ERIKS sealing elements

High purity sealing and component solutions for the food-, pharma- and biochemical industry

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Responsibility

All technical information in this brochure has been selected with the utmost care. Nevertheless, we are not responsible for incorrect details in this brochure.

This information has been carefully prepared to help in selecting the correct elastomer or perfluorocarbon utilized in high puritiy sanitary hygenic seals where critical pure water, process fluids (both ambient and hot) and SIP environments exist.The intention is to consider the different uses, applications and conditions to determine the most favorable seal and gasket material for each application.

The three main goals of this brochure are to be of help:

- To protect products from contamination, spalling, particulates and TOCs resulting from the use of improper sanitary gasket material.
- To protect facilities from unneccessary downtime associated with sanitary gasket failure and replacement from use of improper gasket material.
- To provide a standard of consistency of sanitary gaskets selection between multiple facilities.

1. Introduction FDA concept

In the processing of food, there are situations where significant contact of the food with rubber products can occur. The unique properties of rubber as a flexible and elastic material lead to the use of rubber in conveyor belting, hosing, seals and gaskets etc. A wide variety of rubber compound types can be employed.

For the various food industries, the times, temperatures and areas of contact vary greatly, and these parameters have a profound effect on the potential of species to migrate from the rubber component into the food. In general, the use of rubbers for mainly processing applications means that the contact times with food are short (e.g. minutes). This is different to plastics which, when used as packaging materials, often have long contact times (e.g. weeks).

It is obviously inherently undesirable for any chemical species to migrate into a foodstuff during either processing or storage. It is therefore important to understand how rubber products might affect the quality of foodstuffs due to the migration of chemicals by obtaining data on both the types of species that migrate and the extent of migration. Given that rubber components are produced from complex formulations, and that chemical modification occurs during any vulcanisation step, prediction of migration data may be difficult; certainly more difficult than it is for the majority of plastics.

Rubber constituents which can potentially migrate include low molecular mass monomers, vulcanising agents, antidegradants, plasticisers, oils and waxes and their breakdown products. For example, polar plasticisers such as di-2-ethylhexyl phthalate are readily soluble in alcohol, so plasticised rubber should not be used in contact with alcoholic drinks.

Similarly, the acrylonitrile monomer is of concern to health and is not permitted to migrate at detectable levels, so levels of free monomer are tightly controlled during production.
Rubbers intended for food contact use are normally compounded to compositional guidelines given in legislation.

Migration data from a rubber product are expressed in terms of overall migration and specific migration. In the case of overall migration, it is only the mass of migrating material under a given set of conditions that is of interest and no consideration as to its composition is given. With specific migration, analysis techniques are chosen that can quantify individual chemical species. Overall tests can be used to assess the quality and suitability of a rubber compound for a food contact application, whereas specific tests are targeted on chemical species that are known to give particular health and safety concerns.

When it comes to designing migration experiments, a worse case scenario is often set up. This involves maximising the potential for migration for a given system by choosing the highest values for parameters such as temperature, contact area and contact time for the testing. If the migration values obtained are still within the legislative limits, a margin of safety is obtained for the everyday use of the rubber product.

The objective of this catalogue is to present the different products with FDA compliancy to our customers.

More details can be achieved on request.

1. Introduction FDA concept

1.1. Rubber components used in food processing operations

Rubber components used in contact with food were found to be generally restricted to the situations shown in Table 1.
Other uses of rubber components were found, which do not fit into the listed categories, e.g. silicone sweet moulds, rubber skirting, paddle rubber lips, gloves and feather pluckers.

Table 1 : Rubber components used in food contact applications

Location	*Component*
Food transportation	Conveyor belts, hoses and tubing
Pipework components	Seals, gaskets, flexible connectors and butterfly valves
Pumps	Progressive cavity pump stators, diaphragm pumps
Plate heat exchangers	Gaskets
General seals and gaskets	Used in machinery and storage vessels
Packaging seals	Can sealants and bottle seals

1.1.1. Contact areas

Food contact areas of whole assemblies, be these total pipelines, paddle rubber lips, or plate heat exchangers cover a wide range from less than 100 cm^2 to around 56.000 cm^2, the plate heat exchanger being the assembly found generally to be associated with the highest contact area.

It is important to make a distinction between the contact area of an individual rubber component (e.g. a plate exchanger gasket) and the total contact area of the assembly the component is in (i.e. the plate heat exchanger). The vast majority of rubber components had individual food contact areas of less than 1000 cm^2 with around two thirds of these having contact areas of less than 100 cm^2.

From the categories listed in Table 1, the following rubber components usually have contact areas of less than 200 cm^2: general seals and gaskets, plate heat exchanger gaskets, pipe work seals and packaging seals. Pump components, pipe valves and flexible connectors have greater individual contact areas, up to 1.000 cm^2.Individual components that have contact areas greater than 1.000 cm^2 tend to have a high aspect ratio, as typified by hoses and conveyor belts. The highest contact area found in the Rapra survey was for a hose at approximately 50.000 cm^2. However certain conveyor belts had potential contact areas of up to 1.500.000 cm^2.

1.1.2. Contact times

In general, contact times with rubber components are low, i.e. less than 60 seconds, and the maximum contact time in a plate heat exchanger is reported by manufacturers of these products to be no more than 3 minutes. Few components or assemblies give longer contact times, the exceptions generally being conveyor belts and sweet moulds where contact times were less than 1 hour.
One butterfly valve sealing off a soakig tank remained in contact with the food for 24 hours routinely, and beer could reside in beer engines for up to 12 hours. The brewing industry is one process area where contact could occur for periods in the range from seconds to 12 weeks. Meat and poultry nets can remain in contact with the product for up to four weeks. The longest contact times (up to 5 years are possible) occur with packaging seals.

1. Introduction FDA concept

1.1.3. Contact Temperature

The review of the food processing industry indicated that the temperature at which contact with rubber occurs rarely exceeds 80°C.

Temperatures in the range 100-140°C do occur in some processes, e.g. pasteurisation of UHT milk, the production of toffee in silicone moulds and the sterilisation of cans and jars, but the contact time of the food at the elevated temperature is normally reasonably short (<1 hour).
The most extreme temperatures were encountered in the refining of vegetable oils where temperatures in the range 170-250°C were used in the deodorising section of the plant. Fluorocarbon rubbers are required to resist these high temperatures.

Meat and poultry nets may be subject to temperatures up to 250°C for several hours if they are not removed prior to cooking.

1.1.4. Contact Data

The food processing areas reviewed included: a creamery; butter packaging; the production of sugar from sugar beet; breakfast cereal manufacture; a maltings; a brewery; the refining of vegetable oil; chocolate manufacture; sweet production; an abattoir; the processing of baked beans; vending machines; the processing of canned pulses, carrots and potatoes; and the processing of chilled fruit juice and long-life fruit juice. The information collected on food contact with rubber is summarised in Table 2.

Table 2 : Summary of the information collected on food contact with rubber

Component	*Contact area individual component (cm2)*	*Contact area in assemblies (cm2)*	*Typical contact times*	*Maximum contact time*	*Contact Temperature*	
					General	*Extreme*
Food transportation	Up to 50,000	-	< 1 hr	-	< 85°C	-
Pipework components	< 1,000	< 10,000	< 1 hr	2 weeks	< 140°C	250°C
Pumps	< 10,000	-	< 1 hr	2 weeks	< 85°C	-
Plate heat exchanger gaskets	< 1,000	Up to 56,000	< 3 min	-	< 140°C	250°C
General seal & gaskets	< 1,000	Up to 30,000	< 1 hr	12 weeks	< 85°C	-
Packaging seals and closures	< 1,000	-	Up to 5 years	-	ambient	140°C
Miscellaneous	< 1,000	-	< 1 hr	4 weeks	< 85°C	250°C

Notes:
1. Potential contact areas could be up to 1.500.00 cm^2 for some conveyor belts
2. May have extended contact times during shut downs. Beer keg seals may have contact times of up to 12 weeks
3. Refining of vegetable oil
4. During pasteurisation/sterilisation
5. Meat and poultry nets
6. Meat and poultry nets if not removed before cooking

1. Introduction FDA-USP concept

1.2. General information on FDA

Since many years ERIKS has a leading role in the production and marketing of high quality seals.
ERIKS has also developed a vast range of elastomeric compounds that are formulated to comply with the regulations issued by the 'United States Federal Food and Drug Administration' (FDA). These regulations are stipulated in **Title 21, chapter 1, subchapter B, section 177.2600 of the 'Federal food and Cosmetic Act'**.
These regulations define which rubber polymers and compounding ingredients can be used in rubber articles, intended for repeated contact with food and preventing the use of dangerous substances that might cause cancer.

1.3. Types of FDA

Two important types (class 1 and class 2) of FDA exist, depending on the percentage of furnace carbon/black that is added to the compound.
Class 1: for aqueous and edible oils greasy media;
Class 2: for aqueous media.

1.4. Certification

ERIKS guarantees the 'conformity' by:
- strict production methods,
- FDA-sticker is put on the packaging,
- a certificate of conformity can be obtained (on payment) with every delivery.

In general ERIKS guarantees that the FDA-materials are 'FDA-compliant' which means they are composed with ingredients according the FDA-regulations under 1.2. on this page.

1.5. Migration tests FDA

Some compounds have been tested by independent laboratories (for example 'Rapra' in England).
Rubber articles intended for repeated use in contact with aqueous food shall meet the following specifications: 'The food-contact surface of the rubber article in the finished form in which it is to contact food, when extracted with distilled water at reflux 20 milligrams per square inch during the first 7 hours of extraction, nor to exceed 1 milligram per square inch during the succeeding 2 hours of extraction'.

Rubber articles intended for repeated use in contact with fatty foods shall meet the following specifications: 'The food-contact surface of the rubber article in the finished form in which it is to contact food, when extracted with n-hexane at reflux temperature, shall yield total extractives not to exceed 175 milligrams per square inch during the first 78 hours of extraction, nor to exceed 4 milligrams per square inch during the succeeding 2 hours of extraction'.

1.6. USP

USP class VI was especially developed for the pharmaceutical industry. This information has been carefully prepared to help in selecting the correct elastomer or perfluorocarbon utilized in high purity sanitary hygenic seals where critical pure water, process fluids (both ambient and hot), and SIP environment exist.
The intention is to consider the different uses, applications and conditions to determine the most favorable gasket material for each application. The following criteria is used in determining correct sanitary gasket materials.

- USP Pharmacopoeia Class VI-XXII Certification
- Cytotoxicity Criteria
- CFR Title 21 Section 177.1550
- CFR Title 21 Section 177.2600
- Traceability: Lot and Batch
- Certification: Lot and Batch
- ASME-BPE Standards
- USD Standards
- 3-A Sanitary Standards
- Current Good Manufacturing Practices (CGMP)
- Manufacturer data and specifications
- Consultation with various pharmaceutical users

The gasket materials considered are Tef-Steel® (Teflon/Stainless Steel), Teflon® (PTFE), Silicone (platinum), Viton®, EPDM and Buna-N.

The 3 main goals are:
- To protect products from contamination, spalling, particulates and TOCs resulting from the use of improper sanitary gasket material.
- To protect facilities from unnecessary downtime associated with sanitary gasket failure and replacement from use of improper gasket material.
- To provide a standard of consistency of sanitary gaskets selection between multiple facilities.

Most decisions driving gasket type selection are based on chemistry, temperature, exposure limits, USP, FDA qualifications, and curing methods.

2. O-rings

2.1. VulcOrings FDA class 1 (less 10% carbon black)

VulcOrings are produced in small quantities. Inside diameter from 30 mm up to 5.000 mm in different cross-section diameters from 1,78 up to 25 mm.
For silicone up to 40 mm diameter.
No chemical additif is added in the bonding of the core-ends.
Datasheet on request.

VulcOrings, class 1

Compound	*Description*		*Hardness °Shore A*
Silicone 60 FDA GP60	VulcOring - Silicone 60, transparent	FDA, WRC	60
Silicone 70 FDA GP70	VulcOring - Silicone 70, transparent	FDA, WRC	70
Silicone 75 FDA MC203	VulcOring - Silicone 75, red	FDA	75
Silicone 80 FDA GP80	VulcOring - Silicone 80, transparent	FDA, WRC	80
EPDM 75 FDA MC 187	VulcOring - EPDM 75, black	FDA	75
NBR 75 FDA MC 185	VulcOring - NBR 75, black	FDA	75
Viton® 75 FDA MC 172	VulcOring - Viton® 75, black	FDA	75
Viton® 75 FDA MC 205	VulcOring - Viton® 75, white	FDA	75
Neoprene® FDA MC 186	VulcOring - Neoprene® 75, black	FDA	75

Note: These compounds can also be produced as compression moulded O-ring.

2.2. O-rings Silicone FDA class 1

ERIKS O-rings, compressed moulded, produced in smaller quantities
Datasheet on request.

Silicone, class 1

Compound	*Colour*	*Hardness ° Shore A*
S 40 H	white	40
S 40 T	transparent	40
S 50 H	white	50
S 50 T	transparent	50
S 55 T	transparent, Platinum cured, less extractabels	50
S 60 H	white	60
S 60 T	transparent	60
S 65 R	red	65
S 65 T	transparent, Platinum cured, less extractabels	60
S 70 H	white	70
S 70 T	transparent	70
S 75 T	transparent, Platinum cured, less extractabels	70
S 80 H	white	80
S 80 T	transparent	80
S 1/70	Ral 3000 red (also KTW approved; only injection moulded)	70
S 1/60	Ral 3000 red (also KTW-WRC approved; injection moulded)	60

2. O-rings

2.3. O-rings EPDM / NBR / Neoprene®-FDA

ERIKS O-rings, compressed moulded, produced in smaller quantities
Datasheet on request.

EPDM, class 2

Compound	*Colour*	*Hardness ° Shore A*
E 50 Q	black (peroxide cured)	50
E 60 H	white - class 1	60
E 70 H	white - class 1	70
E 70 Q	black (peroxide cured)	70
E 80 Q	black (peroxide cured)	
E 80 H	white - class 1	80
E 90 Q	black (peroxide cured)	90
TIMO 70	black (FDA-WRC-NSF-KTW approved; only injection moulded)	70
TIMO 1-70	black (FDA-KTW approved; only injection moulded)	70
1520	black - ACS	70

NBR (Nitrile, Buna-N), class 2

Compound	*Colour*	*Hardness ° Shore A*
N 70F class 1	black	70
N 70W class 1	white - class 1	70
N 80F class 1	black	80
N 90F class 1	black	90
NBR 70 class 1	black	70
WRC 70	FDA-KTW-DVGW approved; (only injection moulded)	70

CR (Neoprene®), class 2

Compound	*Colour*	*Hardness ° Shore A*
C 70F class 2	black	70
C 70H class 2	white - class 1	70

2. O-rings

FOOD INDUSTRY

2.4. O-rings Viton® FDA

ERIKS offers you a number of compounds with approval for contact with food stuffs.

These compounds meet the demands according to the FDA Regulations, title 21, Chapter 1, Subchapter B, Paragraph 177.2600 for use in contact with unpacked food stuffs.

For seals, two relevant FDA classes exist: firstly, Class 2 for contact with liquids and drinks and Class 1 for contact with milk, milk-derived products and edible oils.
Our standard Viton® FDA O-rings meet Class 1 requirements.

We offer:

FDA-approved Viton® Compounds for direct contact with food-stuff: class 1

Compound	*Colour*	*Hardness ° Shore A*
V-178 FDA	red	75
V-180 FDA	white	75
MC172 (VulcOring)	black	75
MC205 (VulcOring)	white	75

Last but not least, we can supply a number of compounds, hardness varying from 60 to 95° Shore, that also meet FDA Class 2.
We kindly invite you to contact us for further information.

2. O-rings

2.5. O-rings Kalrez® FDA

Kalrez® perfluoroelastomer parts are not routinely tested using the USP testing protocol. Cured samples made only from compounds 6221 and 6230 have been tested in accordance with USP protocols and meet the requirements of a USP Class VI polymer. USP testing was done to support use of Kalrez® parts in pharmaceutical processing and food processing applications. While USP Class VI compliant materials are not required for pharmaceutical and food processing applications, many pharmaceutical and food processing customers, including customers seeting ISO-9000 certification, have requested compliance. Testing of any finished article that incorporates Kalrez® perfluoroelastomer parts is the responsibility of the manufacturer or seller of the finished article if certification that meets USP standards is required.

Note:
Ask our engineers for calculation of the right Kalrez® O-Ring for your application

Medical use

Caution: Do not use Kalrez® perfluoroelastomer parts in medical applications involving implantation in the human body. For other medical applications, see DuPont Dow Elastomers Medical Applications Policy, H-69237. DuPont Dow Elastomers will not sell or support products for implantation in the human body. DuPont Dow Elastomers does not make surgical or medical grades of Kalrez® perfluoroelastomer parts and does not guarantee continuity of process in our manufacturing operations as changes may occur from time to time.

Kalrez® gains Food Contact Substance Notification

We are very pleased to announce that the United States Food and Drug Administration (FDA) has reaffirmed the compliance of Kalrez® 6221 and 6230 perfluoroelastomer parts for repeated use in contact with food.

Food Contact Substance Notification FCN000101 describing perfluorocarbon cured elastomers Kalrez® 6221 and 6230 became effective on December 19, 2000. Meeting this stringent requirement in addition to existing compliance with FDA 21CFR177.2600 reinforces DuPont Dow's determination to exceed standards used by the pharmaceutical industry. The notification process for food contact substances, described in section 409(h) of the Federal Food, Drug and Cosmetic Act (FFDCA), emerged in 2000 as the primary method by which the FDA authorises the use of food additives that are food contact substances. A notification for a food contact substance contains sufficient information to demonstrate that the substance is safe for the intended use that is the subject of the notification (21U.S.C.348(h)(1)).

Proven suitability for food and pharma processing

DuPont Dow Elastomers welcomes the new legislation as an opportunity to reaffirm the suitability of Kalrez® 6221 and 6230 perfluoroelastomer parts for repeat use food contact applications. The FCN requires Kalrez® 6221 and 6230 to meet extractable levels not to exceed 0.2 milligrams per square inch. This provides further confirmation of the low risk of contamination from Kalrez® parts, the long term sealing solution for challenging food and pharmaceutical applications.

Statement of Compliance

Kalrez® parts made from compounds 6221 and 6230 meet the extractive requirements of 21CFR177.2600(E) and may be used for repeated use in compliance with the Food, Drug and Cosmetics Act and all applicable food additive regulations. Kalrez® parts made from compounds 6221 and 6230 have been tested in accordance with the United States Pharmacopeia Class VI (USP Class VI) testing protocol. Testing using the protocols cited above was performed by an external testing facility in compliance with 21 CFR, Part 58 Good Laboratory Practice for Nonclinical Laboratory Studies.
6221 and 6230 offer excellent steam cycling resistance and reduce extractables from sealing materials to trace levels.

2. O-rings

2.5. O-rings Kalrez® FDA

Kalrez® Perfluoroelastomer Parts for Pharmaceutical and Food Handling Applications

Kalrez® parts made from compounds 6221 and 6230 provide superior chemical resistance and low contamination from extractables in pharmaceutical and food handling applications where FDA compliance is required. Compounds 6221 and 6230 are especially suited for Water For Injection (WFI) systems, Steam-In-Place (SIP) cleaning and other critical systems.

Thermal Stability

Unlike other elastomeric seals made with FDA compliant elastomers, Kalrez® perfluoroelastomer parts are thermally stable up to 260°C, permitting use in applications such as Stage II Sterilization processes, where other elastomers lose their sealing capabilities.

Aggressive Water Resistance

In aggressive pharmaceutical and semiconductor processing environments, seal failure from excess swelling, embrittlement or decomposition can cause unscheduled downtime or product contamination. Elastomeric materials that come in contact with highly pure and aggressive water (e.g. WFI) must be chosen with care in order to prolong seal life. The perfluoroelastomer compounds used in Kalrez® parts have been shown to have extremely low to non-detectable extractable levels in aggressive water systems. Because the perfluoroelastomer polymer in Kalrez® parts is fully saturated, it is also well suited for Ozonated Deionized Water service. Kalrez® parts also exhibit verly low swell and loss of mechanical properties after repeated steam cycling.

General Chemical Resistance

The overall chemical resistance of EPDM's, silicone elastomers and fluoroelastomers (FKM) is limited by their respective polymer structures. Kalrez® parts, on the other hand, offer the same universal chemical resistance as PTFE, but unlike PTFE, they have elastomeric properties, which help them maintain their sealing capabilities. Table 1 lists the chemical compatibility of Kalrez® perfluoroelastomer parts and other elastomers used as sealing materials in the pharmaceutical and food handling industries.

Table 1- Elastomer Chemical Compatibility *

Chemical	*Kalrez*	*EPDM*	*SI*	*FKM*
Acetic acid	A	A	A	B
Acetone	A	A	C	U
Citric acid	A	A	A	
Hydrogen peroxide	A	B	B	B
Isopropyl alcohol	A	A	A	
Metthyl ethyl ketone	A	A	U	U
Mineral oil	A	U	B	A
NaOH	A	A	B	B
Nitric acid	A	B	B	A
Sodium Hypochlorite	A	B	B	A
Soybean oil	A	C	A	A
Steam (<150°C)	A	A	C	U
Steam (>150°C)	A	C	U	U
Toluene	A	U	U	A
Xylene	A	U	U	A
Maximum Service Temp.	260°C	135°C	200°C	200°C

A = little or no effect ; B = slight swelling and/or loss of physical properties ; C = moderate to severe swelling and/or loss of physical properties/limited functionality ; U = not suitable or recommended.

** Data has been drawn from DuPont Dow Elastomers tests and industry sources. Data is presented for use only as a general guide and should not be the basis of design decisions. Contact DuPont Dow Elastomers for further information.*

Table 2- Typical Physical Properties * *

Compound	*Kalrez® 6221*	*Kalrez® 6230*
Colour	White	Black
Durometer hardness, Shore A, points±5	70	75
100% Modulus, psi (MPa)	1,050	1,020
Tensile strength at break(1), psi (MPa)	2,200	2,400
Elongation at break(1), %	150	170
Compression set (2), 70h at 160°C	20	18

(1) ASTM D412, (500 mm/min) ; (2) ASTM D395 B, Size 214 O-rings

*** Typical physical properties should not be the basis of design decisions. Contact DuPont Dow Elastomers for further information.*

2. O-rings

2.6. Teflex encapsulated FDA

Availability
The following are examples of such formats but we would consider any requests for special items not displayed here.

Circular
Circular shapes are by far the most common and account for over ninety percent of the current production. Available from 5 mm inside with no upper diameter limit.

Oval
Oval shapes are used mainly in 'inspection hatch' applications on chemical vessels. We can produce most of the common hatch sizes as well as non standards.

Semi circular
Semi circular shapes are used for both inspection hatch and heat exchanger sealing. There are no standard sizes available but tooling costs are very low so most applications are worth serious consideration.

Square and rectangular
Square and rectangular shapes are used in many applications such as heat exchanger plate and pump housings. All the above shapes (excluding circular) have to be produced with radiused corners and are priced on application.

FEP Jacket on solid Viton® core

This is the most popular combination and indeed the most technically capable in providing a compression seal. The Viton® core compound has been specifically formulated to give very low compression set results and this characteristic speeds up the somewhat slow memory of the FEP jacket. The temperature range is -20° to +204°C.

FEP Jacket on solid Silicone core

This combination again is very popular and this is due to lower costs against that of Viton® core. Technically it is inferior to Viton® except when used for low temperature use. The temperature range is -60° to +204°C.

PFA Jacket on solid Viton® core

PFA offers higher abrasion resistance to that of FEP and the cost is some 50% higher.
The temperature range is -20° to +204°C.

PFA Jacket on solid Silicone core

This combination is preferred for higher temperature applications. The PFA jacket shares the same temperature service limits as the Silicone core. The temperature range is -60 to +260°C.

FEP Jacket on hollow Silicone core

Used commonly where low seal loading is encountered. For slow reciprocating or rotary movement, the hollow core does not offer quite such energising load thus reducing jacket wear and premature failure. Temperature range is -60 to +204°C.

PFA Jacket on hollow Silicone core

Used for the same applications as FEP on hollow Silicone core but when additional abrasion resistance is necessary to prolong the seal life. Temperature range is -60 to +260°C.

FEP Jacket on Solid Viton® or Silicone core

Rectangular and square sections can be produced and we have a standard range of gaskets in the price list section for cam action type hose couplings. These provide a far superior alternative to envelope gaskets or solid PTFE joints. Temperature range is -20°to +204°C.

2.6. Teflex encapsulated FDA

Approvals

FDA : Food and Drug Administration.
This data pertains to the US Federal Food and Drug Administration regulations governing the use of fluoropolymers as articles or components intended for use in contact with food.
The Teflon FEP and PFA resins used to produce Teflex may be used as articles or components to contact food incompliance with FDA Regulation 21 CFR 177.1550.
This specification includes acceptance by The United States Department of Agricultrue for direct use in contact with meat or poultry food products and Food Industries Supply. Association Inc. for product contact surfacces for Dairy Equipment.
USP Class VI requirements are met by Teflon FEP and PFA for use in Pharmaceutical Processing.
Teflon FEP is approved for use with potable water under section 5296 certificate no 930716.

Teflon-FEP

21 CFR 177.1550	21 CFR 177.2600	21 CFR 175.105
21 CFR 176.180	21 CFR 177.1520	21 CFR 175.300
21 CFR 176.170		

Teflon-PFA

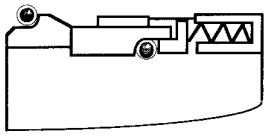
21 CFR 177.1550	21 CFR 175.105	21 CFR 176.180
21 CFR 175.300	21 CFR 176.170	

P.S. Our Viton® can be produced compliant to FDA.

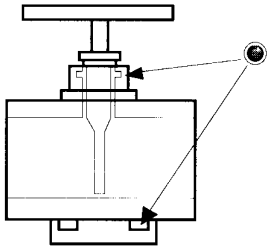
Markets and applications

There is hardly a market in which our Teflex O-rings are not currently utilised and they are very well established in the following industries: chemical processing and production, oil extraction, petrochemical refining, pharmaceutical production, food and drink processing, paint and die manufacture refrigeration engineering, cosmetics and perfumery, automotive components and aerospace engineering.

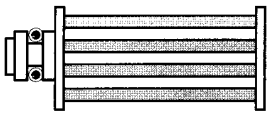
Mechanical seals



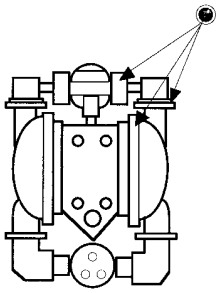
Valves



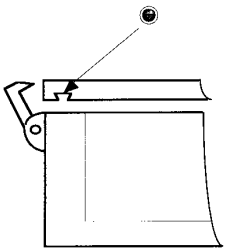
Filter elements



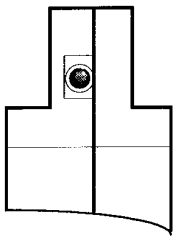
Pumps



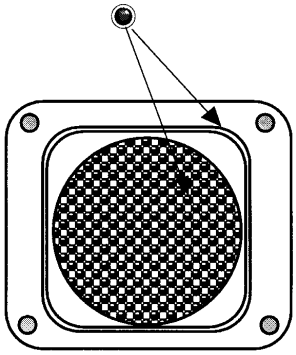
Mixers and vessels



Flanges



Heatexchangers



2. O-rings

2.7. Cam Action Coupling Gaskets

We produce a range of Ncap encapsulated FEP/Silicone/Viton® Gaskets which are used as seals for Cam Action Couplings.

A cam Action Coupling as the name implies, is a coupling made usually of steel, aluminium, brass or plastic with two cam acting levers used to lock the male probe into the female coupler.

These couplings are used in a wide range of industries such as Petroleum, Water, Dairy and Food processing, in fact any industry that requires the transporting around of liquids, powders or granules. They are often to be found fastened to flexible hose ends which allow tankers to discharge their loads quickly into containers or storage vessels.

Once locked into place by the cams, a seal is required between the probe and the coupler to stop leakage of produce passing between the two.

Sizes Available
The standard range of sizes we can manufacture are as follows:

Standard sizes

NB Size	*OD x*	*ID x*	*Thickness*
25.4 (1”)	40.0	26.0	6.50
31.7 (1.1/4”)	49.8	35.0	6.50
38.0 (1.1/2”)	55.6	41.0	6.50
50.8 (2”)	67.0	52.0	6.50
63.5 (2.1/2”)	78.0	60.0	6.50
76.2 (3”)	95.0	76.0	6.50

We used to produce sizes above this but the demand reduced beyond economical levels. These gaskets are available with Viton® or Silicone solid core but with the jacket only in FEP.

Prior to utilising Ncap Gaskets, coupling manufacturers would need to ascertain which product would be passing through the coupling in order to select a suitable plain rubber gasket.

The main advantages of using NCAP Gaskets are their FDA and Potable Water status, their ability to withstand steam purging for cleaning, their versatile chemical resistance and the benefits of any product suitability.

Other dimensions
It is possible to make gaskets in other sizes with square or rectagular profiles. However, fluoropolymer profiles are not easy to produce and tooling costs are extremely high.

FDA 177.2600

2.8. USP compliant O-rings

We deliver USP class VI O-rings in:
- Viton® 70 black
- PT cured Silicone 70 transparent
- Peroxide cured Silicone 70 transparent
- EPDM 70 black

Our standard program is the AS 568-range.

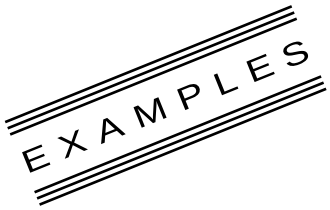
USP class VI O-rings can be delivered with:
- Custom packaging
- 100% inspection rate
- Sterile packaging
- Cure date
- Batchnumber
- Certification

Join the many companies curing USP class VI products.

The ERIKS USP O-rings are produced to following parameters:
- USP pharmacopoeia class VI-XXII
- Cytotoxity criteria
- CFR Title 21 Section 177.2600
- ASME-BPE Standards
- 3-A Sanitary Standards
- CGMP: Current Good Manufacturing Practices

2.9. Datasheets

We give a few examples of our O-ring data-sheets. Other data-sheets on demand.



MVQ 70 SILICONE-S1/70 FDA

- Material type : Methyl-vinylsilicone
- Application : Food, beverage and pharmaceutical industry
- Temperature range : -65 à +225°C

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	ASTM D 2240	72 +-5° IRHD
Tensile strength at break	ASTM D 412	8 Mpa
Elongation at break	ASTM D 412	250%
Specific weight	DIN 53479	1,20
Compression set - 70h/150°C, on slab	ASTM D 395 B	18%
Heat aging 70h/225°C	ASTM D 573	
Hardness change		5
Tensile strength		-16%
Elongation break		-20%
Immersion in ASTM oil n° 1-70/150°C	ASTM D 471	
Hardness change		-3°
Volume change		+4%
Tensile change		-2%
Surface tackiness		none
Low temperature test Brittleness	ASTM D 2137	non-brittle at -65°C
Colour		red

Other information: Conform to AMS 3304G-FDA approved.

MVQ 60 SILICONE CORD 714MP FDA

- Material type : Methyl-vinylsilicone, food, pharma, FDA, BGA compliant
- Application : Oils, ozon, hot air
- Temperature range : -60 à +200°C

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	DIN 53505	60 +-5° IRHD
Tensile strength at break	DIN 53504	7.5 N/mm^2
Elongation at break	DIN 53505	300%
Specific weight	DIN 53479A	1.13
Compression set 24h/175°C, on slab	DIN 53517	25%
PROPERTIES:		
temperatures till 200°C		
steam till 130°C		
this is a medical quality		
Low temperature test TR10		
Colour		red

Other information: tolerances foll. DIN 7715 E2.

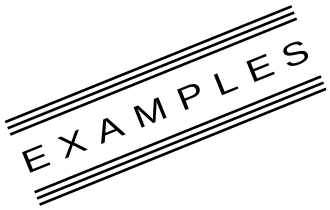
2. O-rings

EPDM 70 - E 70 Q - FDA

- Material type : EPDM peroxide cured, formulated to FDA to be non-toxic and non-carcinogenic, Phtalate-free
- Application : Excellent water and steam resistant for use in equipment for production of foodstuffs for human consumption
- Temperature range : -40 à +125°C, short periods to 150°C

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	ASTM D 2240	70 +-5° IRHD
Tensile strength at break	ASTM 412C	11,2 MPa
Elongation at break	ASTM 412C	350%
Specific weight	ASTM D 1817	1,25
Compression set 22h/150°C, on slab	ASTM D 395/B	max; 29%
Compression set in water at 130°C, 28 days	ASTM D 395/B	max; 31%
Test results following FDA regulations in boiling water after 7 hours (limit 20 mg/sq in)		0,24
n-hexane after 7 hours (limit 175 mg/sq inch)		4,38
Low temperature test TR10		-40°C
Colour		black

Other information:
Can be produced in small quantities, due to compression-moulding production facilities.



FDA GRADES IN VULC-O-RINGS

- Material type : Neoprene® MC 186 - EPDM MC187 - NBR MC185
- Application : Contact with foodstuff
- Temperature range : -

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	ASTM D 2240	70 +-5° IRHD
Tensile strength at break	ASTM 412	Neop.: 12,3 MPa EPDM: 12,6 MPa NBR: 7,6 MPa
Elongation at break	ASTM 412	Neop.: 482% EPDM: 210% NBR: 288%
Compression set 24h/100°C, on slab	DIN 53517	Neop.: 42% EPDM: 10% NBR: 20%
Heat aging 168h/100°C *Hardness change* *Tensile strength change*	ASTM D 573	 Neop.: +8° EPDM: +1% NBR: +7° Neop.: -11% EPDM: -10% NBR: +3%
Colour		black

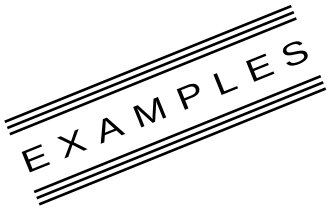
Other information: Class 1 FDA. Can be produced in small quantities, due to compression-moulding production facilities.

2. O-rings

TEFLEX-SILICONE

- Material type : Silicone O-ring encapsulated with FEP or PFA
- Application : Chemical resistant O-ring where low and high temperatures are required
- Temperature range : -60° to +204°C (FEP) and +260°C (PFA)

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	ASTM D 2240	70 +-5° IRHD
Tensile strength at break	ASTM 412	9 MPa
Elongation at break	ASTM 412	250 % EPDM: 210% NBR: 288%
Specific weight		
Compression set *22h/100°C, on slab*	ASTM D 395 B	10 %
FEP-Cover		
Tensile strength	ASTM D 2116	28 Mpa
Hardness	ASTM D 2240	56 Duro
Melting point	ASTM D 3418	260°C
PFA-Cover *(on request)*		
Tensile strength	ASTM D 2116	28 Mpa
Hardness	ASTM D 2240	55 Duro
Melting point *Info: PFA has a better chemical, heat and wear-resistance than FEP*	ASTM D 3418	305°C
Colour		red (silicone) translucent (FEP)



Other information:

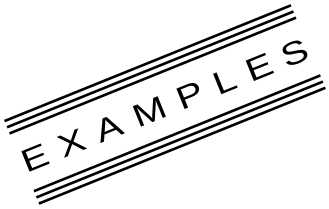
- *On demand we produce silicone hollow O-rings for better flexibility;*
- *Other silicone colours on demand;*
- *FEP and PFA are compliant to FDA 21 CFR 177.1550 and USP Class VI for pharmaceutical use;*
- *PFA withstands 260°C.*

2. O-rings

VITON 70 FDA 514641 CLASS 1

- Material type : Copolymer of vinylidene fluoride and hexafluoropropylene.
- Application : Food industry for use in aqueous or fatty food.
- Temperature range : -10° to +200°C

PHYSICAL PROPERTIES:		
Test method	*Norm*	*Test-results*
Hardness	DIN 53519	70 +-5° IRHD
Tensile strength at break	DIN 53504	min. 13 MPa
Elongation at break	DIN 53504	min. 170 %
Specific weight	ASTM D 1817	1,84
Compression set 24h/200°C, on o-ring	ISO 815	9,6 %
Heat ageing 70h/200°C	DIN 53508	
Hardness change		max. +3°
FDA regulations:		
These compounds has been tested foll. the FDA Regulations Title CFR 21 Section 177.2600.		
Extraction Hexane 7h	*175 mg/inch²*	*1mg/inch²*
Extraction Hexane 2h supplementary	*4 mg/inch²*	*<1mg/inch²*
Extraction boiling water 7h	*20 mg/inch²*	*<1mg/inch²*
Extraction boiling water 2h supplementary	*1 mg/inch²*	*<1mg/inch²*
Low temperature test TR 10	ASTM D 1329	-16°C
Colour		black



OTHER DATASHEETS ON REQUEST

This information is, to the best of our knowledge, accurate and reliable to the dta indicated. The above mentioned data have been obtained by tests we consider as reliable. We don't assure that the same results can be obtained in other laboratories, using different conditions by the preparation and evaluation of the samples.

3. Rubber cords

3.1. Silicone FDA cords

This overview gives the stock FDA-Silicone dimensions.
We produce other sections on request.

Silicone cord from stock

Ø (mm)		VMQ 60 Silicone 714 BF Tol E2 FDA/BGA Transparent	VMQ 60 Silicone 714 MP Tol E2 FDA/BGA Med/pharma red
2	Art. nr.	10000485	
	Stock	X	
	L. max.	600 m	
2,50	Art. nr.	10000560	
	Stock	X	
	L. max.	600 m	
2,62	Art. nr.	10000486	
	Stock	X	
	L. max.	600 m	
3	Art. nr.	10000487	
	Stock	X	
	L. max.	600 m	
3,53	Art. nr.	10000448	
	Stock	X	
	L. max.	200 m	
4	Art. nr.	10000489	10000552
	Stock	X	X
	L. max.	200 m	200 m
5	Art. nr.	10000490	
	Stock	X	
	L. max.	200 m	
5,70	Art. nr.	10000491	
	Stock	X	
	L. max.	150 m	
6	Art. nr.	10000492	10000493
	Stock	X	X
	L. max.	100 m	100 m
7	Art. nr.	10000494	10000553
	Stock	X	X
	L. max.	100 m	100 m
8	Art. nr.	10000496	10000495
	Stock	X	X
	L. max.	100 m	100 m
9	Art. nr.	10000497	
	Stock	X	
	L. max.	50 m	

X = stock

Silicone cord from stock

Ø (mm)		VMQ 60 Silicone 714 BF Tol E2 FDA/BGA Transparent	VMQ 60 Silicone 714 MP Tol E2 FDA/BGA Med/pharma red
10	Art. nr.	10000498	10000499
	Stock	X	X
	L. max.	50 m	50 m
12	Art. nr.	10000500	10000501
	Stock	X	X
	L. max.	50 m	30 m
13	Art. nr.	10000561	
	Stock	X	
	L. max.	50 m	
15	Art. nr.	10000562	10000554
	Stock	X	X
	L. max.	20 m	20 m
16	Art. nr.	10000502	
	Stock	X	
	L. max.	25 m	
17	Art. nr.		10000556
	Stock		X
	L. max.		20 m
18	Art. nr.	10000503	
	Stock	X	
	L. max.	25 m	
20	Art. nr.	10000563	
	Stock	X	
	L. max.	25 m	
22	Art. nr.	10000564	10000559
	Stock	X	X
	L. max.	25 m	20 m
23	Art. nr.		10000557
	Stock		X
	L. max.		20 m
25	Art. nr.		10000558
	Stock		X
	L. max.		20 m
31	Art. nr.	10000565	
	Stock	X	
	L. max.	20 m	

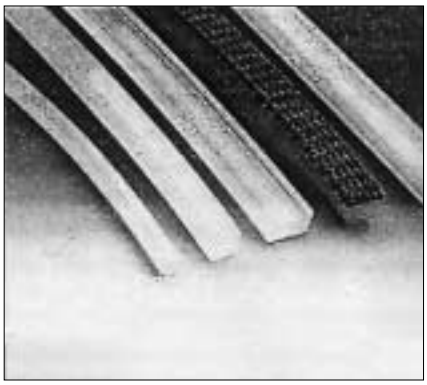
X = stock

We produce other cord FDA qualities (Viton®, EPDM, CR, PUR, etc.) on request. Following compounds are standard compounds:

Production items FDA-cord / profile

- in silicone 25-30-40-50-60-79-80° shore; colour: white
- in silicone HVCR 75 red (lowest compression-set)
- in VulcOring FDA : NBR 75, EPDM 75, Viton® 75; colour: black

3. Rubber cords



3.2. Polyurethane & Polyester cords for the drive and conveyor engineering

ERIKS has been working on the production of highly valueable thermoplastic weldable plastic belts on the basis of polyurethane and polyester for the drive and conveyor engineering.

PUR 80A, colour nature

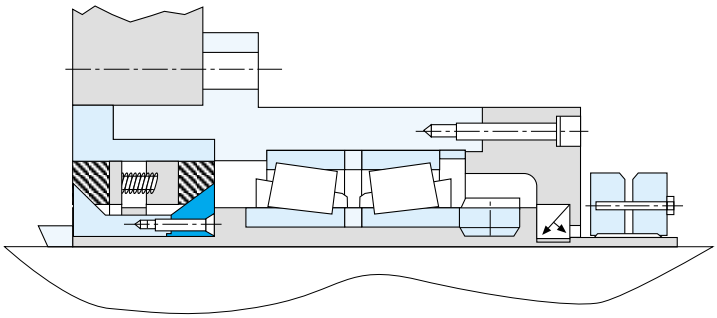
Material characteristics:
- weldable piece belts
- high tractability
- excellent wear and abrasion resistance
- resistance and insensitivity to oils, greases, dirt and most chemicals
- temperature resistance between -30°C and +80°C
- high resilience, low permanent stretching
- high static coefficient of friction and consequently good nonskid ability even during load variation
- silent and damped running, optimum adaptability
- drive and deviation via belt head possible
- non-staining
- Food fastness, FDA approved, physiologically perfect in accordance with USFDA 175.300 as well as para 31 Section 1 of the German Law for Food Comodities.
- Profiles are weldable between each other provided the same basic material has been used.

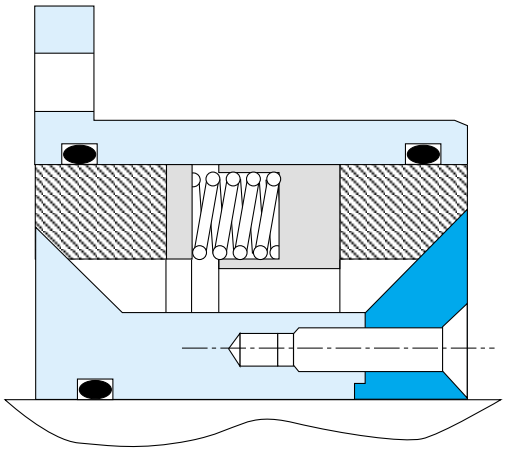
Quality nature PUR 80A

The material PUR 80A is mainly used for the food industry with direct contact with the goods.
Meat, fish, fruit, vegetable, bread, cakes, pastries.

4. Oil Seals - V-Seals - ATD-Sealsystem

The ATD-sealsystem is especially designed for the food and pharma industry and is ‘dead leg’ free.
ATD can be delivered in Ø 30 up to 500 mm for speeds up to 5 m/s.
All seal elements can be delivered in FDA execution.

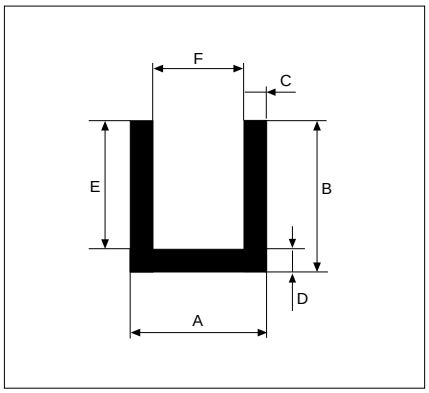




V-Seals

We produce V-seals in FDA execution in PUR, NBR, CR, silicone and FPM in all different types. We also produce a special white FDA Nitrile for the food industry.

5. Rubber profiles



Type A

Standard Quality:
714 BF transparent -
FDA and BGA compliant

Minimum: 25 m.
existing dies

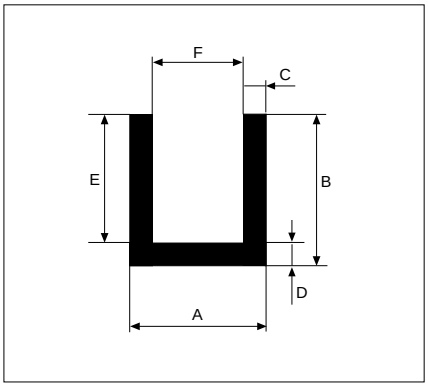
We produce different FDA compounds in our ca 4000 standard moulds.
Ask for our 'Profile catalogue' and our 'Silicone catalogue'.

On the next 4 pages, you find some standard profile shapes we can produce in FDA-compounds from 20° to 80° Shore.

U-Profiles in Silicone

art.nr.	*Prof.nr.*	*A*	*B*	*C*	*D*	*E*	*F*	*Type*	*°Shore A*
11050391	ST0081	3.2	7.3	1.8	1.8	5.5	0.6	A	60
11051170	SP0660	3	4	1	1	4	1	A	60
11051181	SP0076	3	5	1	1	3	1	A	60
11050396	ST0327	4.5	17	1.5	1.5	15	1.5	A	50
11050398	ST0428	4.5	6	2	2	4	1.5	A	20
11050409	ST0742	11	18	4.7	4.7	13	1.5	A	60
11050454	ST1684	5.5	7	2	2	5	1.5	A	60
11050507	ST2786	5.5	4	2	2	2	1.5	A	40
11051143	SP0060	7.5	20	3	3	17	1.5	A	60
11051149	SP0065	4.5	10	1.5	1.5	8.5	1.5	A	60
11050390	ST0078		10	2	2	8	2	A	60
11050509	ST2805	12	12	4	4	6	2	A	50
11051206	SP0345	5	10	1.5	1.5	8	2	A	60
11051223	SP0374	8	19	3	3	16	2	A	60
11050550	ST2881	25	12	11	11	8	3	A	40
11051148	SP0640	6	12	1.5	1.5	9	3	A	60
11051175	SP0710	5	5	1	1	4	3	A	60
11051183	SP0780	11	15	4	4	10	3	A	60
11051195	SP0096	9	25	3	3	22	3	A	60
11051221	SP0373	9	19.5	3	3	17	3	A	50
11050395	ST0313	7	6	1.8	1.8	4	3.5	A	60
11050503	ST2435	7.5	20	2	2	18	3.5	A	60
11050393	ST0170	8	13	2	2	11	4	A	60
11050405	ST0629	10	17	3	3	14	4	A	60
11050439	ST1596	11	11	3.5	3.5	7.5	4	A	60
11051145	SP0610	10	20	3	3	17	4	A	60
11051147	SP0630	8	12	2	2	10	4	A	60
11051196	SP0920	13	25	3	6	22	4	A	60
11051197	SP0930	18	8	7	7	5	4	A	60
11050404	ST0564	6.9	12	1.4	1.4	10.6	4.1	A	60
11050397	ST0395	8	8	1.5	1.5	6.5	5	A	60
11050437	ST1029	11	25	3	3	15	5	A	60
11050505	ST2543	13	22	4	4	18	5	A	60
11051146	SP0620	11	15	3	3	10	5	A	60
11051171	SP0670	9	12	2	2	10	5	A	60
11051173	SP0690	11	13	3	3	10	5	A	60
11051180	SP0750	10	12.5	2.5	2.5	10	5	A	60
11051205	SP0344	8	9	1.5	1.5	7.5	5	A	60
11051207	SP0348	11	20	3	3	17	5	A	60
11051208	SP0354	15	30	5	5	20	5	A	60
11050392	ST0139	10	10	2	2	8	5.5	A	60
11050394	ST0306	7.5	7	1.5	1.5	5.5	5.5	A	60
11050431	ST0908	12.5	15.5	3.2	3.2	11	6	A	30
11050453	ST1656	12	15	3	3	11	6	A	70
11050457	ST1912	11	16	2.5	2.5	13.5	6	A	60
11050557	ST3305	10	11	2	2	9	6	A	40
11051201	SP0342	12	20	3	3	17	6	A	50
11050552	ST2957	32	20	12.5	12.5	15	7	A	70
11051179	SP0740	16	16	4.5	4.5	11	7	A	60
11051182	SP0770	11	25	2	2	23	7	A	60
11051210	SP0367	25	20	9	9	8.5	7	A	60

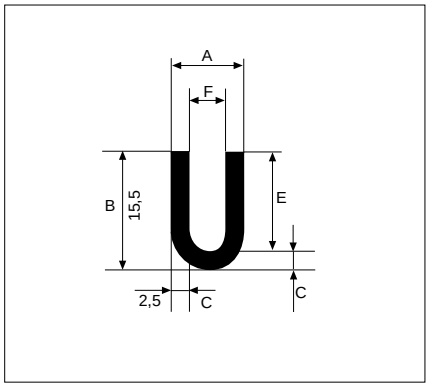
5. Rubber profiles



Type A

Standard Quality:
714 BF transparent -
FDA and BGA compliant

Minimum: 25 m.
existing dies



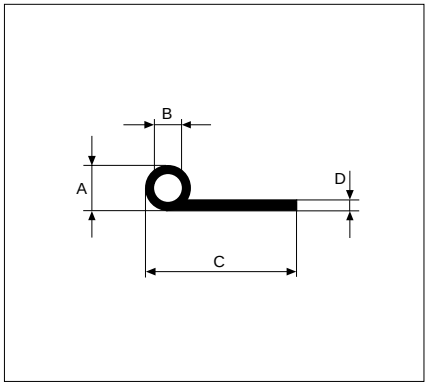
Type B

SILICONE FDA

U-Profiles in Silicone

art.nr.	Prof.nr.	A	B	C	D	E	F	Type	°Shore A
11050451	ST1655	14	20	3	3	10	8	A	70
11051203	SP0343	11	8	1.5	1.5	6.5	8	A	60
11050399	ST0456	18	12	4	4	8	10	A	30
11050407	ST0711	14	17	2	2	13	10	A	60
11050455	ST1862	20	17.5	5	5	14.5	10	A	50
11051174	SP0700	17	16	3.5	3.5	10	10	A	60
11051176	SP0720	16	13	3	3	10	10	A	60
11051198	SP0340	18	28	4	4	24	10	A	70
11050400	ST0457	23	12	4	4	8	15	A	30
11050502	ST2275	25	45	5	5	40	15	A	70
11050438	ST1343	20	40	2	2	37	16	A	70
11050456	ST1863	30	21	7	7	18	16	A	60
11050436	ST1005	25	23	4	4	18	17	A	60
11050458	ST2195	26	28	4	4	20	18	A	60
11051172	SP0680	27	18	4	4	14	19	A	60
11051178	SP0730	27.5	17	4	4	14	19.5	A	60
11050406	ST0698	35	30	5	5	25	25	A	70
11050402	ST0522	31	17	2.5	2.5	14.5	26	A	60
11050504	ST2454	44	15	3	3	12	38	A	60
11050322	ST0781	5	7	2	2	4	1	B	60
11050370	ST2976	3	8	1	1	7	1	B	70
11051184	SP0800	3	6	1	1	3	1	B	60
11051185	SP0810	3	10	1	1	9	1	B	60
11051187	SP0840	8	12	3.5	3.5	9	1	B	60
11051191	SP0870	8	12	2.5	2.5	9	1	B	60
11050329	ST1952	3.3	9	1.1	1.1	8	1.1	B	70
11050379	ST3447	5	15	1.6	1.6	13.3	1.5	B	60
11051190	SP0860	4.5	15	1.5	1.5	13.5	1.5	B	60
11050208	ST0155	7	15,5	2,5	2,5	12	2	B	50
11050320	ST0304	5	10	1.5	1.5	8.5	2	B	60
11050326	ST1580	5	15	1.5	1.5	13	2	B	20
11050363	ST2119	5	14	1.5	1.5	12	2	B	30
11051186	SP0820	6	12	2	2	10	2	B	60
11051189	SP0850	6	25	2	2	23	2	B	60
11051192	SP0880	6	12	2	2	10	2	B	60
11051193	SP0890	4	8	1	1	5.5	2	B	60
11050372	ST3207	7.5	13	2.5	2.5	10.5	2.5	B	60
11050204	ST0038	11	15	4	4	10	3	B	50
11050366	ST2165	6	16	1.5	1.5	13	3	B	60
11050373	ST3230	6	10	1.5	1.5	7	3	B	30
11050377	ST3310	6	14	1.5	1.5	12.5	3	B	60
11050209	ST0237	10	18	3	3	15	4	B	50
11050368	ST2166	7	16	1.5	1.5	14	4	B	60
11050369	ST2335	9	16.5	2.5	2.5	13	4	B	60
11050375	ST3309	7	14	1.5	1.5	12.5	4	B	60
11050325	ST0946	11	20	3	3	17	5	B	60
11050360	ST1958	13	20	3	3	16	7	B	30
11050324	ST0787	12	22	2	2	20	8	B	70
11050361	ST2029	12	22	2	2	19	8	B	60
11050328	ST1885	22	30	6	6	20	10	B	60

5. Rubber profiles



Standard Quality:
714 BF transparent -
FDA and BGA compliant

Minimum: 25 m.
existing dies

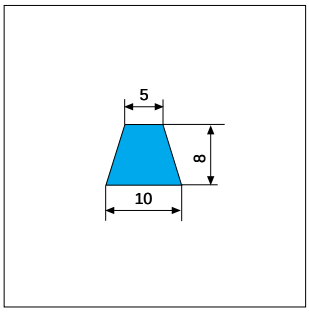
Welting sections

art.nr.	*Prof.nr.*	*A*	*B*	*C*	*D*	*°Shore A*
11050674	ST0407	3.5	2	9.5	1.5	40
11050672	ST0385	4	2	10	2	40
11050842	ST1309	4	2	26	2	50
11050875	ST2477	6	2	20	2	60
11050681	ST0489	7	5	22	1	30
11050877	ST2733	7	5	27	1	60
11050676	ST0419	7.9	6.3	19	0.8	50
11050632	ST0097	8	4	24	2	60
11050638	ST0282	8	6	16	1.3	50
11050818	ST1139	8	6	20	1	60
11050865	ST1714	8	6	20	1	50
11050589	ST0023	9	7	21	1	60
11050811	ST0818	9	6	26	2	60
11050871	ST1996	9.5	6.5	35	1.5	60
11050631	ST0091	10	7	25	1.5	60
11050634	ST0141	10	6.4	24	2	60
11050770	ST0760	10	8	35	1	60
11050817	ST1088	10	5	25	1.5	50
11050870	ST1820	10	6	35	2	60
11050879	ST3042	10.5	3	31	3.5	60
11050683	ST0681	11	5	30	4.5	50
11050779	ST0768	11	3	30	2.5	60
11050816	ST0934	11	7.8	23	2	60
11050878	ST2836	11	4	23	2.5	60
11050814	ST0854	12	8	23	1.3	60
11050848	ST1366	12	8	22	2	60
11050913	ST3137	12	9	22	4	60
11050840	ST1237	12.5	7.5	35	0.5	50
11050682	ST0550	13	11	30	2	50
11050685	ST0713	13	7	32.5	3.5	40
11050835	ST1187	13	10	21.5	2.5	50
11050600	ST0031	14	9	30	2.5	60
11050601	ST0067	14	2	13	1	40
11050635	ST0275	14	10	36	2	60
11050637	ST0281	14	6	30	2	40
11050815	ST0878	14	8	35	2.5	60
11050602	ST0077	14.5	8.5	33	3	60
11050671	ST0311	15	6	30	5	40
11050813	ST0841	15	11	35	3	60
11050678	ST0481	16	7	38	5	40
11050688	ST0724	16	12	35	1.4	60
11050912	ST3068	16	7	36	3	40
11050687	ST0715	18	13	38	3.5	60
11050838	ST1196	18	14	42	2	60
11050874	ST2475	18	12	38	2.6	60
11050633	ST0134	19.5	14.5	39	5	60
11051227	ST0140	20	15	50	2	60
11051230	ST0151	20	12	50	3	60
11050752	ST0733	25	21	38	2	70
11051228	ST0150	27	20	55	3.5	60
11051232	ST0310	30	20	60	4	60
11051229	ST0148	40	30	75	3	60
11051232	ST0149	40	24	100	8	60
11050873	ST2262	40	30	67	5	70

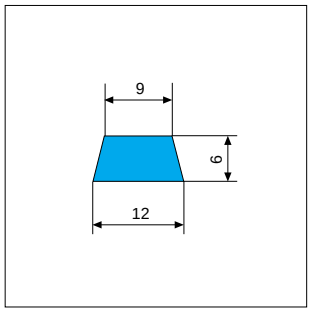
5. Rubber profiles

SILICONE FDA

Profiles to drawing



Art. n°: 11051585
SP 0001 - 60° Shore



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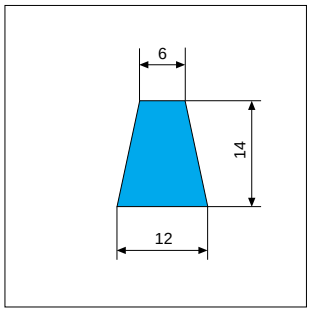
SP 0002 - 60° Shore



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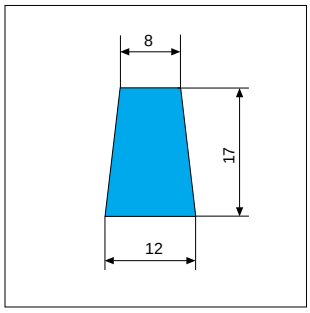
SP 0003 - 60° Shore



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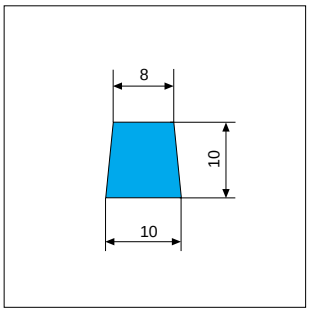
SP 0004 - 60° Shore



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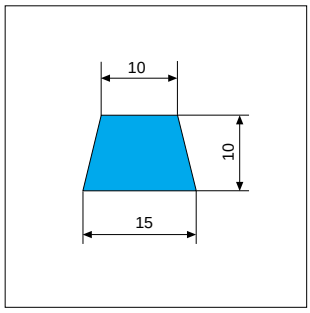

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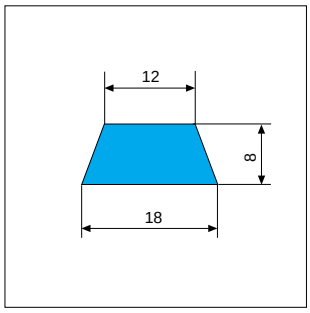
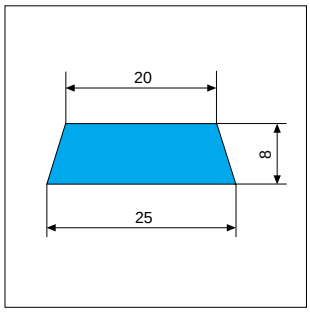
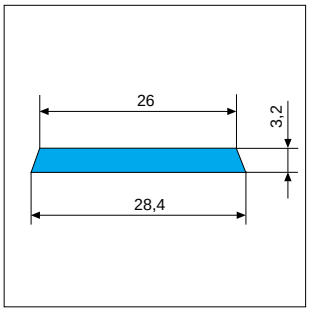


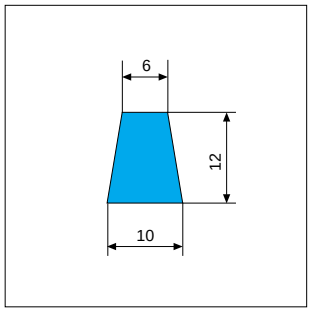
Art. n°: 11051623
SP 0007 - 40° Shore



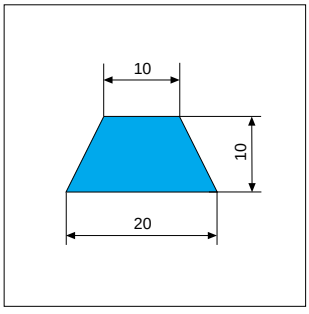
Art. n°: 11051624
SP 0008 - 40° Shore



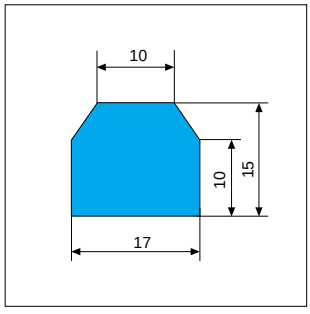
Art. n°: 11051625
SP 0009 - 60° Shore



Art. n°: 11051627
SP 0011 - 60° Shore



Art. n°: 11051651
SP 0015 - 60° Shore



Art. n°: 11051652
SP 0040 - 60° Shore

4000 STANDARD MOULDS FOR FDA-EXTRUSION

In different colours and qualities
Minimum: 25 m. - existing dies

6. Rubber moulded parts

Eriks is able to produce moulded parts in various FDA compounds (NBR, EPDM, CR, HNBR, PUR, Viton®, silicone) in different hardnesses from 40 to 90° shore.

Tolerances DIN ISO 3302-1 Silicone moulded parts

diameter (mm)	*tol. class M1 (± mm)*	*tol. class M2 (± mm)*	*tol. class M3 (± mm)*	*tol. class M4 (± mm)*
0 à 4.0	0.10	0.15	0.40	0.50
4.0 à 6.3	0.12	0.20	0.40	0.50
6.3 à 10	0.15	0.20	0.50	0.70
10 à 16	0.20	0.25	0.60	0.80
16 à 25	0.20	0.35	0.80	1.00
25 à 40	0.25	0.40	1.00	1.30
40 à 63	0.35	0.50	1.30	1.60
63 à 100	0.40	0.70	1.60	2.0
100 à 160	0.50	0.80	2.0	2.5
160 à -	0.4%	0.7%	1.3%	1.5%

Our standard moulded parts are produced according to tolerance class M2.

Eriks produces products to your drawings in all above mentioned qualities. We use the ISO-tolerances.

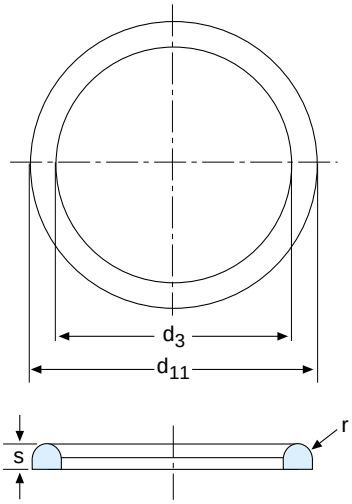
We produce small quantities by compression-moulding as well as large quantities, using the LSR-method.

Note:
We are willing to make a study with your engineering-departement.
Ask our documentation ‘standard moulded parts’.

6. Rubber moulded parts

Rings to DIN 11851

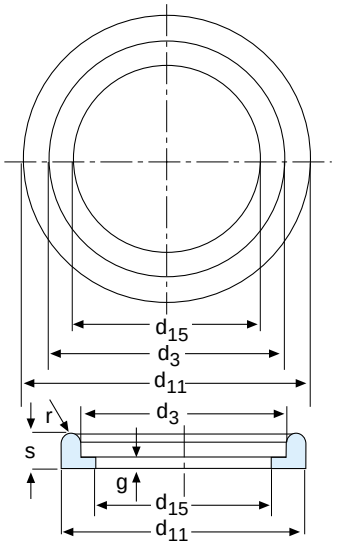
NW	d_3	d_{11}	r	s
10	12	20	2,3	4,5
15	18	26	2,3	4,5
20	23	33	2,8	4,5
25	30	40	2,8	5
32	36	46	2,8	5
40	42	52	2,8	5
50	54	64	2,8	5
65	71	81	2,8	5
3[11]	78	88	2,8	5
80	85	95	2,8	5
90	94	104	2,8	5
100	104	114	2,8	6
125	130	142	3,5	7
150	155	167	3,5	7



Note:
These rings are delivered in EPDM black, HNBR black, NBR blue, Viton® black, Silicone transparent, Eriflon PTFE white. All are FDA compliant.

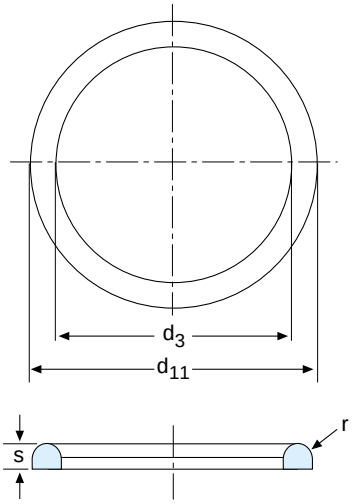
Rings with internal centering ring

NW	d_3	d_{11}	d_{15}	g	s	r
10	12	20	10.5	1,5	5	2,3
15	18	26	16.5	1,5	5	2,3
20	23	33	20.5	1,5	5	2,8
25	30	40	26.5	2	6	2,8
32	36	46	32.5	2	6	2,8
40	42	52	38.5	2	6	2,8
50	54	64	50.5	2	6	2,8
65	71	81	66.5	2	6	2,8
80	85	95	81.5	2	6	2,8
100	104	114	100.5	2	6	2,8
125	130	142	125	2	7	3,5
150	155	167	150	2	7	3,5



Rings

NW	d_3	d_{11}	r	s
25	30	40	2,8	8
32	36	46	2,8	8
40	42	52	2,8	8
50	54	64	2,8	8
65	71	81	2,8	6,5
65	71	81	2,8	8
80	85	95	2,8	6,5
80	85	95	2,8	8
100	104	114	2,8	8



7. Triclover Gaskets / Clamp Gaskets

7.1. Summary Materials for Triclover gaskets

7.2. Triclover gasket Dimensional List

7.3. Certification of Imperial Dimensions

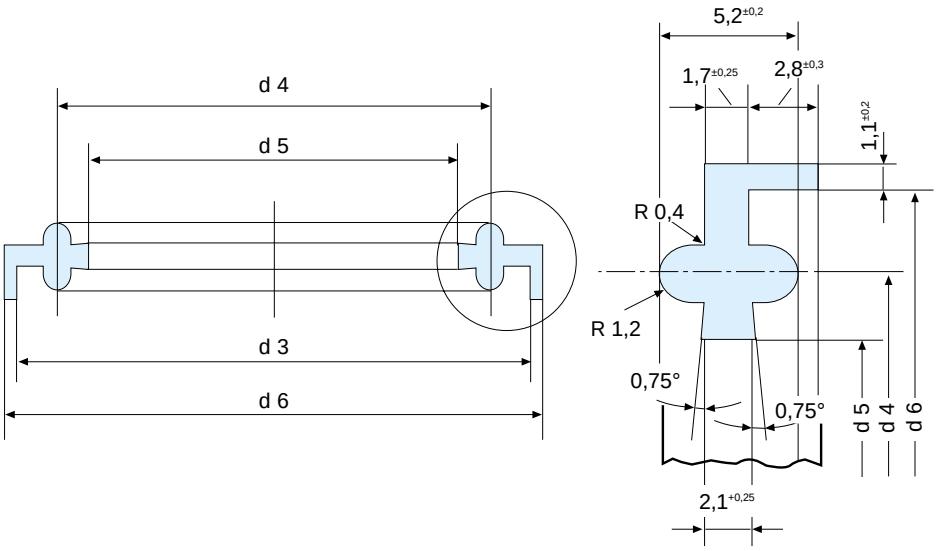
7.4. Platinum Cured Silicone Triclover Gaskets

7.5. Torque-Rite® for Perfect Surface Gasket Systems

7.6. TEF-STEEL: The next generation Triclover gasket

7.7. Criti Clean Pack

7.8. Screen Gaskets



FDA
177.2600
177.1550

7.1. Summary Materials for Triclover gaskets

Tef-Steel® is the material of choice if the application involves wide temperature variations, exceptional chemical resistance (such as hydrocarbons, ethanol, ketones, etc.).
Outstanding service life.

Teflon® (PTFE) is the material of choice except if the application requires wide temperature variations (leakage will develop).

Silicone (platinum) is the third choice due to wide temperature compatibility range and resistance to chemicals.

Viton® is the fourth choice, however, service life must be considered and monitored.

EPDM is the fifth choice in most applications due to temperature limitations.

Buna-N is the sixth choice in most applications due to temperature limitations and ** does not pass U.S. Pharmacopoeia class VI-XXII Certification and Cytotoxicity.

This table indicates general preferences. Unique applications may require further considerations and analysis. When selecting gasket materials it is important to consider many factors: resistance to heat, resistance to SIP, resistance to chemicals like: hydrocarbons, ethanol, ketones, etc, tear strength and flexibility.
The service life of a material depends on the application. Many of the materials are acceptable if the expected service life is very short in duration, however, in extended exposure situations the material can degrade quickly rendering it ineffective or less desirable overall.

This analysis was intended for sanitary gasket applications specifically.
Sanitary gasket applications are inherently static and can be dynamic.
When different performance attributes are a consideration in dynamic applications, Tef-Steel® may be the material of choice.

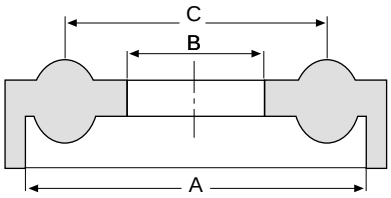
Triclover reference summary

Gasket Type	*Contin. Stream*	*Inter-mittent Steam*	*Pure Water Ambient*	*Pure Water Hot*	*Process Fluids Ambient*	*Process Fluids Hot*	*Process Fluids Variable* *< 0°C* *> 100°C*	*Colour*	*Comments*
Tef-Steel®	1	1	1	1	1	1	1	Bronze *	Maintains seal with wide temperature variations
Teflon®	1	1	1	1	1	1	3	White *	Wide temperature variations may cause leakage
Silicone (platinum)	2	2	2	2	2	2	1	Translu-cent *	Very flexible low temperature
Viton®	0	3	3	3	3	3	2	Black or white	Degrades quickly in steam applications
EPDM	0	4	4	4	4	4	4	Black or white	Low pressure steam only
Buna-N	0	0	5	5	5	5	5	Black or white	Not recommended for strong acids and ozone

** = No pigmentation*

®Tef-Steel is a registered trademark of Rubber Fab Mold & Gasket
®Teflon is a registered trademark of E.I. Dupont
®Viton is a registered trademark of E.I. Dupont

7.2. Triclover Gaskets Dimensional List



Tri-clover gaskets; flanged execution; qualities approved according FDA 177.2600 / 177.1550 / USP class VI

DIN	*ISO/BS*	*Imperial ****		*Diameter*					
		Standard	*Sch 5*	*Flange(A)*	*Groove diam.(C)*	*Inside diam. (B)*	*Flange(A)*	*Groove diam.(C)*	*Inside diam. (B)*
				(mm)			*(inch)*		
10 (x)				34,00	27,50	10,2	1,34	1,08	0,40
15 (x)				34,00	27,50	16,2	1,34	1,08	0,64
20 (x)				34,00	27,50	20,2	1,34	1,08	0,80
		1”		50,50	43,50	22,9	1,99	1,71	0,90
	1” (x)			50,50	43,50	23,10	1,99	1,71	0,91
25 (x)				50,50	43,50	26,2	1,99	1,71	1,03
32 (x)				50,50	43,50	32,2	1,99	1,71	1,27
	1 1/2” (x)			50,50	43,50	35,3	1,99	1,71	1,39
		1 1/2”		50,50	43,50	35,6	1,99	1,71	1,40
40 (x)				50,50	43,50	38,2	1,99	1,71	1,50
			1 1/2”	64,00	56,50	45,2	2,52	2,22	1,78
	2” (x)			64,00	56,50	48	2,52	2,22	1,89
		2”		64,00	56,50	48,0	2,52	2,22	1,89
50 (x)				64,00	56,50	50,2	2,52	2,22	1,98
			2”	77,70	70,50	57,3	3,06	2,78	2,26
		2 1/2”		77,70	70,50	60,2	3,06	2,78	2,37
	2 1/2” (x)			77,70	70,50	60,7	3,06	2,78	2,39
65 (x)				91,00	83,50	66,2	3,58	3,29	2,61
			2 1/2”	91,00	83,50	69	3,58	3,29	2,72
	3” (x)			91,00	83,50	73,2	3,58	3,29	2,88
		3”		91,30	83,50	73,3	3,59	3,29	2,89
			3”	104,80	97,00	84,9	4,13	3,82	3,34
80 (x)				106,00	97,00	81,2	4,17	3,82	3,20
	4” (x)			119,00	110,00	97,8	4,69	4,33	3,85
		4”		119,00	110,00	97,8	4,69	4,33	3,85
100 (x)				119,00	110,00	100,2	4,69	4,33	3,94
115				130,00	122,40	110,5	5,12	4,82	4,35
		4 1/2”		130,00	122,40	110,5	5,12	4,82	4,35
			4”	130,20	122,40	110,3	5,12	4,82	4,34
		5”		144,70	134,00	121,8	5,70	5,28	4,80
125 (x)				155,00	146,0	125,2	6,10	5,74	4,93
	5 1/2”			155,00	146,0	135,9	6,10	5,74	5,35
		6”		167,10	157,00	147,2	6,58	6,18	5,80
			6”	182,80	174,30	163,1	7,20	6,86	6,42
150 (x)				183,00	174,30	150,2	7,20	6,86	5,91
	6 5/8”			183,00	174,30	163,3	7,20	6,86	6,43
		8”		218,00	207,00	198	8,58	8,15	7,80
200 (x)				233,50	225,00	200,2	9,19	8,86	7,88
	8 5/8”			233,50	225,00	214,1	9,19	8,86	8,43
			8”	233,60	225,00	213,9	9,20	8,86	8,42
		10”		267,20	258,00	246,5	10,52	10,16	9,70
			10”	287,50	278,70	266,7	11,32	10,97	10,50
		12”		319,00	308,00	298	12,56	12,13	11,73
			12”	338,50	329,00	315,8	13,33	12,95	12,43

(X)= Standard items in different compounds
**** = see next pages for more information on imperial dimensions*

7.3. Certification of Imperial Dimensions

Triclover gasket material guidelines for imperial dimensions

This information has been carefully prepared to help in selecting the correct elastomer or perfluorocarbon utilized in high purity sanitary hygenic seals where critical pure water, process fluids (both ambient and hot), and SIP environment exist.
The intention is to consider the different uses, applications and conditions to determine the most favorable gasket material for each application. The following criteria is used in determining correct sanitary gasket materials.

- USP Pharmacopoeia Class VI-XXII Certification
- Cytotoxicity Criteria
- CFR Title 21 Section 177.1550
- CFR Title 21 Section 177.2600
- Traceability: Lot and Batch
- Certification: Lot and Batch
- ASME-BPE Standards
- USD Standards
- 3-A Sanitary Standards
- Current Good Manufacturing Practices (CGMP)
- Manufacturer data and specifications
- Consultation with various pharmaceutical users

The gasket materials considered are Tef-Steel® (Teflon/Stainless Steel), Teflon® (PTFE), Silicone (platinum), Viton®, EPDM and Buna-N.

The 3 main goals are:

- To protect products from contamination, spalling, particulates and TOCs resulting from the use of improper sanitary gasket material.
- To protect facilities from unnecessary downtime associated with sanitary gasket failure and replacement from use of improper gasket material.
- To provide a standard of consistency of sanitary gaskets selection between multiple facilities.

Most decisions driving gasket type selection are based on chemistry, temperature, exposure limits, USP, FDA qualifications, and curing methods.

7.4. Platinum Cured Silicone Triclover gaskets

A quality overview

Rubber Fab Purity:
The complete Platinum Cured Silicone Program.

High purity platinum cured silicone gaskets are the ideal choice for use in production facilities of fine pharmaceutical, biotechnology, high -purity water, injectables, food and beverage products. Rubber Fab's platinum cured silicone gasket withstands temperature extremes, radiation, corona, ozone exposure*, moisture and steam. Due to its smooth finish, platinum cured silicone resists product adhesion. These odorless, tasteless, non-toxic gaskets maintain product integrity and can be autoclaved, irradiated and gas sterilized. And because there is no Benzoic Acid residue, rubber Fab's Platinum cured silicone gaskets provide you with the ultimate, high pure, contact surface.

The choice is clear
- Eliminates particulates
- Non-pyrogenic
- No pigmentation
- No plasticizers
- No Benzoic Acid
- Non-toxic
- High/low temperature range: -100°F to 450°F
- S.I.P. up to 30 psi at 123°C
- No reversion
- Smooth bore
- Non leaching
- Odorless
- Tasteless
- Superior tear resistance

Meets High Pharmaceutical Standards
- USDA Pharmacopoeia Class VI-XXII Certification
- Cytotoxicity Criteria
- CFR Title 21 Section 177.2600
- Traceability: Lot and Batch
- Certification: Lot and Batch
- ASME-BPE Standards
- USD Standards
- 3-A Sanitary Standards
- Current Good Manufacturing Practices (CGMP)

The platinum Cured Silicone Gasket
When considering silicone gaskets, platinum cured is the most favorable. The method curing has an effect on the amount and type of extractables silicone will emit. Platinum curing minimizes these reactions with the respective process fluids. All gaskets are post cured and will not cause cell mutation or growth retardation, maintains and upholds ultra-pure water and CGMP process fluid standards.
What you put in, you get out.

Platinum Equals Absolute Purity
When compared with Peroxide Cured silicone Gaskets, platinum Cured is clearly the superior choice. Peroxide curing will always have residuals from the curing additive. Its conversion, Benzoic Acid, will result in an unwanted surface condition causing product conatmination. Platinum curing eliminates this problem.

Superior Tear Resistance
Rubber Fab manufactures all Platinum Silicone Gaskets from milled gum silicone. When compared to LIM (liquid injection molding) silicone, milled gum silicone gaskets have superior resistance to tearing and deformation.

Complete Choice in Platinum Cured Silicone Gaskets and Products
Rubber Fab Mold & Gasket's Platinum Cured Silicone Gaskets are available in all gasket designs and colors. They are interchangeable with standard sanitary clamp gaskets and work with Rubber Fab's Torque-Rite (see next page). Additional product lines are also available including Smart Gaskets, platinum cured silicone sheets, O-rings and platinum cured silicone tubing.

7.5. Torque-Rite for Perfect Surface Gasket System

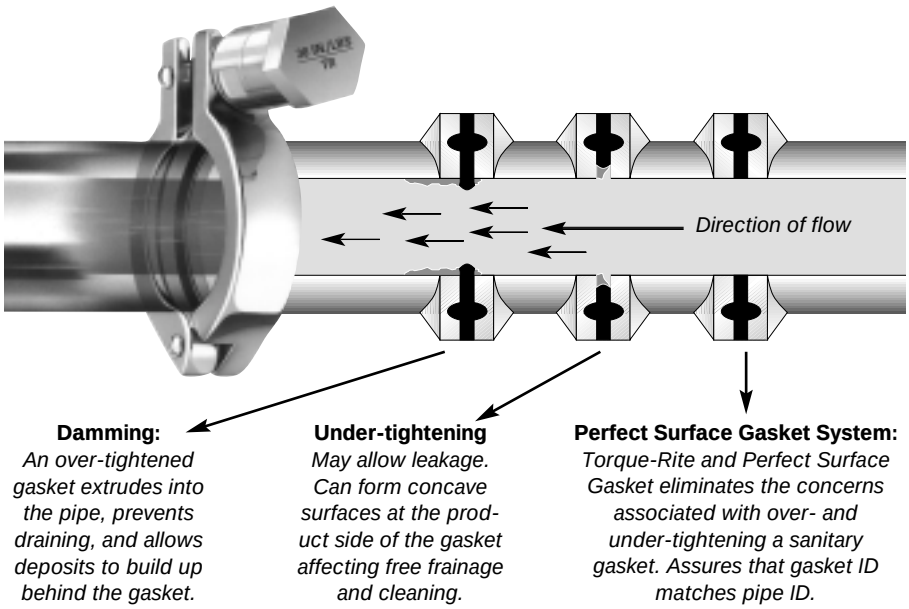
Torque-Rite

Presenting Rubber Fab's Perfect Surface Gasket System
The perfect union of Torque-Rite and the Perfect Surface Gasket:
Torque-Rite allows you to control compression and expansion while maintaining constant inch/pounds force assuring a Perfect Surface ID when used with a Perfect Surface Gasket. Torque-Rite eliminates the problems associated with over- or under-tightening a gasket which can lead to an unsanitary system.

Compression control is easy
when tightened, the Torque-rite's self-limiting internal mechanism will make an audible 'click' signaling the user they have reached proper inch/pounds force. If further tightening is attempted, there will be more 'clicks' but no additional application of force on the gasket (if emergency conditions arise, the Torque-Rite has a built-in manual override feature).

Problems with over-tightening or under-tightening a gasket
Over-tightening can tear or damage a gasket and can also cause a damming effect inside the pipeline. A torn or extruded gasket can hold soil and bacteria. Under-tightening leaves an undesirable concave area at the gasket allowing soil and bacteria to become entrapped.
Both conditions should be avoided in a sanitary system.

Maintaining a 'Perfect Surface' Sanitary System
By maintaining a constant force on a perfect Surface Gasket with the Torque-Rite, gasket ID is maintained lowering bacteria count and enhancing product integrity.
a perfect Surface sanitary system is assured.



The perfect Surface Gasket System

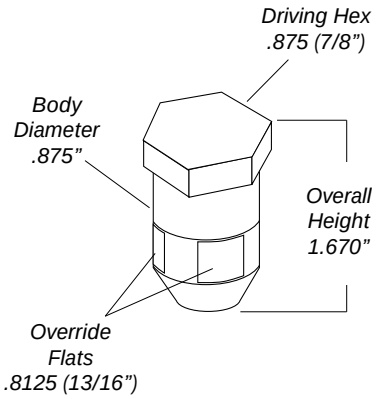
$$\frac{\text{Torque-Rite}}{\text{Perfect Surface Gasket}} = \frac{\text{Compression Control}}{\text{Expansion Control}} = \text{Perfect Surface}$$

7.5. Torque-Rite for perfect surface gasket system

Torque-Rite Specifications

Material:	Stainless Steel
Hardness:	48 Rockwell
Overall height:	1.670”
Driving hex:	.875 (7/8”)
Body diameter:	.875”
Override Flats:	.8125 (13/16”)

Lot Traceable



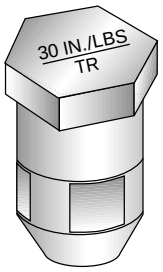
Perfect Surface Gasket Benefits:

- Lower bacteria counts
- Maintains/enhances product integrity
- Assures that gasket ID matches pipe ID
- Passes US Pharmacopoeia class VI-XXII certification
- Passes cytotoxicity criteria
- Complies with title 21 CFR 177.2600
- Complies with USDA and 3-A sanitary standards
- Conforms to CGMP (Current good Manufacturing Practices)

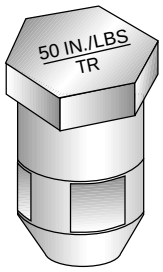
Torque-Rite Features

- An audible ‘click’ indicating correct inch/pounds force
- Maintains constant 30 or 50 inch/pounds force
- Manual override feature
- Retrofits all sanitary clamps, mini through 6”
- Works in rupture disk applications
- Works with all Smart Gasket™ products including spore trap, thermocoupler and sampler
- No torque wrench or special training required
- User friendly

Torque-Rite is avalable in two models:



Model TR30
Perfect Surface Gasket Material:
Buna
Silicone
Viton®
EPDM
Criti-flex



Model TR50
Perfect Surface Gasket Material:
Teflon®
Tef-Steel®
Teflon® Envelope

7.6. TEF-Steel®: The next generation Triclover gasket

Presenting TEF-Steel®: the S.I.P.* Leak Proof Solution

There's a new standard in S.I.P. gasket stability and longevity. With a unique 50/50 blend of non-pigmented PTFE/316L passivated staness steel and Teflon, TEF-Steel® is one tough gasket.

Tough under S.I.P. conditions

- Superior creep resistance
- Minimal thermal expansion
- Excellent chemical resistance
- No pigmentation
- passivated to eliminate rouging
- Stops leaks when torqued correctly (50 in.lbs.**)
- No gasket extrusion into the sanitary tube I.D.
- No obstruction of flow
- Non-stick surfaces
- Excellent expansion and contraction stability
- Maintains sealing stability in ΔT processes
- I.D. Pharmaceutical finish

Meets High Pharmaceutical Standards

- USDA Pharmacopoeia Class VI-XXII Certification
- Cytotoxicity Criteria
- CFR Title 21 Section 177.1550
- USD and 3-A Sanitary Standards
- Current Good Manufacturing Practices (CGMP)
- ASME-BPE Standards

* = Steam In Place
** = Torque-Rite Model TR50

TEF-Steel®: the next generation gasket

TEF-Steel easily outperforms standard solid PTFE and PTFE envelope gaskets under even teh most demanding S.I.P. pharmaceutical applications. In fact, TEF-Steel lasts at least five times longer in most applications!

Prevents System Downtime

The unparalleled strength of TEF-Steel eliminates maintenance needs and helps prevent system downtime by eliminating cold flow creep. This makes TEF-Steel ideal for sanitary steam pipe connections in both extreme cold (down to -20°F) and hot conditions (up to 450°F). TEF-Steel gaskets are available in a variety of sanitary standard sizes - from 1/2" to 12" diameter - to service virtually any S.I.P. application. Plus, TEF-Steel works with the Torque-Rite® perfect Surface Gasket System. This eliminates the potential for bacterial entrapment problems caused by over-tightening or under-tightening gaskets.

The Exclusive Properties of TEF-STEEL

Property	*ASTM Method*	*Value*
Specific Gravity	D792	3.45
Tensile Strength	D4894	1928psi
Elongation at Break	D4894	270%
Compressive Stress at 1%	D695	832
Compressive Stress at 5%	D695	2590
Compressive Modulus	D695	84200
Hardness	D2240	68
Temperature Low	Continuous	-20°F
Temperature High	Continuous	450°F

7.7. Criti Clean Pack

Rubberfab will work with you to develop and supply custom gasket packages and to provide you with exactly the assortment of gaskets needed for equipment setup or maintenance changeouts. Convenient and economical custom kits and packaging are another way our company is committed to customer satisfaction.

Rubberfab gaskets are WFI cleaned and dried utilizing filtered nitrogen in a Class 100 clean room. Our ready-to-use Criti Clean gasket kit is packaged in a see-through 'Vis-U-All II' pack equipped with temperature indicator dots that show completed sterilization when steam or gas sterilized.

The Criti Clean Pack is available in a package of 1, 6, 12 or 24 gaskets and can be custom assembled in a kit conforming to your specific changeout requirements.

7.8. Screen gaskets

Fluid Conditioning Gaskets
Rubber Fab's Sanitary Fluid Conditioning Gaskets are designed to be interchangeable with standard sanitary clamp gaskets.

Metallic Screens
- 304, 316 or 316L stainless steel
- Hastelloy
- Stainless Steel perforated

Non-Metallic Screens
- Polypropylene
- Teflon
- Mesh selection limited
- Removable insert gasket holder only

Available meshes
For in stock product, please see the Rubber Fluid Conditioning Reference Chart on page 39.

Available sizes
- Mini. 1/2", 3/4"
- 1", 1 1/2", 2", 2 1/2", 3", 4" sanitary screen gaskets

Applications
- Prefiltration for critical membrane filters
- Coalescence of water vapor from process exhaust lines
- Liquid gassing or degassing
- Large particulate removal before fill and finish
- Turbulence generation for enhanced mass or heat transfer
- Protection for pump, check valves and other components
- particulate removal in sterile filling operations
- Sparging
- Chromatography purification

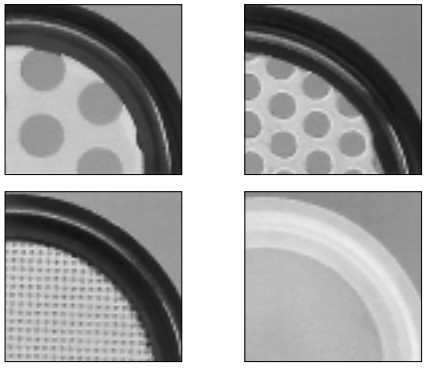
Meets High Pharmaceutical Standards
- USDA Pharmacopoeia Class VI-XXII Certification
- Cytotoxicity Criteria
- Title 21 CFR 177.2600
- USDA and 3-A Sanitary Standards
- Current Good Manufacturing Practices (CGMP)
- ASME-BPE Standards

Rubber Fab Mold & Gasket's Fluid Conditioning Program
Rubber Fab once again offers a gasket program for your consideration and employment. For the first time, you can choose the USP Class VI elastomer of your choice and in a variety of mesh sizes, 20 micron through 4 mesh, which are all normally available for shipment on the day of order. We hope after you have reviewed the Rubber Fab Mold & Gasket Fluid Conditioning Program, you will once again discover the Rubber Fab difference.

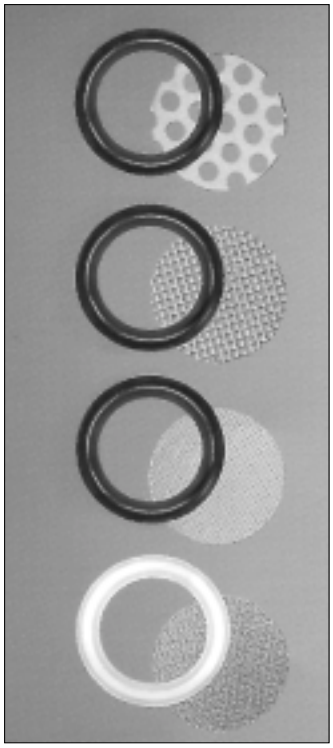
Materials Available
Rubber Fab manufactures fluid conditioning gaskets in the following elastomers:
- Viton®
- EPDM
- Platinum Silicone
- Buna-N*
- Teflon® (fluoropolymer)

Also Available
- Perforated fluid conditioning gaskets. Size range: 1" - 6".
- Complete elastomer selection
- Removable sanitary gasket holders available for all discs
- Screen disc inserts
- Perforated disk inserts
- Orifice plate inserts

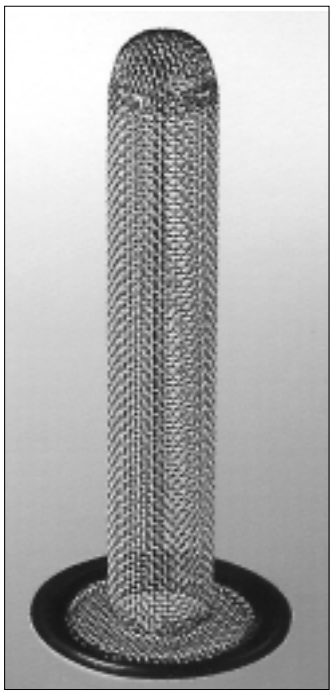
(*) Buna-N does not pass USDA Pharmacopoeia Class VI-XXII Certification and Cytotoxicity.



Perforated fluid conditioning gaskets



Removable disc inserts and holders sold separately



Removable disc inserts and holders sold separately

7.8. Screen gaskets

Range of particulate Elimination
Gluid conditioning gaskets provide for the most comprehensive range of stainless steel mesh and filter cloth which provide for particulate elimination to protect fill and finish sterile products. As illustrated, you can see demonstrated a progressive particulate elimination utilizing 10, 20, 40, 60 and 100 mesh screens. We provide when requested, 20 micron screen and cloth construction.

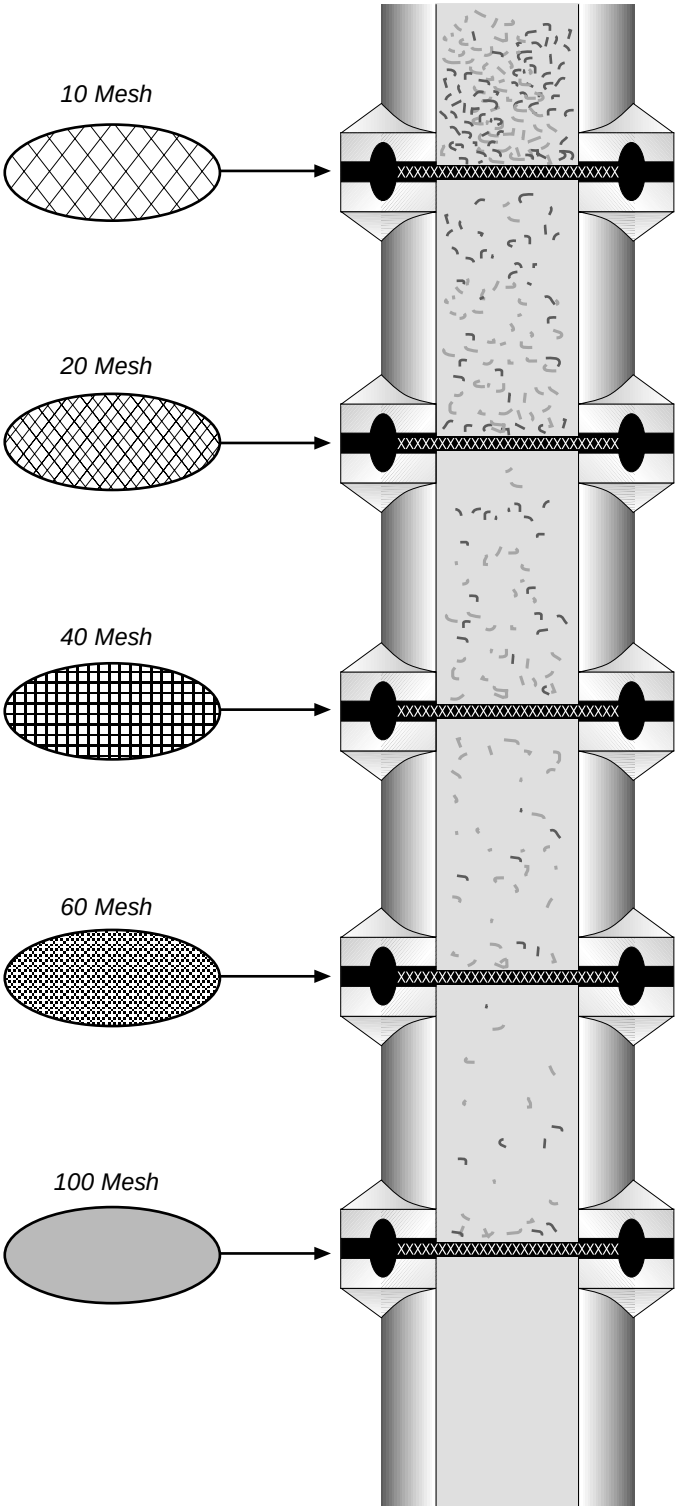
We are also able to provide gaskets which will allow you to remove your screen disc, accept an orifice plate disc or membrane of choice, providing the membrane thickness does not exceed .032 inches.

Sock designs are also available. Sock designs are inserted into the ID of your stainless steel tubing and provide filtration for a greater soil burden.

Please do not hesitate to contact us regarding your special needs and thoughts as it pertains to your fluid conditioning program.

Photography presented here is actual size pertaining to 10, 20, 40, 60 and 100 mesh sizes. For full product availability, refer to the Fluid Conditioning Reference Chart on the next page. Screen construction is Dutch Twill weave for maximum strength and minimum pressure drop. Perforated 1/32 gaskets are also available.

If elimination of particulates are critical to the CGMP in your injectable filled product, chromatography, columns, upstream particulate removal, downstream, filtration, as a reassurance, consider Rubber Fab Mold & Gasket Fluid Conditioning Technology.



7.8. Screen gaskets

Fluid Conditioning Reference Chart

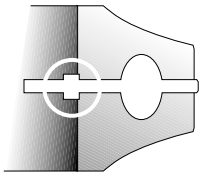
Approximate Retention Microns	*Square Mesh*				*Filter Cloth*	
	Opening (inches)	*Mesh (wires/inch)*	*Wire Diameter*	*Cloth Thickness*	*Mesh*	*Cloth Thickness*
5156	0.2030	4 x 4	0.047	0.094	-	-
3340	0.110	6 x 6*	0.035	0.056	-	-
2464	0.0970	8 x 8	0.028	0.056	-	-
1905	0.0750	10 x 10*	0.025	0.050	-	-
1532	0.0603	12 x 12*	0.023	0.048	-	-
1306	0.0514	14 x 14	0.020	0.040	-	-
1130	0.0445	16 x 18	0.018	0.036	-	-
1081	0.0426	18 x 18	0.013	0.026	-	-
979	0.0386	18 x 18	0.017	0.034	-	-
864	0.0340	20 x 20*	0.016	0.032	-	-
703	0.0277	24 x 24	0.014	0.028	-	-
516	0.0203	30 x 30*	0.013	0.026	-	-
381	0.0150	40 x 40*	0.010	0.020	-	-
318	0.0125	50 x50*	0.0075	0.015	-	-
233	0.0092	60 x 60*	0.0075	0.015	-	-
225	-	-	-	-	16 x 100	0.038
168	0.0065	105 x 105	0.0030	0.006	-	-
160	-	-	-	-	24 x 110	0.035
140	0.0055	80 x 80*	0.0070	0.014	-	-
140	0.0055	100 x 100*	0.0045	0.009	-	-
120	-	-	-	-	30 x 160	0.023
118	0.0046	120 x 120	0.0037	0.007	-	-
110	0.0043	120 x 120	0.0040	0.008	-	-
103	0.0041	150 x 150*	0.0026	0.005	-	-
96	-	-	-	-	20 x 200	0.0325
93	0.0037	150 x 150*	0.0030	0.006	-	-
90	-	-	-	-	20 x 250	0.026
85	-	-	-	-	40 x 200	0.018
83	0.0033	180 x 180	0.0023	0.005	-	-
80	-	-	-	-	120 x 160	0.011
75	-	-	-	-	30 x 250	0.028
74	0.0029	200 x 200*	0.0021	0.004	-	-
70	-	-	-	-	120 x 180	0.011
69	0.0027	200 x 200*	0.0023	0.005	-	-
65	-	-	-	-	120 x 200	0.011
61	0.0024	250 x 250	0.0016	0.003	-	-
60	-	-	-	-	28 x 500	0.016
50	-	-	-	-	120 x 330	0.010
43	0.0017	325 x 325	0.0014	0.003	-	-
40	-	-	-	-	120 x 400	0.010
35	-	-	-	-	120 x 500	0.010
30	-	-	-	-	80 x 700	0.010
30	-	-	-	-	120 x 800	0.009
25	-	-	-	-	20 x 350	0.022
25	-	-	-	-	200 x 600	0.006
21	-	-	-	-	200 x 830	0.006
10	-	-	-	-	200 x 1150	0.006

** = Stock items in stainless steel 316.*

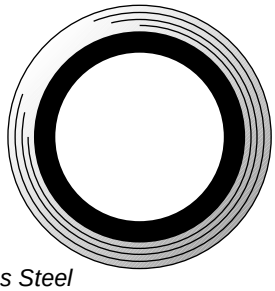
Also available: Hasteloy, Membrane Inserts, and Teflon Screen (limited mesh for removable gasket holders only).

8. Kalrez® sanitary seals

Kalrez® parts made from compounds 6221 and 6230 meet the extractive requirements of 21CFR177.2600(E) and may be used for repeated use in compliance with the Food, Drug and Cosmetics Act and all applicable food additive regulations. Kalrez® parts made from compounds 6221 and 6230 have been tested in accordance with the United States Pharmacopeia Class VI (USP Class VI) testing protocol.
Testing using the protocols cited above was performed by an external testing facility in compliance with 21 CFR, Part 58 Good Laboratory Practice for Nonclinical Laboratory Studies.
6221 and 6230 offer excellent steam cycling resistance and reduce extractables from sealing materials to trace levels.



Sealing Element of Kalrez

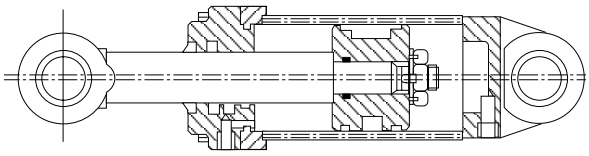


Stainless Steel Retaining Ring

New development from DuPont-Dow Elastomers in 2002!

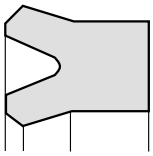
9. Hydraulic & pneumatic seals / wipers

On our Master-CAM-machine, we produce any shape of hydraulic seal to your application. Standard FDA material is Erthane G-FDA, a urethane-based seal.



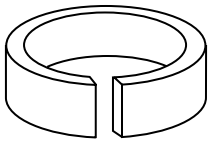
POLYURETHANE U 203 FDA

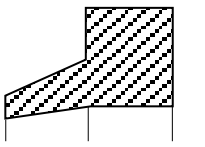
- Material type : Prepolymer based on glycols and MDI
- Application : Water and oil-based foodstuff
- Temperature range : Up to +80°C in water continious use/oils 100°C cont. use



PHYSICAL PROPERTIES:

Test method	*Norm*	*Test-results*
Hardness	DIN 53505	95 +-2° Shore A
Tensile strength at break	DIN 53504	+40 MPa
Elongation at break	DIN 53504	460%
Specific weight		1.15
Compression set 3 weeks / 70°C	DIN 53517	31 %
Tear Strength	DIN 53515	135 KN/m
Abrasion Loss	DIN 53516	-35 mm^3
100% Modulus	DIN 53504	+10 MPa
Hardness at -5°C	DIN 53505	96° shore A
Hardness at +80°C	DIN 53505	93° Shore A



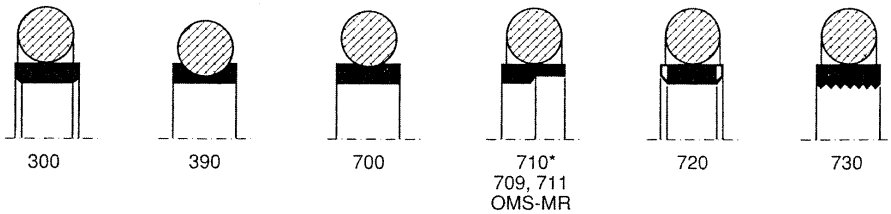


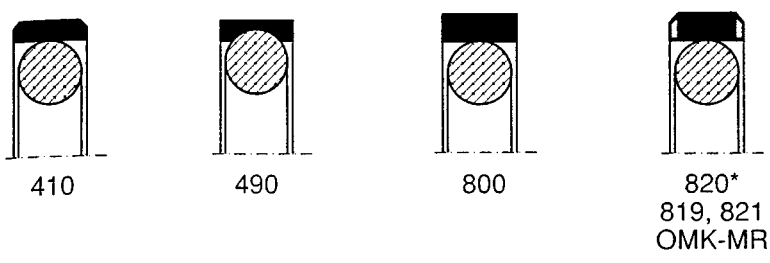
Chemical food stuff resistance:

Water 80°C, demineralized water, salty water, mineral and vegetable oils, peanut oil, beer, alcohols. Greases. Resists also HFA, HFB and HFC fluids.

ERIFLON PTFE seals

We produce FDA compound PTFE seals with FDA O-rings on request. See different shapes.

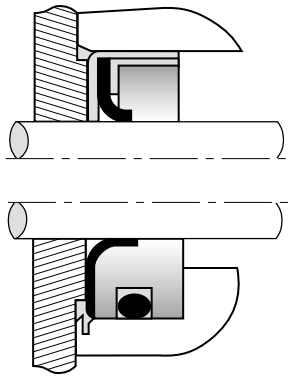




10. ERIFLON PTFE Lip Seals, Garlock® PS-seals, Dynalipseals

Eriflon's PTFE Lip Seal was introduced in the early 1970's. The seals were designed to bridge the gap between conventional elastomer lip seals and mechanical face seals. Hostile environments such as extreme temperatures, aggressive media, high surface speeds, high pressures, and lack of lubrication forced the designer to specify the expensive and complicated mechanical face type seals. Eriflon's PTFE Lip Seal provides the designer a significant iprovement in performance over elastomer lip seals at a much lower cost than the mechanical face seal.
Due to our unique manufacturing capabilities we are able to quickly supply the geometry and material which best meets your requirements. This is accomplished by utilising modern computer-controlled equipment and the stocking of semi-finished components.
Eriflon PTFE Lip Seals solve difficult applications which are not addressed by conventional elastomer seals. We exceed the performance of elastomer lip seals in the following areas:

- Greater chemical resistance
- Lower friction
- Capable of surface speeds to +30 meters/second
- Works to temperature extremes (-70°C to +250°C)
- Has extended seal life in dry or abrasive media
- Handles pressures to 35 bar
- Shaftspeeds up to 36 m/s



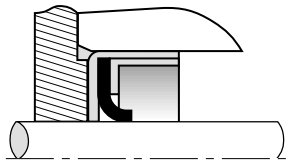
Successful Applications:

- Hydraulic motors and pumps
- chemical pumps
- Rotary unions
- Vacuum pumps
- Blowers
- Drilling and tapping spindles
- High-speed gearboxes
- Crankshafts of engines and compressors
- Robotics
- Pharmaceutical and food processing equipment
- Mixers
- Chemical processing equipment
- Actuators
- Alternators and generators
- Encoders
- Radar/targeting devices

Note:

- We stock the unique Garlock® PS-Seal in ca. 100 different dimensions
- PS-Seals are seen as the best PTFE-seals worldwide
- PS-Seals give the best results in lifetime-tests under the most difficult circumstanses
- Some types also have BGA-approval

10. ERIFLON PTFE Lip Seals, Garlock® PS-seals, Dynalipseals



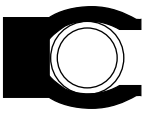
Element materials

Material Code	*Name and description*	*Application details*
SEALING LIP MATERIALS :.		
72	**Rulon® 641** Proprietary filled PTFE White colour	Meets FDA requirements. Moderate wear and heat resistance. Suitable for use on soft shafts such as 316 Stainless Steel.
F8	**Gylon 3510** Special filled PTFE White colour	Extreme wear resistant material for use in high-speed applications in dry or non-lubricating environments. Excellent material for use in water. Requires a shaft hardness of 55 HRC minimum. • Gylon white complies with FDA 21CFR1550. • It meets ingredient and extract requirements. • The fillers are acceptable under 21CFR 177.2600 • Branding ink complies with FDA 21 CFR.175.300
METAL COMPONENTS :		
M1	**Low-carbon steel**	Used for outer case, inner case and washers. Low cost. Limited corrosion resistance.
M2	**Aluminium**	Lightweight material used for outer case, inner case and washers. Low cost. Limited corrosion resistance.
M3	**Stainless Steel 304**	Used for outer case, inner case, washers and support rings. Good corrosion resistance.
M4	**Stainless Steel 316**	Used for outer case, inner case, washers and support rings. Good corrosion resistance.
M5	**Stainless Steel 316 TI**	Used for outer case, inner case, washers and support rings. 316 Stainless Steel with titanium for superior corrosion resistance.

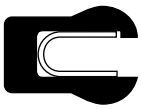
Rulon® is a registered trademark of Furon Company. Ekonol® is a registered trademark of SOHIO Company.
Ask for our technical documentation.

11. Eriseals

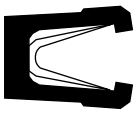
We have different executions.
Please ask:
- Our technical ‘omniseal documentation’
- FDA execution filled with silicone



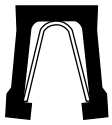
Temp.: -70/+260°C
Velocity: 15 m/s
Helicoidal spring
200 bar
Type: 230-239



Temp.: -70/+260°C
Velocity: 15 m/s
V-spring
450 bar
Type: 220-225



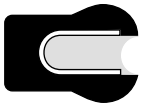
Temp.: -70/+260°C
Static
V-spring
Type: 320-323



Temp.: -70/+260°C
Static
V-spring
Type: 348-349

FDA, filled with silicone

Omniseal 400A can be supplied with an FDA- silicone-filling.



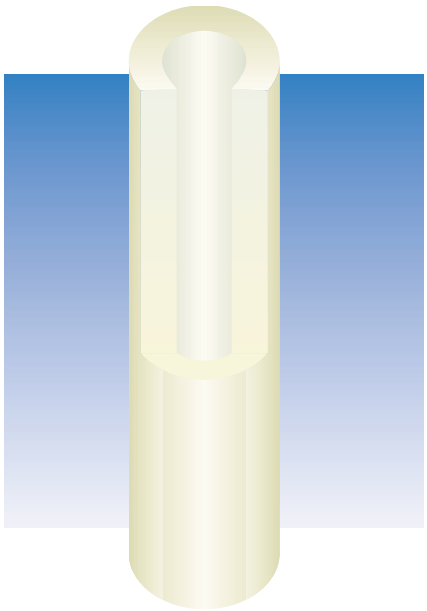
Type RS

In this unique design the inserted stainless steel spring is totally protected by the PTFE-coating on the media side. Applications with high temperatures, defined friction forces and very elastic behaviour are characteristics for this sealing element. Even extra-pure media can be conveyed or sealed off with this seal, where the medium may not get into contact with the metal. This type is FDA approved and admitted for food and pharmaceutical drugs.

Type JS

The series JS is a variant of the RS type, but with a machined synthetic material jacket. Available in all sizes without additional costs. Mostly for small quantities. The jacket is available in PTFE or also in FDA approved UHMW-Polyethylene.

12. Hoses



RX-LABO SILICONE MEDICAL 60° Shore transparent

- "Medical Grade" : ST-EC-60-01
- FDA, USP and BGA compliant

Temperature: -70 °C up to +200 °C

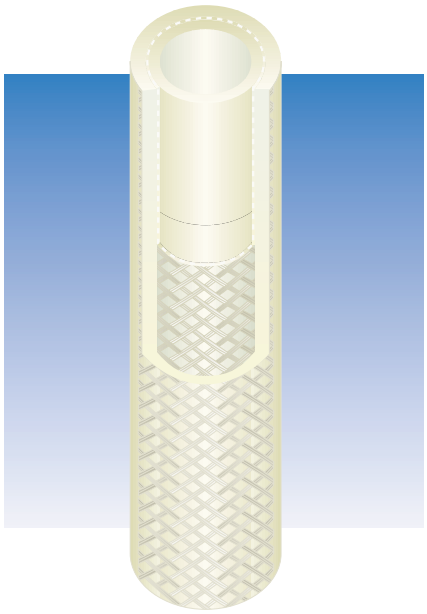
Insertion : None

Working pressure : No

RX-LABO SILICONE MEDICAL

ERIKS art.nr.	*Int. diameter*	*Wall thickness*	*Weight*	*Length coil*
	mm	*mm*	*mm*	*kg/m*
10015203	2	1.5	0.02	25
10015204	2	2	0.03	25
10015205	3	1	0.03	25
10015206	3	2	0.04	25
10015207	4	1	0.03	25
10015208	4	1.5	0.04	25
10015209	4	2	0.05	25
10015210	5	1	0.04	25
10015211	5	2	0.05	25
10015212	5	3	0.09	25
10015213	6	1	0.03	25
10015214	6	1.5	0.04	25
10015215	6	2	0.06	25
10015216	6	3	0.10	25
10015217	7	1	0.04	25
10015218	8	2	0.07	25
10015219	8	3	0.13	25
10015220	8	4	0.18	25
10015221	9	1	0.07	25
10015222	10	2	0.10	25
10015223	10	2.5	0.12	25
10015224	10	3	0.15	25
10015225	12	2	0.12	25
10015226	15	3	0.20	25
10015227	18	3	0.22	25
10015202	19	3	0.25	25

12. Hoses



RX-SILIPRESS MEDICAL 70° Shore

- "Medical Grade"
- FDA, USP and BGA compliant

Temperature: -60 °C up to +180 °C

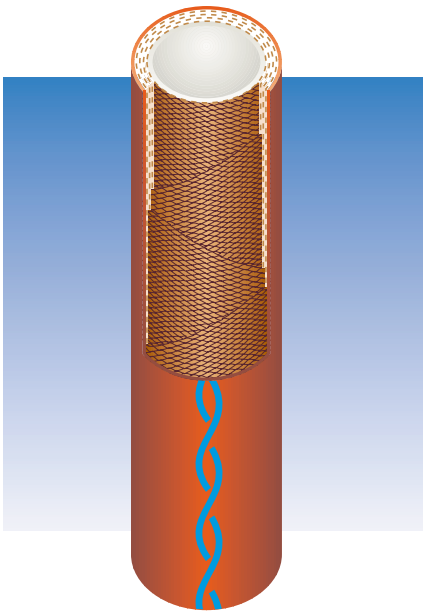
Insertion : Glassfiber

RX-SILIPRESS MEDICAL

ERIKS art.nr.	*Internal diameter*	*Wall thickness*	*Working Pressure*	*Bend radius*	*Weight*	*Length coil*
	mm	*mm*	*bar*	*mm*	*kg/m*	*m*
	3	3	20	10	0.08	25
10015230	4	3	20	10	0.09	25
	5	3	15	15	0.09	25
10015231	6	3	12.5	15	0.09	25
	7	3	11	18	0.10	25
10015232	8	3.5	10	28	0.12	25
10015233	10	3.5	9	38	0.12	25
10015234	12.5	3.5	9	50	0.15	25
10015235	16	5	7.5	60	0.20	25
10015236	19	5	7.5	60	0.20	25
10015237	25	6	5	100	0.25	25

Technical data at 20 °C. .

12. Hoses



RX-DELIFIXX

- A flexible suction and discharge hose for use in wine cellars and breweries, in the food and beverage industry.
- White EPDM-Tube, food quality, high temperature-resistance to aggressive cleaning.
- Suitable for conveying alcohol (up to 40%), soft drinks and non-fatty foods.
- For the application of cleaning liquids please see our separate information sheet.
- The hose complies with the 'Recommendation XXI, Category 2' of BGVV, KTW and FDA.

Temperature:
tube shortely up to +95 °C for water, lowest temp. at which the hose remains flexible: -35°C, brief steam; sterilisation up to max. 130°C/30 min.

Safety factor : 3,15 : 1

Tube : EPDM, white, smooth, food quality

Reinforcement : textile, wrapped

Cover : NR/SBR, red, smooth, abrasion resistant, cloth impression

Identification :
- Blue marking stripe with text: "RX DELIFIXX BEER/WINE 12 BAR D"
- Embossed text: "RX DELIFIXX EPDM D diam. 12 bar "

RX DELIFIXX

ERIKS art.nr.	*Internal diameter*	*Wall thickness*	*Working pressure*	*Vacuüm*	*Bend radius*	*Weight*	*Length coil*
	mm	*mm*	*bar*	*%*	*mm*	*kg/m*	*m*
11088581	13	5	12	50	50	0.40	40
11088582	19	5	12	50	100	0.55	40
11088583	25	6	12	50	150	0.85	40
11088584	32	8	12	50	170	1.45	40
11088585	38	9	12	50	200	1.85	40
11088586	40	10	12	50	250	2.25	40
11088596	50	11	12	50	350	2.95	40
11088597	65	12	12	40	450	4.05	40
11088598	75	15	12	40	600	6.10	40
11088599	80	15	12	30	650	6.40	40
11088600	100	15	12	20	750	7.75	40

12. Hoses/Flex-Rite

Non glass sight 'glasses'

Following extensive research and stringent testing, Flex-Rite have developed the use of and FDA approved thermoplastic translucent shatterproof tubing as a replacement for glass which provides a safe, hygienic and durable answer to in-line sight glasses and vessel level indicators as used in the Brewing, Food & pharmaceutical industries.

It is unique in that it has a totally non-stick surface, does not discolour and is virtually indestructible from the point of view of operator misuse, will withstand thermal shock, steam sterilisation and as it is one of the most chemically inert materials available to date, is impervious to all cleaning agents such as caustics/acids etc.

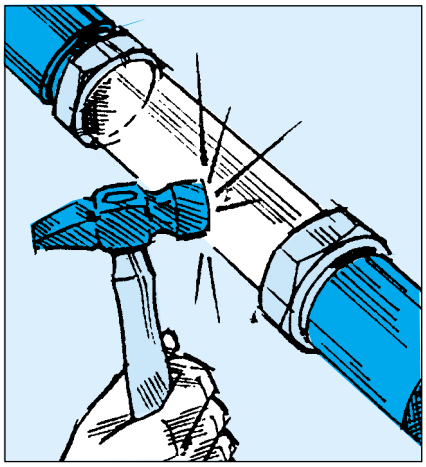
The tubing is available in 1/2", 3/4", 1.1/2", 2", 2.1/2", 3" and 4" nominal sizes and can be supplied with a full range of hygienic end connections to Flex-Rite's standard lengths or alternatively can be made-up to interchange with existing sight glasses of proprietary manufacture.

The material is capable of being used at temperatures of up to 205°C but as it is a thermoplastic the working pressure is greatly affected by the operating temperature and application details must be taken into account when determining suitability. Under normal CIP conditions it is not always necessary to incorporate the addition of a S/S safety guard for sizes up to and including 2". Sizes above 2" are supplied incorporating S/S safety guards as standard.

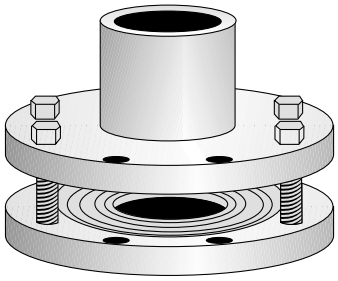
All end fittings in contact with the product are manufactured in 316 S/S and are permanently attached by means of swaging which produces a totally hygienic coupling eliminating any ingress of product between the liner and the tube I/dia., identical in fact to that of our hose assemblies using our Lactafix Coupling System.

Shatter proof for extra safety

The Flex-Rite Sight 'Glass', because of its thermoplastic construction, can withstand the roughest of treatment. Even the most heavy handed operative will have difficulty inflicting damage - in fact it has been tested with hammer blows just to prove it can take the knocks.



13. Gaskets



13.1. Rubbergaskets

Following sheets and gaskets are produced in FDA-compound, some in KTW compound.

Standard Industrial qualities

Material	*Hardness + colour ° Shore*	*Suitable for :*					*Temp. ±°C*	*S.G kg/m³*	*Tensile strength*		*Remarks*	*Stock*	*Avail-able sizes (mm)*
		oil	*fuel*	*acids*	*logen*	*ozon*			*N/mm²*	*Elong-. ation %*			
GU 67 NR-SBR	65° white	4	4	2	3	3	-45/80	1,30	10	600	KTW approved for contact with water	-	1-20 inlay: 1,5-6
GU 48 white	50° white	4	4	2	2	2	-30/90	1,27	12	550	both sides smooth for food industry Lebensmittelecht	1-10	1-30
EPDM 65 THT	65° black	4	4	3	3	2	-30/150	1,12	13	300	KTW approved for water	-	1 à 10
EPDM 90 THT	90° black	4	4	3	3	2	-30/150	1,26	8,5	100	KTW approved for water	-	1 à 10
EPDM THT	50° black	4	4	2	2	1	-40/150	1,68	12	350	KTW approved VW 2.8.1.650 best quality for steam peroxidisch vernet	-	1-10
ERICA SILICONE MVQ	60° transp.	3	3	2	2	1	-60/200	1,15	6	400	both sides smooth BGA execution odourless; tasteless suitable for food	0,5-10	1-10
ERICA SILICONE 40	40° blue	3	4	4	4	2	-45/200	1,13	5	450	foll. FDA 177.2600 610 x 610 mm plate	-	1-10
Viton® FDA FPM white	65° white	1	1	2	2	1	-20/200	2,09	10,3	200	FDA compliant 177.2600	-	1,5 à 3
Neo 70	70° white	3	4	2	2	2	-30/125	1,4	8,5	450	Lebensmittelecht	1-10	1-10

1 = excellent, 2 = very good, 3 = good, 4 = bad

13. Gaskets

13.2. Gylon PTFE gaskets

Gylon Standard Style 3500 and Style 3501E
These general purpose gasketing materials offer significant advantages over conventional PTFE in regard to functionability at higher temperature/pressure combinations. Style 3500 and 3501 E GYLON gasketing conform to FDA specifications.

Gylon Off-White Style 3510
Style 3510 GYLON has a very wide chemical resistance (the optimum of all the GYLON gasketing products). It is particularly suited for service against hydrofluoric acid and other strong chemicals such as potassium and sodium hydroxide, hydrogen fluoride, aluminium fluoride and chrome plating solutions. Conforms to FDA specifications.

GYLON - technical data

	GYLON standard Style 3501 E	*GYLON Blue Style 3504*	*GYLON Off-White Style 3510*
Temperature range	-210 to +260°C	-210 to +260°C	-210 to +260°C
Pressure load	83 bar	55 bar	83 bar
P x T, max. thickness : 1 and 1,5 mm	12000	12000	12000
3,0 mm	8600	8600	8600
Compressive creep strength (DIN 52913) 150°C - 30 N/mm²	16	15	14
175°C - 50 N/mm²	25	-	-
Modules at 100% Elongation (ASTM D1708)	11 N/mm²	10 N/mm²	9 N/mm²
Compressibility (ASTM F 36)	7-12%	25-45%	4-10%
Recovery (ASTM F 36)	40%	30%	40%
Creep relaxation (ASTM F 38)	18%	40%	11%
Tensile strength (ASTM D 1708)	14 N/mm²	14 N/mm²	14 N/mm²
Sealability (ASTM F 37 B) ASTM Fuel A: Internal pressure = 0,7 bar, Gasket load = 7 N/mm²	0,1 ml/h	0,12 ml/h	0,04 ml/h
Gas sealability (DIN 3535/6)	0,10 cm³/min	0,15 cm³/min	0,10 cm³/min
Leak rate (DIN 28090-2), λ 2,0	<0,001 mg/(s x m)	<0,001 mg/(s x m)	<0,001 mg/(s x m)
Density (DIN 28090-2)	2,19 g/cm³	1,70 g/cm³	2,80 g/cm³
Quality	FDA	FDA	FDA

13. Gaskets

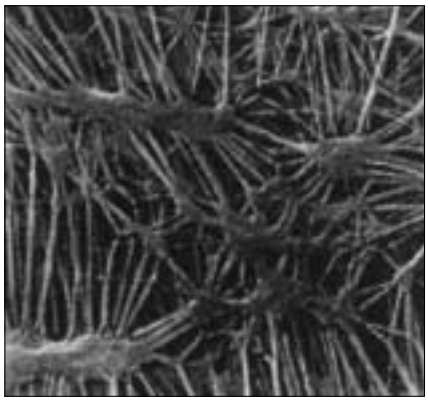
13.3. GORE-TEX® gaskets

GORE-TEX® sealants are among the world's tightest, chemically resistant gaskets. They have proven value to companies that handle aggressive or toxic materials that must be kept in compliance with environmental and safety regulations. Made from 100% expanded PTFE, GORE-TEX® gaskets are suitable for use throughout the entire pH range, except molten alkali metals and elemental fluorine. They withstand temperatures from -450°F to 600°F (-268°C to 315°C) which makes them ideal for high temperature as well as cryogenic applications.

Physiological Safety
GORE-TEX®, gasket tape, GORE-TEX GR® Style R sheet gasketing and GORE-TEX® TriGuard may be safely used as articles or components of articles used in producing, manufacturing, packaging, processing, preparing, treating, transporting or holding foods. Physiologically harmless in prolonged installation at temperatures up to +260°C according to VDI/VDE guideline 2480, complies to FDA 21 CFR 177.1550 5PTFE) requirements for food.

GORE-TEX GR® Style R Sheet Gasketing
GORE-TEX GR® Style R Sheet gasketing is manufactured using Gore's unique proprietary expanded ePTFE process. Its multidirectional strength inhibits creep and cold flow and also limits the possibility of blow out. GORE-TEX GR® Style R Sheet gasketing is a development based on GORE-TEX GR® sheet gasketing. It provides a 6-fold increase in bend resistance making the gaskets easier to handle.

GORE-TEX® Gasket Tape
A form-in-place ePTFE gasketing material available in a variety of profiles to suit virtually any sealing configuration. Ideal for full-face gaskets where precise compressed thickness is essential.



GORE-TEX® Triguard
GORE-TEX® TriGuard gaskets are used to seal fragile pipe flanges with low bolt load. Unlike other gaskets, they seal tight and stay tight, even with varying flange conditions.
Designed for low stress-to-seal flanges, GORE-TEX® TriGuard gaskets are ideal for contamination services and highly permeable fluids, chlorine and monomer service.
Unaffected by even the most aggressive chemicals GORE-TEX® TriGuard gaskets combine all the properties of expanded PTFE with very good sealability.

GORE-TEX® - technical data

Availability	*DF* *Tape*	*Series 300 and 600* *Tape*	*GR Style R* *Sheet and cut gasket*	*TriGuard*
Installation	Apply overlap, cut, tighten up		Cut to shape, insert, tighten up	Standard DIN and ANSI dimensions
Temperature range	-240°C to +270°C for short periods up to +315°C	-240°C to +270°C for short periods up to +315°C	-240°C to +270°C for short periods up to +315°C	-240°C to +270°C for short periods up to +315°C
Pressure	210 bar	210 bar	210 bar	vacuum to 40 bar (600psi)
Chemical resistance	pH 0-14	pH 0-14	pH 0-14	pH 0-14
Sealing factor $k_{1(PN40)}$ = $k_0 x k_{D(PN40)}$ =	 1,6 x b_D 1,95 x b_D	 2,5 x b_D 25,4 x b_D	 2,5 x b_D 25,4 x b_D	
Material characteristics	Expanded PTFE	Multi-directional orientated ePTFE	Multi-directional orientated ePTFE	Multi-directional orientated ePTFE

14. Mechanical seals

Mechanical seals for Food & Water Processing Industries require:

- Compliance to FDA Regulations
- Compliance to the Water Supply Regulations 1989
- Hygienically profiled components in contact with the processed product media
- Component design which minimises the likelihood of food entrapment

WAFQ™ Water & Food Quality Seals

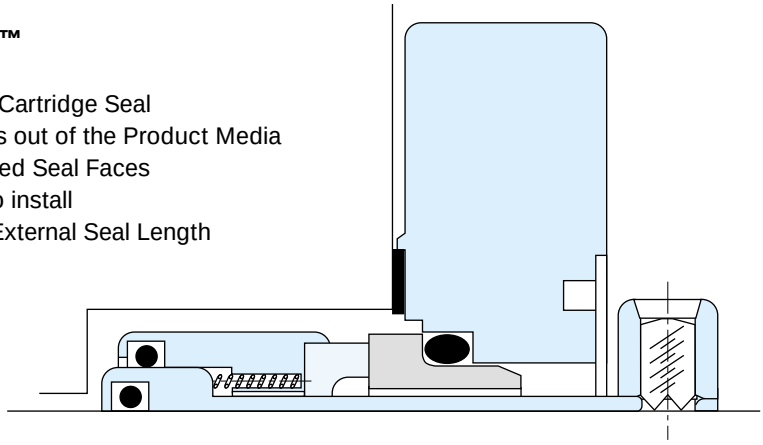
The AESSEAL® range of Water and Food Quality mechanical seals have been specifically designed to meet the stringent requirements of Food Processing Industries. All seal designs are available to suit the following shaft sizes (sizes marked with * are not available in WAFQ-III™ design):

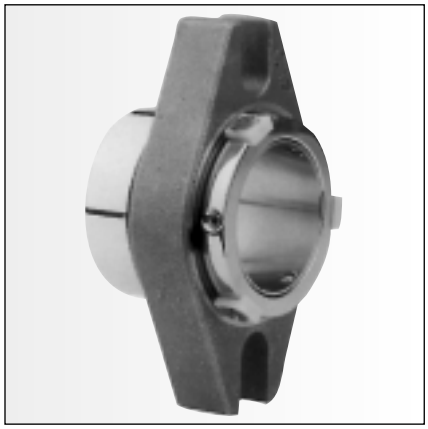
Imperial shaft sizes				
1.000”	1.625”	2.250”	2.875”*	3.500”*
1.125”	1.750”	2.375”	3.000”*	3.625”*
1.250”	1.875”	2.500”	3.125”*	3.750”*
1.375”	2.000”	2.625”	3.250”*	3.875”*
1.500”	2.125”	2.750”	3.375”*	4.000”*

Metric shaft sizes (mm)					
24	33	45	58	70	95*
25	35	48	60	75*	100*
28	38	50	63	80*	
30	40	53	65	85*	
32	43	55	68	90*	

WAFQ-II™

- Single Cartridge Seal
- Springs out of the Product Media
- Balanced Seal Faces
- Easy to install
- Short External Seal Length

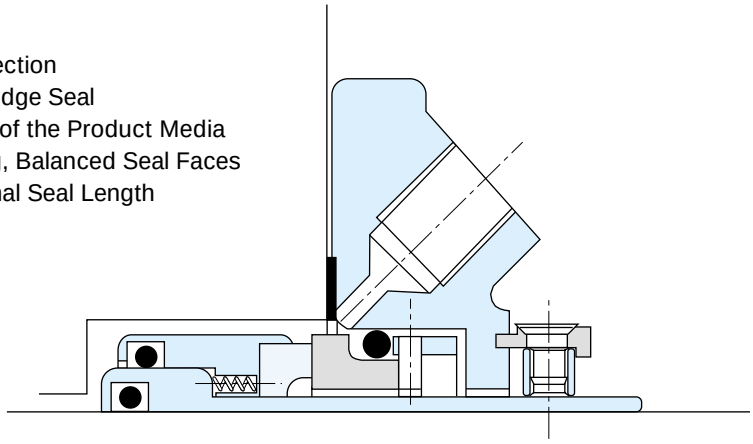




14. Mechanical seals

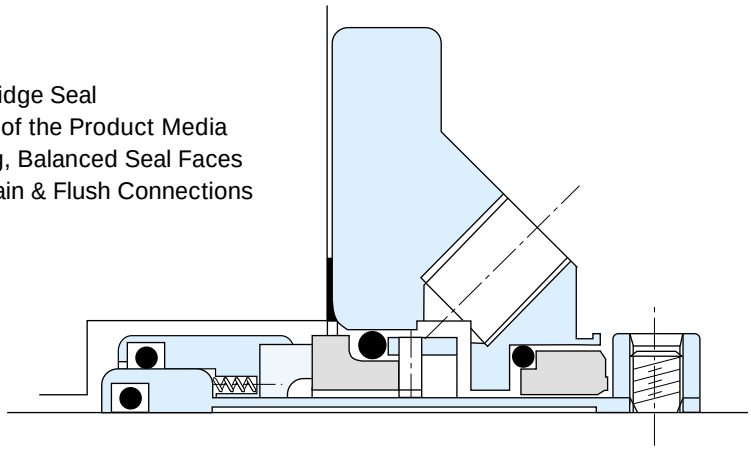
WAFQ-III™

- Flush Connection
- Single Cartridge Seal
- Springs out of the Product Media
- Self Aligning, Balanced Seal Faces
- Short External Seal Length



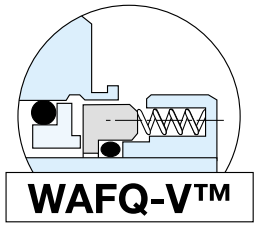
WAFQ-IV™

- Single Cartridge Seal
- Springs out of the Product Media
- Self Aligning, Balanced Seal Faces
- Quench, Drain & Flush Connections



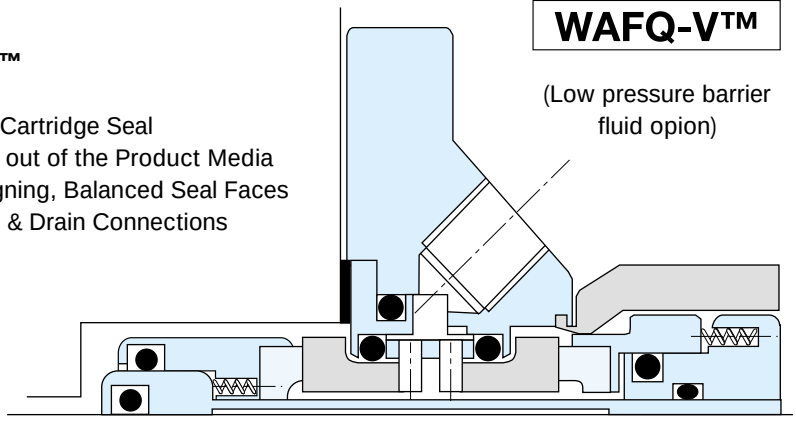
WAFQ-VI™

- Double Cartridge Seal
- Springs out of the Product Media
- Self Aligning, Balanced Seal Faces
- Quench & Drain Connections

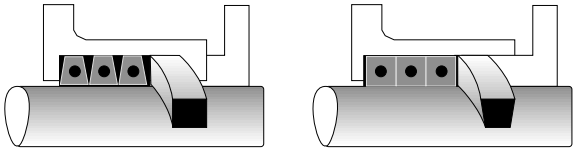


WAFQ-V™

(Low pressure barrier fluid opion)

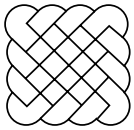


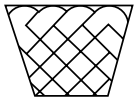
15. Braided packings



We have a few braided packings which have been tested by FDA and/or FMPA (Forschungs- und Materialprüfungs-anstalt, Stuttgart, Germany).
FMPA specialises on migration test of braided packings. You can receive a copy of the conformity test (in German).

Following braided packings are conform:





- Trapez pack 1 : FMPA
- Trapez pack 12 : FMPA
- Trapez pack 600 : FMPA + FDA
- Hamar 628 : FMPA
- Hamar 626 : FMPA
- Ramilon : FMPA
- P10-P12-P17 : FMPA
- A19 : FMPA + FDA
- A15 : FMPA
- P600 : FMPA + FDA

15. Braided packings

Carbon Sealing Rings in FDA

We have developed a high performance carbon product under the name BK 230.

BK has certificates:

DVGW:
from technology-center KZW-Karlsruhe
LMBG:
from Fresenius Institute in Germany (Lebensmittel-und Bedarfsgegenständegesetzes
FDA:
Food and Drug Administration

Applications and Physical Properties

Quality	*BK 230*	
Impregnation	Resin	
Compr.-strength	283	N/mm2
Flex.-strength	86	N/mm2
Density	1,85	g/cm3
Hardness	80	kp/mm2
Porosity	0,1	%
Therm.-Expansion	5,8	$x10^{-6}$
Temp.-Limit	280	°C

BK 230, Standard sizes in mm

Outer Ø	*Inner Ø*	*Length*
21	6	80
33	10	80
41	17,5	80
44,5	11	80
50,8	19	80
50,8	25	80
57	12,7	80
57	23,8	80
63,5	19	80
63,5	31,8	80
73	38,1	80
79,4	47,6	80
82,5	28,6	80
84	38,1	80
84	44,5	80
85,7	50,8	80
101,5	63,5	80
108	69,9	80
114	69,9	80
127	69,9	80
128	97	80
139,7	88,9	80
139,7	104,8	80
158,8	79,4	80
174,5	101,6	80
211	107	80

16. Diaphragm valves

with its high-quality range of SED diaphragm valves, ERIKS can offer solutions for a wide variety of tasks.
FDA approved diaphragms in EPDM, Silicon and PTFE/EPDM, are available for all types and sizes.

	Type	*DN*	*Actuator Plastic Version*		*Actuator with stainless steel adaption*	
			Manually operated	*Pneumatically operated*	*Manually operated*	*Pneumatically operated*
	190	6-12 1/4" - 1/2"				X
	290	6-12 1/4" - 1/2"			X	
	188	8-15 1/2" - 3/4"		X		
	289	8-15 1/2" - 3/4"	X			
	195	8-15 1/2" - 3/4"				X
	295	8-15 1/2" - 3/4"			X	
	385	15-80 1/2" - 3"		X		
	985	15-100 1/2" - 4"	X			
	495	15-100 1/2" - 4"				X
	995	15-100 1/2" - 4"			X	

17. Engineering plastics

New program will be issued during 2002!

18. Speciality Lubricants for the Food and Pharma-Industry

Introduction

Whether in industry or in handicraft, when treating or processing food or pharmaceuticals the use of machines and other technical applications is gaining more and more importance. It is only with the support of machines that these products can today be produced profitably in large quantities. However, the quality of the products must not suffer. The food and pharmaceuticals manufacturers as well as manufacturers of machines and equipments have to trust in the fact that the used lubricants are technically reliable and hygienically perfect.

Since December 1996 the **EU regulation 93/43/EWG** has to be implemented in European countries. This **hygiene guideline** prescribes that all precautions and measures are taken to ensure harmless and consumption suitable food- and pharmaceutical stuffs. This compromises too that the risk of contamination of the product has to be kept as small as possible. The practical feasibility is based on **HACCP** (**H**azard **A**nalysis and **C**ritical **C**ontrol **P**oints) including and monitoring all critical points of processing to ensure limits of contamination and product safety.

At points where incidental product contact with a lubricant is inevitable or cannot be excluded 100 %, **OKS Speciality Lubricants for the Food and Pharma-Industry** comply with these regulations.

OKS Speciality Lubricants for the Food and Pharma-Industry comply with the regulations of **FDA** (**F**ood and **D**rug **A**dministration) and the hygiene requirements of the "Guidelines of Security 21 CFR 178.3570". They have been tested and approved by the **USDA** (**U**nited **S**tates **D**epartment of **A**griculture) being previously the worldwide most rigid standard for hygiene concerning the incidental, technically inevitable food contact (USDA - H 1). This testing and certification procedure of the USDA stops in May 1998 but continues with the same rigid requirements by the **NSF** (**N**ational **S**anitation **F**oundation).

Further worldwide accepted institutions for testing and certifying hygienic lubricants are the **LGA** (**L**andes**g**ewerbe **A**nstalt) in Nuremberg/Bavaria, a state-owned German scientific institute for foodstuff research, the **TZW** (**T**echnologie**z**entrum **W**asser) in Karlsruhe/Germany, responsible for **KTW** approvals or the **BPVA** (Staatliche **B**rautechnische **P**rüf- und **V**ersuchs**a**nstalt of the technical University of Munich-Weihenstephan) which is a states-owned institute for the brewery industry.

18. Speciality Lubricants for the Food and Pharma-Industry

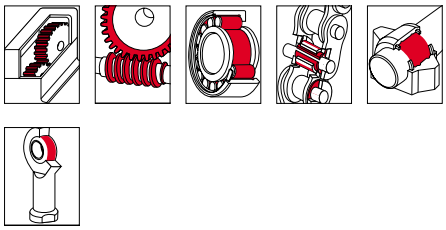
Product Survey
OKS Speciality Lubricants for Food and Pharma – Industry

OKS 370	Multipurpose Oil	LGA / FDA / NSF-H1*
OKS 371	Multipurpose Oil, Spray	LGA / FDA / NSF-H1*
OKS 3720	Gear Oil, ISO VG 220	FDA / USDA-H1 / NSF-H1
OKS 3730	Gear Oil, ISO VG 460	FDA / USDA-H1 / NSF-H1
OKS 3750	Adhesive Lubricant with PTFE	FDA / NSF-H1*
OKS 3751	Adhesive Lubricant with PTFE, Spray	FDA / NSF-H1*
OKS 3760	Multipurpose Oil	FDA / USDA-H1 / NSF-H1
OKS 3770	Hydraulic Oil, ISO VG 46	FDA / USDA-H1 / NSF-H1
OKS 4220	Extreme-Temperature Bearing Grease	LGA / FDA / NSF-H1*
OKS 470	White Universal High-Performance Grease	LGA
OKS 471	White Universal High-Performance Grease, Spray	LGA
OKS 474	Fluid Grease	FDA
OKS 475	High-Performance Grease	LGA
OKS 476	Multipurpose Grease	FDA / USDA-H1 / NSF-H1
OKS 477	Valve Grease	FDA / BPVA
OKS 478	Adherent Grease	FDA / USDA-H1 / NSF-H1
OKS 479	High-Temperature Grease	FDA / USDA-H1 / NSF-H1
OKS 1110	Multi-Silicone Grease	LGA / FDA / NSF-H1* / KTW / BPVA

FDA = Product formulation according to FDA
LGA = Approved and certificated by the LGA
USDA-H1 = Approved and certificated by the USDA
NSF-H1 = Approved and certificated by the NSF
(* = certification recently applied)
BPVA = Approved and certificated by the BPVA
KTW = Approved and certificated by the TZW

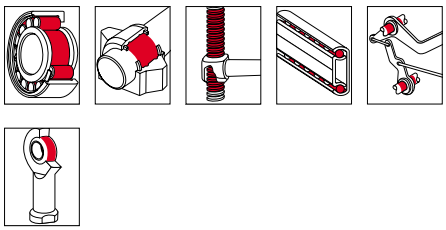
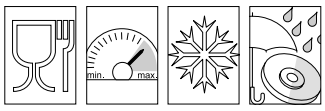
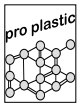
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 474 Fluid Grease (also for the food industry)		Biodegradable (degradability above 80% acc. to CEC test). For filling and packaging machines. Also for chains if grease lubrication is required.	 DIN 51 502: KEOP-20

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ organic polymer, ester	-20°C/+160°C +4°F/+320°F	0	500.000	130	+220°C +428°F	1,400/1.8	0 and 0	tins of 1kg hobbocks of 5 kg hobbocks of 25 kg drums of 180 kg

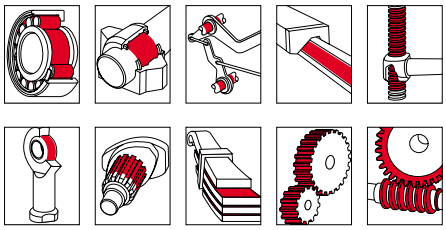
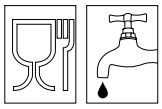
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 475 High-Performance Grease (also for the food industry)		Synthetic grease especially for high number of revolutions and low temperatures. In the food industry particularly for filling and packaging machines.	  DIN 51 502: KFHC2-50

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ PTFE, lithium, soap, polyalphaolefin	-50°C/+140°C -58°F/+285°F	2	1,000,000	35	+200°C +392°F	1,700/1.7	0 and 0	tins of 1kg hobbocks of 5 kg hobbocks of 25 kg drums of 180 kg

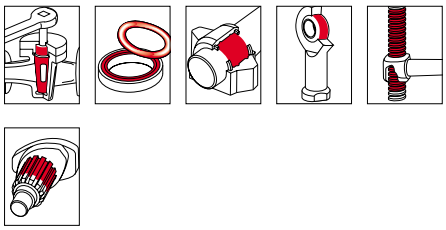
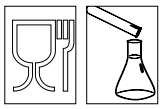
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 476 Multipurpose Grease for the Food Industry		Universal application. Resistant to alcaline and acid disinfection and cleaning agents.	 DIN 51 502: KF2K-20

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ aluminium-complex soap, white oil	-20°C/+120°C -4°F/+248°F	2	400.000	67	+250°C +482°F	2,200/1.8	0 and 0	cartridges of 400 g, tins of 1 kg, hobbocks of 5 kg, hobbocks of 25 kg, drums of 180 kg

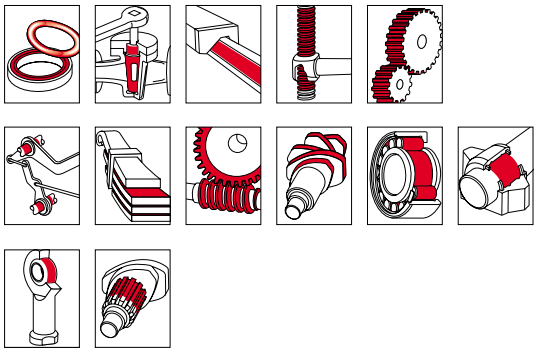
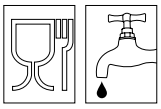
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 477 Valve Grease for the Food Industry		Without taste and odour. Resistant to sterilization. Froth of beer is not affected.	 DIN 51 502: K3P-10

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ inorganic thickener, polyalphaolefin	-10°C/+160°C +14°F/+320°F	3	not applicable	1,200	none	not applicable	not applicable	tins of 100 kg tins of 1 kg hobbocks of 5 kg hobbocks of 25 kg

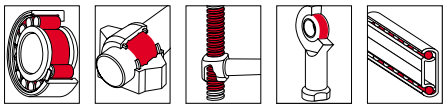
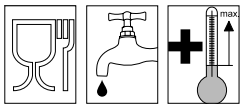
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 478 Adherent Grease for the Food Industry		Strongly adherent and sealing. Long service life. Resistant to alcaline and acid disinfection and cleaning agents.	 DIN 51 502: K2N-20

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ aluminium-complex soap, white oil	-20°C/+150°C -4°F/+302°F	2	500.000	67	+200°C +392°F	not applicable	not applicable	tins of 1 kg, hobbocks of 5 kg, hobbocks of 25 kg, drums of 180 kg

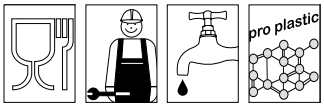
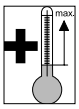
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 479 High-Temperature Grease for the Food Industry		Long service life even at high temperatures. Also for mould parts and rubber elastic materials exposed to cold and hot water. Resistant to alcaline and acid disinfection and cleaning agents.	 DIN 51 502: KPF1P-20

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/ aluminium-complex soap, polyalphaolefin	-25°C/+160°C +13°F/+320°F	1	350,000	400	+200°C +392°F	2,200/0.7	0 and 0	cartridges of 400 g, tins of 1 kg, hobbocks of 25 kg, drums of 180 kg

18. Speciality Lubricants for the Food and Pharma-Industry

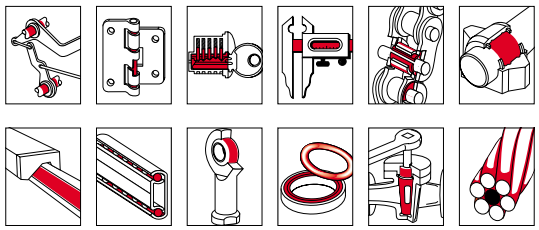
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 1110 Multi-Silicone Grease, physiologically harmless		Sealant and lubricant with adhesion on all kind of materials. No drying out, hardening or bleeding in a wide temperature range. Resistant to acetone, ethanol, ethylene, glycol, glycerin and methanol.	  recommendation of Krones and KHS DIN DVGW Certificate N°. 5162 BL 0482 KTW recommendation in section D2 sealings DIN 51 502: MSI3S-40

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
Transparent/ inorganic thickener polydimethyl siloxane	-40°C/+200°C -40°F/+392°F	3 other consis-tency classes on request	not applicable	9,500	none	not applicable	not applicable	tubes of 10 g, tubes of 100 g, cartridges of 400 g, tins of 500 g, hobbocks of 5 kg and 25 kg, drums of 180 kg

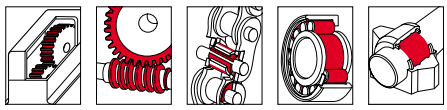
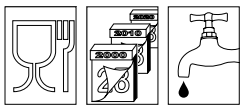
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 370/371* Multipurpose Oil for the Food Industry		High-Performance lubricant with good penetration power. Colourless, without taste an odour	 DIN 51 502: C, CL

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
colourless/ additives, white oil	-10°C/+180°C +14°F/+356°F	0.86	14	15	not determined	pump spray of 100 ml canisters of 5 l canisters of 25 l drums of 200 l aerosol of 400 ml*

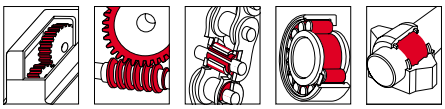
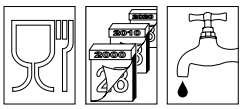
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 3720 Gear oil for the Food Industry		Good antiwear properties. Long service life by good temperature and oxidation stability. Without taste and odour. Resistant to steam, alcaline and acid disinfection and cleaning agents.	 DIN 51 502: C, CL, CLP

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
light-coloured additives, white oil	0°C/+160°C +32°F/+320°F	0.88	209	220	FZG gear-test rig scuff load > 12	canisters of 5 l canisters of 25 l drums of 200 l

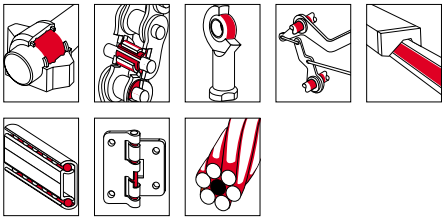
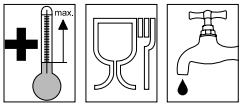
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 3730 Gear oil for the Food Industry		Good antiwear properties. Long service life by good temperature and oxidation stability. Without taste and odour. Resistant to steam, alcaline and acid disinfection and cleaning agents.	 DIN 51 502: C, CL, CLP

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
light-coloured additives, white oil	0°C/+160°C +32°F/+320°F	0.88	455	460	FZG gear-test rig scuff load > 12	canisters of 5 l canisters of 25 l drums of 200 l

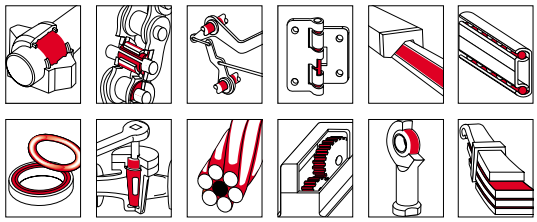
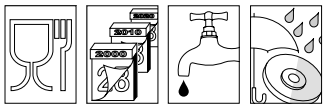
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 3750/ 3751* Adhesive Lubricant with PTFE		Without colour and taste, very adhesive lubricating oil with PTFE. High load carrying capacity. Resistant to water and steam alcaline and acid disinfection and cleaning agents.	 DIN 51 502: CF, CLF 100

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
whitish/ PTFE additives, white oil	-10°C/+180°C +14°F/+356°F	0.87	100	100	2,600/0.7 (at 300 N)	canisters of 5 l canisters of 25 l aerosol of 500 ml*

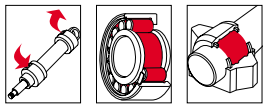
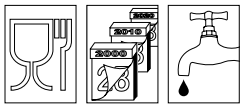
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 3760 Multipurpose Oil for the Food Industry		Universally applicable by good long-term lubrification and strong adhering properties. Without taste and odour.	 DIN 51 502: C, CL

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
colourless/ additives white oil	-10°C/+180°C +14°F/+356°F	0.87	100	100	not determined	canisters of 5 l canisters of 25 l drums of 200 l

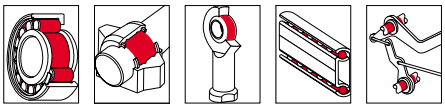
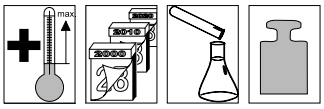
Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 3770 Hydraulic Oil for the Food Industry		Long service life. High wear prevention. Without taste and odour.	 DIN 51 502: C, CL, CLP, H, HL, HLP

Colour / Main Components	*Temperature Range (°C/°F)*	*Density (g/ml)*	*Viscosity + 40°C/ +104°F (mm^2/s)*	*Viscosity Grade ISO VG*	*Four-Ball Test Rig welding load (N)/ wear scar at 800 N (mm)*	*Packaging*
light coloured/ additives mineral oil, ester	-15°C/+200°C +5°F/+392°F	0.88	46	46	not determined	canisters of 5 l canisters of 25 l drums of 200 l

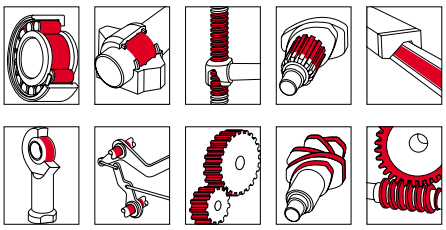
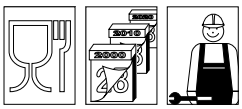
18. Speciality Lubricants for the Food and Pharma-Industry

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 4220 Extreme-Temperature Bearing grease		Long-term grease for very high temperatures, high loads and aggressive media.	  Only soluble in perfluorinated solvents. DIN 51 502: KFK2U-20

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
white/PTFE, organic polymer, perfluorinated synthetic oil	-20°C/+280°C +4°F/+536°F	2	300.000	500	none	9,000/0.6	0 and 0	tins of 500 g cartridges of 800 g, tins of 1 kg, hobbocks of 5 kg, hobbocks of 25 kg

Product Survey

Product Designation	*Fields of Application*	*Main Advantages and Benefits*	*Additional Info for correct selection*
OKS 470/471* White Universal High-Performance Grease (also for the Food Industry)		Clean, nonstaining lubrication. Safety reserves through white solid lubricants. For foodstuff, textile, paper and precision-mechanical industry.	 DIN 51 502: KFK2K-30

Colour / Main Components	*Temperature Range (°C/°F)*	*Consis-tency NLGI grade*	*DN Factor (d x n)*	*Base Oil Viscosity + 40°C/ +104°F (mm²/s)*	*Drop Point (°C/°F)*	*Four-Ball Test Rig welding load (N)/ wear scar under 800 N (mm)*	*Corrosion Protection SKF emcor method*	*Packaging*
light coloured/, white solid lubricants, lithium, soap, mineral oil	-30°C/+120°C +22°F/+248°F	2	300.000	108	+195°C +383°F	3,800/0.3	0 and 0	tubes of 10 g tubes of 100 g cartridges of 400 g tins of 1 kg, hobbocks of 5 kg, hobbocks of 25 kg, drums of 180 kg, aerosol of 300 ml*

19. Rubberqualities - Overview

Elastomers and their various properties

Chemical Nomenclature	*Natural Rubber Rubber*	*Styrol-Butadien-Buna S*	*Nitril-Rubber Buna N (Perbunan)*	*Chloroprene Rubber (Neoprene®)*	*Ethylene Propylene*	*Fluor Rubber (Viton)*	*Methyl Silikon*	*Poly vinylchlorid*
Abbreviation as per ASTM D 1418	NR	SBR	NBR	CR	EPDM	FKM	MQ/MVQ	PVC-soft
Shore A Hardness Range (±5)	40-90	45-90	45-90	40-90	40-90	65-90	30-80	55-95
Tensile Strength N/mm²	4-15	4-15	4-14	5-15	6-13	8-15	4-12	0
Recoil Elasticity at 20°C	++	+	0	+	+	0	0	
Abrasion Resistance	++	++	+	+	+	0	0	0
A Chemical Resistance	+	+	+	+	++	+++	+	++
A Oil Resistance	-	-	++	+	-	++	+	+
A Petrol Resistance	none	-	+	-	-	++	-	+
A Solvent Resistance	-	-	+	+	0	0	+	0
A Temp Stability in °C	-40 to +80	-30 to +80	-30 to +100	-25 to +100	-40 to +100	-20 to +200	-50 to +180	-25 to +60
Ozone Resistance	0	0	0	++	+++	++	++	0
General Climate Resistance	0	+	+	++	++	++	++	+
Gas Impermeability	0	0	+	+	0	+	-	
B Resistance to permanent deformation	++	+	+	+	+	+	0	0
Adhesion to metal	++	++	0	+	0	0	0	
Dielectric Properties	++	+	+	0	++	+	+	0

A = In view of the multitude of chemicals, solvents, application temperatures and times the value quoted may vary in some cases. For example one type of elastomer which normally has only low resistance properties could show very good resistance to certain media.

B = At relatively high or low temperatures, resistance generally drops.

C = These are borderline values which, depending on the composition of the mixture, can vary. If used permanently in such borderline areas, this can lead to a change in the physical values. For such extreme applications it is advisable to use special elastomer mixtures.

++ = excellent to very good

+ = good

0 = satisfactory

- = low to very poor

20. Addendum

Doing business with ERIKS means:

- possibility of ‘customer packaging’
- traceability through each product
- certification of FDA and USP conformity on request
- special migration test in our lab on demand, also for special products
- USP certification on request for some product lines
- FDA label on the packaging on demand.
- having access to the high performance seals rubbers and plastics
- having access to the development centers of our partners such as: DuPont-Dow, University Ghent, labo Richter, Clywd compounders, Northern Engineering, Rubberfab.
- having access to quality seals rubbers and plastics produced with the highest security for your application

21. Glossary

FDA Regulations for Rubber:

ERIKS offers its customers materials for their products that are used in numerous food contact applications. We find that often there is confusion over the definition of 'FDA Approved'. We hope this bulletin will clarify that definition and what ERIKS offers its customers with regards to materials intended to come in contact with food.

The United States Food and Drug Administration (FDA) issues guidelines for the manufacture of rubber articles used in the handling of food. These include the guidelines of what ingredients can be used in the production of rubber, in what proportions and what amount can be extracted when tested in relation to the food for which it is intended. The only FDA Guideline Rubber Development attempts to comply with is the FDA Title 21, part 177.2600, 'Rubber Articles Intended for Repeated Use'.

Part 177.2600 lists numerous chemicals permitted in the manufacture of rubber articles intended for repeated contact with food. Parts 100 through 199 of the same FDA Title 21 regulate these chemicals. Rubber Compounders purchases from its suppliers those chemicals that are documented, by those suppliers, to comply with those regulations.

We offer three levels of compliance with the FDA Title 21, Part 177.2600 as follows:

1. Formulated with Ingredients Complying with FDA Title 21, Part 177.2600
Certification that the ingredients and proportions used comply with FDA Title 21, part 177.2600. There is no charge to the customer for this level.

2. Formulated and Tested to Meet the Requirements of FDA Title 21, part 177.2600
Certification that the ingredients and proportions used comply with FDA Title 21, Part 177.2600 and test results (ERIKS utilizes an independent laboratory for these tests) that the extractives comply with the same. A quotation is required, but the charges usually run in the hundreds of dollars and can take a few weeks to complete. (Not required for articles intended for use with dry food.)

3. FDA Approved
This involves formal submission to the United States Government Food and Drug Administration, costs ca. $6000 and up and can take from 4 to 18 months to receive approval. A quotation will be supplied upon request.

21. Glossary

ACS: French norm for waterapproval

AOAC:
Products with this symbol meet requirements for a specific method as reported by AOAC International. AOAC International is a nongovernmental organization that tests and approves analytical methods according to recognized standards.

ASTM: American Society of Testing and Materials

BGVV: German norm for food contact

CEN: Comité Européen de normalisation

CIP: Cleaning In Place

DIN: Deutsche Industrie Norm

DVGW: Deutsches Verein Gas-Wasser

EHEDG: European Hygienic Equipment Design Group

EN: European norm

Eriflon: PTFE

Eriseal: Energised PTFE seal

FDA: Food Drugs Administration

FEP: Fluorethylene propylene

FFPM: Perfluorelastomer

FPM: Fluorelastomer

FKM: Fluorelastomer

GRAS: Generally Recognised As Safe

GMP: Good Manufacturing Practices

Gylon: Special filled PTFE from Garlock

HACCP:
Products with this symbol meet HACCP requirements for monitoring critical control points of your process control plan. HACCP stands for Hazard Analysis & Critical Control Point, a FDA and USDA regulatory plan to promote food safety and quality.

IAFP: International Association for Food Protection

ISO: International Organisation for Standardisation

ISO 9000:
Manufacturers who produce these products meet certain quality standards set by ISO-9000 quality program

21. Glossary

Kalrez®: Registered name PTFE DuPont-Dow for perfluorelastomers

KTW: German norm for waterapproval

LSR: Liquid Silicone Rubber

MVQ: Silicone

NNI: Nederlands Normalisatie Instituut

NSF:
National Sanitary Foundation. Products with this symbol have been tested and certified by NSF International. NSF is a nongovernmental agency that focuses on health-related standards for products and services.

PT cured: Platinum cured

PTFE: Poly Tetra Fluorethylene

SIP: Steam In Place

Teflex®: Encapsulated O-ring

Teflon®: Registered name PTFE DuPont-Dow

Tef-Steel®: Teflon-Stainless Steel

UHMW: Ultra High Molecular Weight

UL:
Products with this symbol are listed by Underwriters Laboratories, Incorporated (UL). Samples of these products have been evaluated by UL and meet the applicable UL Standards for Safety.

USDA: US Department of Agriculture

USP: United states pharmacopeia

Viton®: Registered name PTFE DuPont-Dow

VulcOring: O-ring produced out of cord

WRC: English norm for waterapproval

3-A: Symbol that assures that:
- equipment meets sanitary standards
- guidelines are established for compliance by sanitarians