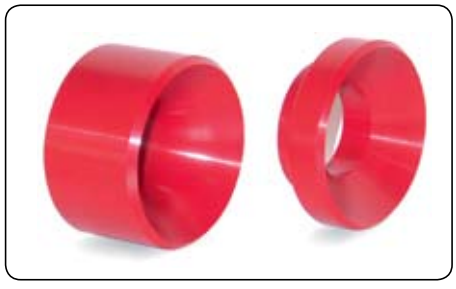
SKF Economos supplies the above mentioned materials which comply to the FDA regulations. For detailed information and material data sheets or approval certificates, please contact our specialists in Austria.

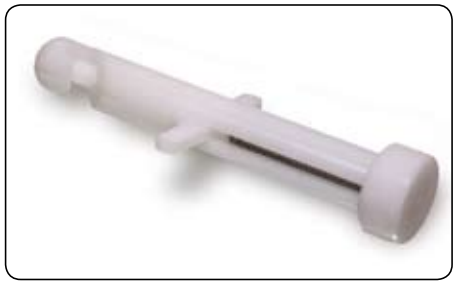
Material availability

All the materials listed in this brochure are available in diameters of up to 600 mm and some selected grades can be supplied in diameters of up to 1 600 mm for rubber materials and up to 8 500 mm in polyurethane materials. Milled parts, plates and sheets are available in a wide range of dimensions.

The SKF Economos production philosophy allows us to produce all seals and plastic parts as a single item, in small quantities, or larger quantities up to a couple of thousands, using machining or milling techniques.

Larger quantities and high volume business will be produced using an injection moulding process, as used in the manufacture of polyurethanes and high performance thermoplastics such as polyetheretherketone (PEEK).





Cleaning procedures

The need for sanitising programmes has been commonly established. Cleaning and sanitising procedures have to be developed for all food processing equipment. The objective of cleaning and sanitising food contact surfaces is to remove remaining food particles (nutrients) from the system.

Cleaning definitions

Clean

Free from dirt, stain, or impurities and generally unsoiled.

Sanitised

Free from elements that endanger health, reduction of micro-organisms.

Disinfect

Refers to inanimate objects and the destruction of all vegetative cells (not spores).

Sterilise

Refers to the statistical destruction and removal of all living organisms.

SKF Economos has wide ranging experience in material and product design compatibility to overcome problems in the cleaning processes used in the food, beverage and pharmaceutical industries.

Our laboratories can offer compatibility testing of particular formulations if needed. Ongoing material development will keep SKF Economos at the forefront of this vital requirement.

Manual cleaning

Procedures performed by cleaning personnel using:

- buckets, brushes and hoses or
- HPLV-Systems (High Pressure Low Volume) via spray nozzles or
- by foaming (cleaning primarily by chemical action)

Mechanical cleaning

COP (Clean-out-of-Place)

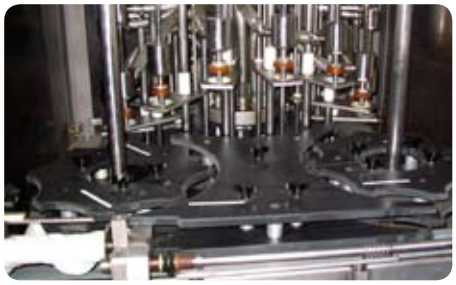
System using an agitated tank to clean components (equipment parts and short section of piping) disassembled and placed in the tank.

CIP (Clean-in-Place)

This cleaning process is usually accomplished via chemical action based on spray or pressure recirculation of the flush, wash, and rinse solutions under controlled conditions of time, temperature and chemical concentration. It involves the washing of processing and storage tanks, the piping systems and integrated equipment.

SIP (Sterilisation-in-Place)

The objective is to sterilise all sterile product contact equipment at its point of use to eliminate or reduce the need for aseptic additions or connections.



Seals in contact with cleaning chemicals

SKF Economos has wide variety of plastics and polymeric sealing materials which comply with the most important food standards and regulations. In the food, beverage and pharmaceutical industries, there are a lot of important requirements and parameters which influence the quality of seals and plastic parts.

Standards and regulations for material manufacturers*

- EC regulations
- FDA
- NSF
- drinking water
- pharmaceutical regulation

Requirements for seals

- resistance against chemical cleaning products
- resistance against used CIP media
- sealing surfaces which are easily cleaned and sterilised
- good resistance against abrasion and wear
- non-toxic sealing materials
- installation without any dead spots (spaces)

Compatibility

In addition to the above mentioned requirements, the following parameters strongly influence the quality of the cleaning process as well as the durability of the seals:

- immersion period
- temperature
- type of cleaning media
- concentration of the cleaning solution

Material	Nitric acid 85 °C, 3%	Caustic soda 85 °C, 3%	Auqua dest. 100 °C	Steam 140 °C	Sodium hypochlorite solution 70 °C, 5%	Sodium sodium hydroxide sodium hypochlorite 70 °C, 3%	Sodium sodium hydroxide sodium carbonate 70 °C, 3%	Sodium hydrogen peroxide peracetic acid 50 °C, 3%	3-A Sanitary standards 18-03
H-ECOPUR	+	+	+	-	+	+	+	+	Class 1,3**
SKF Ecorubber-1	(-)	+	+at 70 °C	(–)	n.d.a.	n.d.a.	n.d.a.	n.d.a.	n.d.a.
SKF Ecorubber-H	(-)	+	+	-	n.d.a.	n.d.a.	+	–	n.d.a.
SKF Ecorubber-2	(o)	o	o	-	o	o	+	+	Class 1
SKF Ecorubber-2 85A-w-FG	o	–	(o)	(–)	o	o	+	+	Class 1
SKF Ecorubber-3	(o)	(o)	+	+	o	o	+	+	Class 2
SKF Ecorubber-3 85-w-FG	o	o	(+)	(+)	o	o	+	+	Class 2
Ecosil	–	(–)	+	(–)	n.d.a.	n.d.a.	+	n.d.a.	n.d.a.

+	resistant	immersion period:	168 hours
o	limited resistance	(+,o,–):	n.d.a, supposed to be +, o or –
–	not resistant	**Class 1, 3:	to product or sterilization (possible up to 100 °C)
n.d.a.	no data available		

**) for detailed information of standards and regulations please contact our specialists at headquarters in Judenburg/Austria.*

***) The data mentioned above is only valid for short-term operations and must be evaluated for longer periods. Please contact our application department for further information.*

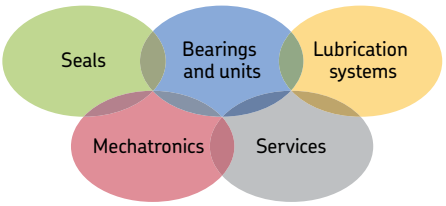
The knowledge engineering company

The SKF brand now means more than ever to the customer. While maintaining its position as world leader in quality bearings, greater customer value has been created through new advances in technology, product support and services, making SKF a truly solutions-oriented supplier. Customer productivity has increased through leading edge application-specific products, design simulation tools, consultancy services, plant asset efficiency maintenance programs and the industry's most advanced supply management techniques.

The SKF brand still stands for the very best in rolling bearings, but now offers even more. SKF – the knowledge engineering company. Seals and sealing technology are part of SKF's essential skills and signify excellence and leadership. SKF Sealing Solutions supplies the very best standard seals, customised standard seals and customer engineered solutions.

SKF Economos offers a unique and comprehensive seal consultancy service, providing customers with the latest advances in sealing technology. In cooperation with our customers, we analyse operational requirements and applications. All our seals, whether standard or customised, are manufactured on demand without tooling costs or delays.

Our sealing experts are joining your team to develop unique solutions to your unique sealing needs.



The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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