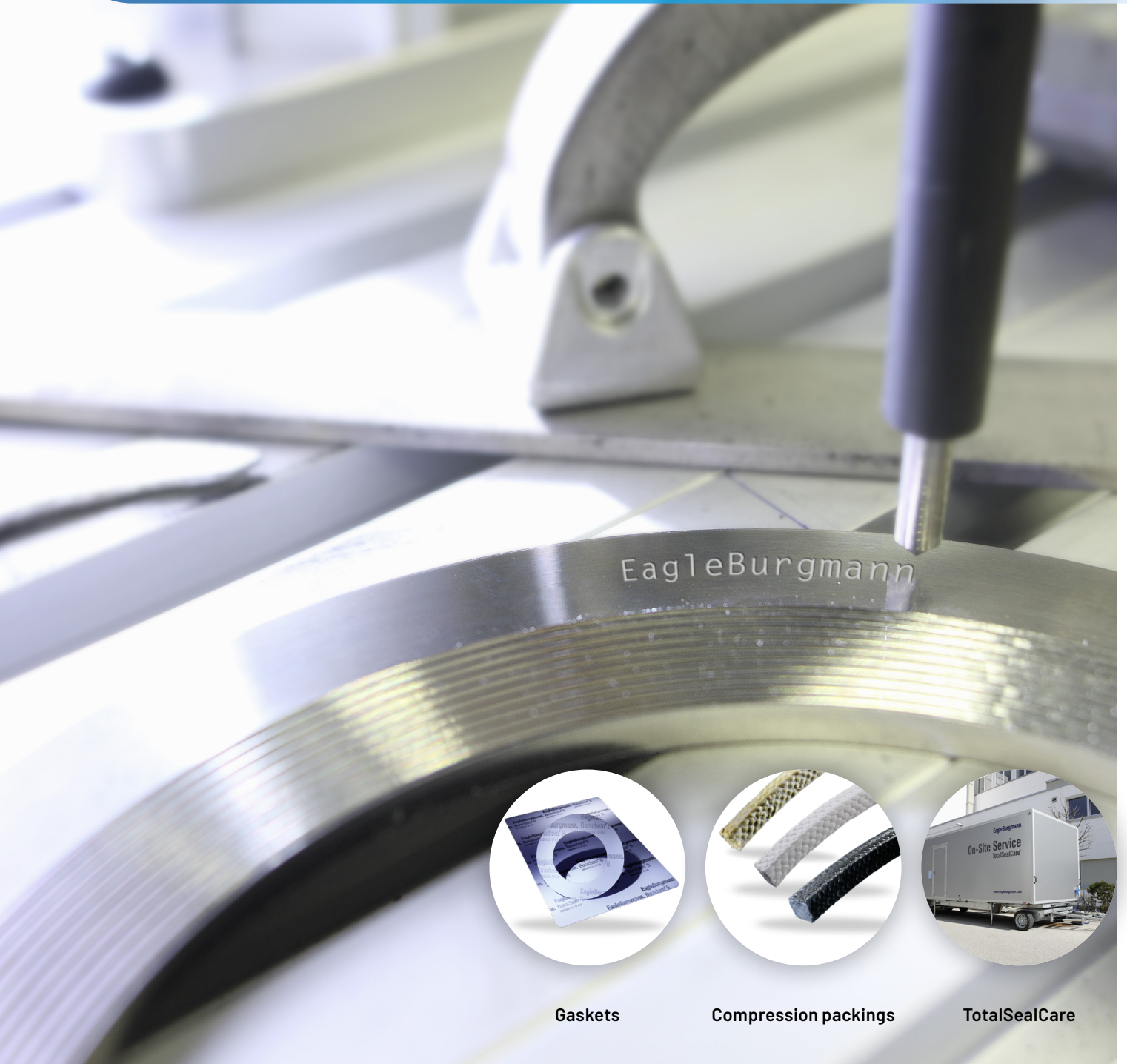


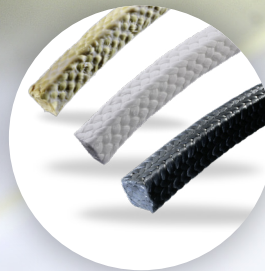
RELY ON EXCELLENCE

## Gaskets and compression packings

Reliability and maximum cost-effectiveness



Gaskets




Compression packings



TotalSealCare





Dresden in 1884. Here Feodor Burgmann revolutionized sealing technology with his invention of the mechanically braided, self-lubricating compression packing. And we have continued to this date – with unbroken enthusiasm. Every day we are motivated afresh by our customers' requirements. The result is consistently improved performance and maximum reliability from our products.

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# Seals by EagleBurgmann

## Reliable, safe and efficient. Maximum cost-effectiveness

### **The right seal for every application.**

Seals are key components of any system, so their role is of immense importance. They protect process media against external influences and contamination, and contribute to reducing emissions. This, in turn, improves process stability, along with the availability and operating efficiency of the system. With a broad range of high quality gaskets – from the fiber and rubber-based PTFE types through to graphite and metal seals, compression packings and the associated accessories – you can rely on EagleBurgmann to supply the right sealing solution for any application.

### **Reliable, safe and cost-effective solutions from a single source.**

In parallel with our comprehensive product range, our technical knowledge of media, processes and applications allows us to develop high quality solutions that are not simply reliable and safe. No matter what requirements our customers have, we know how all the factors involved will affect functionality and economic viability, and we continuously translate this expertise into practice in the form of sustainable and durable sealing solutions. We use all the skills and experience obtained in practice to follow, support and improve the seal's entire development, life and service cycle. EagleBurgmann offers the complete package: from the engineering, advice and design stage through to the provision of tailored on-site services.







EagleBurgmann has been developing, producing and installing sophisticated sealing systems for more than 125 years. Our lasting success is firmly based on our uncompromising focus on ensuring maximum safety, reliability and cost-effectiveness for our customers. Many of our seals are developed in close collaboration with the people who operate the process systems. This has the considerable benefit of allowing us to take full account of the application-specific processes and conditions on site. Industrial facilities are increasingly required to take environmental sustainability into account. As a result, it is important to constantly further develop and redevelop our gasket and packing solutions. This is because gaskets and packings need to offer the maximum possible safety and durability in operation. EagleBurgmann products are able to fulfil these requirements. But we do even more than that to protect people and the environment.

We offer our customers active on-site support in selecting the best solution, which, in turn, helps us to continuously further develop our products and services. There is always room for improvement. Finally, our primary goal is to ensure that our customers are totally satisfied. This is clearly demonstrated by our modular TotalSealCare service concept, for example, which combines advice, engineering and on-site service with conversion, upgrading and standardization measures. We aim to reduce our customers' workload, particularly for high-maintenance systems or if there are personnel shortages during general overhauls. The operation can be resumed sooner which, in turn, considerably increases cost-effectiveness.

This catalog provides an overview of our range of standard products; we also offer a broad spectrum of further variants to meet special needs and requirements.

## Sealing profile overview

### Rubber-steel seals

#### Load-bearing connection



9107/KH

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#### Force shunt



9117/KN

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9107/KN

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### Fiber, PTFE, graphite and mica gaskets

#### Ring without eyelet



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Burachem V 9655/V Page 34  
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#### Ring with inner eyelet



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## Corrugated ring seals

### Ring without eyelet



Corratherm 9631/P

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Corrachem 9631/T

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### Ring with inner eyelet



Corratherm 9631/P

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Corrachem 9631/T

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## Metal-jacketed seals

### Metal gasket



Buralloy 2500

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### Metal gasket with graphite jacketing



Buralloy 2500

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### French style- Jacketed on one side



Buralloy 2500

Page 59

### French style - Jacketed on both sides



Buralloy 2500

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### Jacketed on one side - Open



Buralloy 2500

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### Jacketed on one side - Closed



Buralloy 2500

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### Jacketed on both sides - Closed



Buralloy 2500

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### Double sided jacketing with double wrapper - Closed



Buralloy 2500

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## Sealing profile overview

### Spiral-wound gaskets

for tongue-and-groove flanges



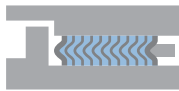
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for projection and recess flanges



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for projection and recess flanges,  
with inner ring



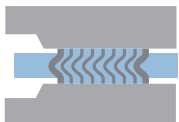
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for raised-face flanges,  
with outer ring



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for raised-face flanges,  
with inner and outer ring



Spiraltherm Graphite S 9584	Page 66
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### Serrated gaskets

without centering ring



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with integral centering ring



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with loose centering ring

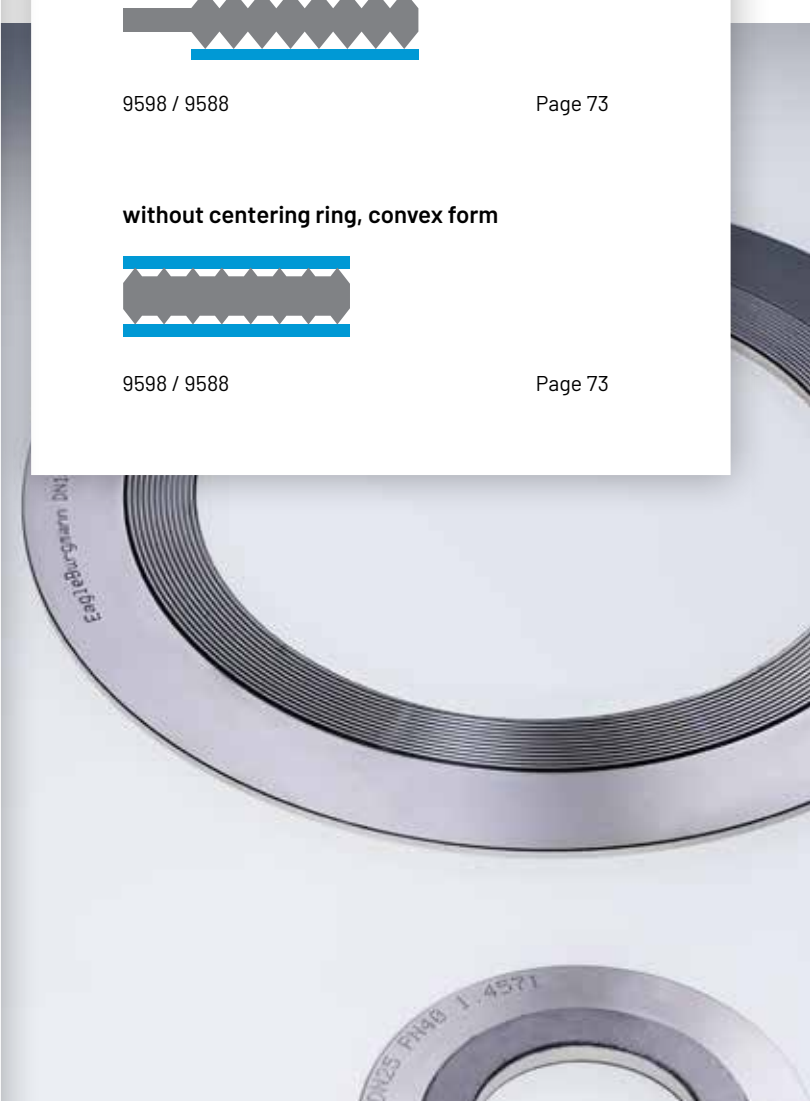


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without centering ring, convex form



9598 / 9588	Page 73
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## Ring-type joint gaskets

### Oval profile



Buralloy 2961

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### Octagonal profile



Buralloy 2961

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### Octagonal profile with larger flange make-up distance



Buralloy 2961

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### Octagonal profile with hole for equalizing the resulting pressure



Buralloy 2961

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### Octagonal profile with larger flange make-up distance and hole for equalizing the resulting pressure as per API 17D



Buralloy 2961

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## Cover seals

### Rectangular without cap



Statotherm V881  
Statotherm V901

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### Rectangular with 1 cap



Statotherm V881  
Statotherm V901

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### Rectangular with 2 caps



Statotherm V901

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### Outer chamfer without cap



Statotherm V881  
Statotherm V901

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### Outer chamfer with 1 cap



Statotherm V881  
Statotherm V901

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### Outer chamfer with 2 caps



Statotherm V901

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### Inner chamfer without cap



Statotherm V881  
Statotherm V901

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### Inner chamfer with 1 cap



Statotherm V881  
Statotherm V901

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### Inner chamfer with 2 caps



Statotherm V901

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## Sealing profile overview

### Compression packings

#### Conventional braiding



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Buramex SF 6335	Page 136
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#### Diagonal braiding



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Buramex SF 6335	Page 136
Araflon 6426	Page 136
Burasoft 6225/L	Page 138
Thermoflon 6230	Page 139
Thermoflon SL 6230/SL	Page 139

#### Round cross-section



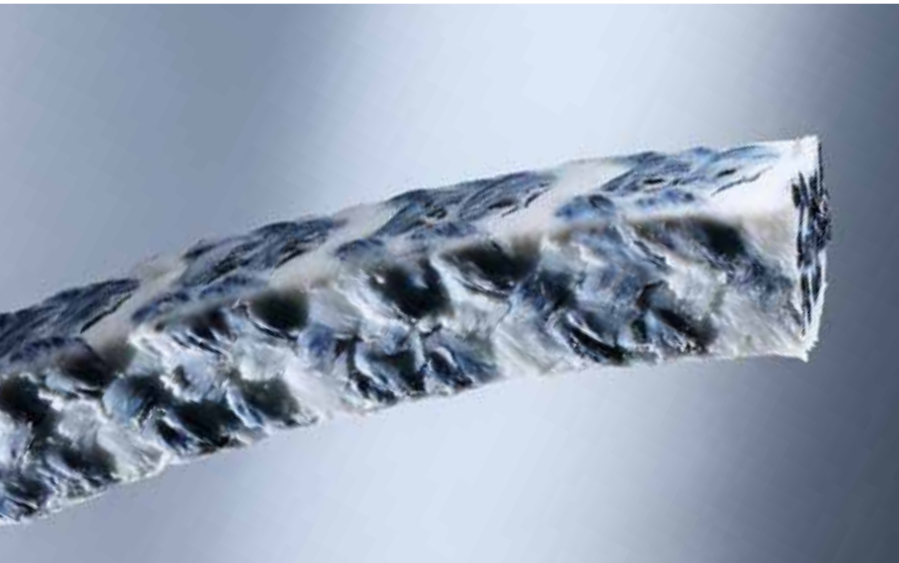
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#### Conventional braiding with reinforcement

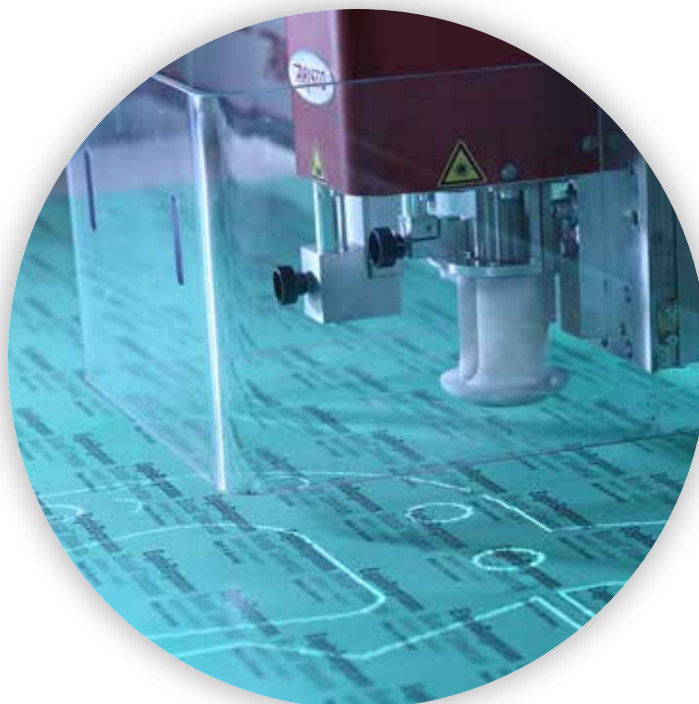
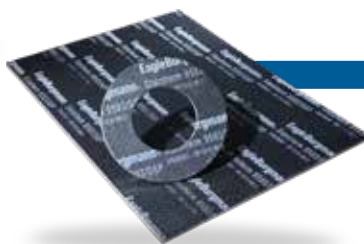


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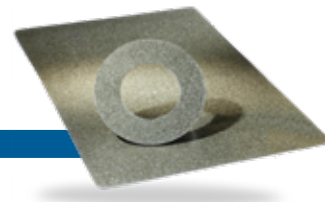


Section overview



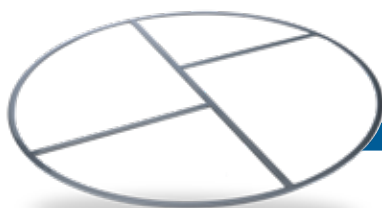


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### Serrated gaskets

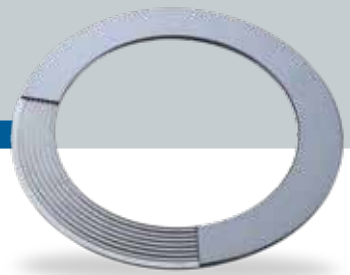
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### Ring-type joint gaskets

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### Assembly of static seals

Assembly of static seals	84
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# Operating range for EagleBurgmann static seals

	Page	Range of applications		Temperature stability			
		Operating pressure (bar)		Temperature stability T <sub>min.</sub> [°C]	Temperature stability T <sub>max.</sub> [°C]	Transient peak temperature (°C)	Temperature limit for steam operation [°C]
<b>Rubber-steel</b>							
KN Rubber-PVC gasket 9117/KN	24	25		-30	120	200	-
KH Rubber-steel gasket 9107/KH	24	40		-30	120	-	-
KN Rubber-steel gasket 9107/KN	25	64		-30	120	200	-
<b>Fiber</b>							
Burasil Basic 9544/B	30	80		-50	220	280	-
Burasil Universal 9544/U	30	120		-100	260	380	-
Buratherm T 9544/T	31	150		-100	350	380	-
<b>PTFE</b>							
Burachem V 9655/V	34	-		-240	260	315	-
Burachem Blue 9655/B	35	55		-210	260	-	-
Burachem Brown 9655/R	35	83		-210	260	-	-
Burachem White 9655/W	36	83		-210	260	-	-
Burachem Multi 9654/M	36	200		-270	270	315	-
<b>Graphite and mica</b>							
Statotherm P Foil 9591	42	40		-250	450	-	550
Statotherm 1P 9593/1	42	40		-200	400	500	550
Statotherm S6P 9593/S6	43	100		-200	500	-	550
Statotherm 5Ppro 9593/ 5Ppro	43	100		-250	450	-	550
Statotherm SSTC-TAL 9592	44	200		-200	500	-	550
Statotherm HD 9593/HD	44	250		-250	450	-	550
Statotherm HT 9560	45	5		-	950	1,200	550
<b>Metal</b>							
Corrathem 9631/P	56	100		-200	500	-	-
Corrachem 9631/T	56	100					
Buralloy Heat exchanger seal 2500	59	1)		-270	600	800	550
Spiraltherm Graphite S 9584	66	400		-200	550	-	-
Spiraltherm Graphite H 9594	66	400		-200	550	-	-
Spiraltherm PTFE 9595	67	400		-200	280	-	-
Spiraltherm Mica 9596	67	10		600	900	-	-
Camprofile serrated gasket 9588 / 9598	73	400		-200	550	-	550
Buralloy Ring Type Joint 2961	78	1)		-200	600	800	600

### Important note

All technical specifications are based on extensive testing and our many years of experience. There are so many possible applications, however, so they can only serve as guide values. The table lists all the important operating ranges for EagleBurgmann gasket products in the various possible applications.

Please note that the extreme values for the individual operating parameters cannot be applied at the same time due to the resulting interactions. The operating ranges of individual products will also depend on the associated pressure, external forces and influences, the temperature and the medium to be sealed.



## Media overview

Media	Media group	Media	Media group	Media	Media group
<b>A</b>		Calcium hydroxide (milk of lime)	11, 12	Ethylene	8
Acetaldehyde	15, 16	Calcium hypochlorite (bleaching lye)	9, 11	Ethylene chloride	6, 15
Acetic acid	9, 10	Calgon R <sup>®</sup> (sodium hydroxide phosphate silicate)	11	Ethylene glycol	16
Acetic acid anhydride	10	Calgon S (urea nitrate)	11, 12	Ethylene oxide	8
Acetone	8, 15	Calgon <sup>®</sup> (sodium hexametaphosphate)	11	<b>F</b>	
Acetylene	8, 15	Caprolactam	11, 16	Faeces (feces)	1.1
Acrylonitrile	16	Carbolic acid (phenol)	9, 10	Fat and fatty alcohols	13, 15
Adipic acid	9, 10	Carbon dioxide (gas)	6	Fatty acids	9, 10
Alcohol (ethanol)	15	Carbon dioxide (liquid)	6	Fatty alcohol sulfonate	1.1
Aluminum acetate	9, 11	Carbon disulfide	5	Ferricyanide	9, 11
Aluminum chloride	9, 11	Carbon monoxide (gas)	6	Fir needle oil	13
Aluminum sulfate	9, 11	Carbon tetrachloride	8, 15	Fish liver oils	13
Ammonia (gaseous)	11, 12	Caustic lime (calcium hydroxide)	12	Fish slurry	1.1
Ammonia (liquid)	11, 12	Caustic potash (potassium hydroxide)	11, 12	Fixing bath, acidic	9
Ammonium chloride	9, 11	Caustic soda (sodium hydroxide)	12	Formaldehyde (formalin)	15, 16
Ammonium hydroxide	11, 12	Caustic soda ≤30 % (all conc.)	11, 12	Formic acid	9, 10
Ammonium sulfate	9, 11	Chloracetic acid (mono, di)	9	Freon <sup>®</sup>	8, 15
Aniline	16	Chlorinated biphenyl	15	Frigene <sup>®</sup>	8, 15
Anthracene oil	13	Chlorinated paraffin	15, 17.1	Fruit juices	2
Anti-freeze additive (glycols)	15	Chlorine gas	6, 10	Fruit pulp	2
Apple must	2	Chlorine water (water saturated with chlorine)	10	<b>G</b>	
Arsenic acid	9, 10	Chlorobenzene	8, 15	Gallic acid	9, 10
Asphalt	17.1	Chloroform	15	Gas scrubber water	1.1, 9
ASTM Oil standard no. 1, 2, 3 and 4	13	Chlorosulfuric acid (chlorosulfonic acid)	10	Gelatin	2
<b>B</b>		Chromic acid	10	Glacial acetic acid	10
Barium chloride	9, 11	Chromium oxide salts	9, 11	Glauber's salt (Sodium sulfate)	9, 11
Barium hydroxide	11, 12	Citrus juices	2, 9	Glucose	2
Battery acid	10	Coconut fat	13	Glue	17.1
Beer	2	Coke oven gas	5	Glycerine (glycerol)	15
Beer mash from pumps	2	Copper acetate solution	9, 11	Glycol acetic acid ester	8, 15
Beer mash from wort boiler	2	Copper(I) chloride solution	9, 11	Glycol monoacetate	8, 15
Benzene	15	Copper(II) sulfate solution (vitriol of copper)	9, 11	Groundnut oil	13
Benzenesulfonic acid	10	Cresol	16	<b>H</b>	
Benzoic acid	9, 10	Crude oil	13	Heating oil	13
Benzyl alcohol	15	Cyclohexane	8, 15	Heavy water	1.1
Bitumen (asphalt)	17.1	Cyclohexanol	15	Heptane	8, 15
Blast furnace gas	6	Cyclohexanone	15	Hexafluorosilicic acid	10
Bleaching lye	11	<b>D</b>		Hexane	8, 15
Blood	2	Denatured alcohol	15	Honey	2
Boiler feed water	3	Dibutyl phthalate (DBP)	16	Hydraulic fluid (crude oil-based)	13
Bonder lye	9, 10, 11, 12	Diesel oil	13	Hydraulic fluid (phosphate ester-based)	13
Bone fat (dissolved in tri or petrol)	15	Diethanolamine (DEA)	11, 16	Hydrazine	15
Borax solution	11	Diethyl ether	8, 15	Hydrochloric acid	9, 10
Boric acid	9	Diethylene glycol	8, 15	Hydrocyanic acid	9, 10
Brackish water	1.1	Dimethyl ether	8, 15	Hydrofluoric acid	10
Brake fluid (ATE blue)	13	Dioxane	16	Hydrogen bromide	6, 9, 10
Bromine, aqueous	9, 10	Diphenyl oxide	15, 16	Hydrogen chloride	6, 10
Bunker and heating oil	13	Diphyl heat transfer fluid	14	Hydrogen chloride (hydrochloric acid gas)	6, 9, 10
Butadiene	16, 17.1	Distilled water	2	Hydrogen sulfide	6, 9, 10
Butane	8, 15	Dodecyl benzene	15	<b>I</b>	
Butanediol	15	Dowtherm <sup>®</sup> A	14	Iron phosphate solution	9, 11
Butanol (butyl alcohol)	15	Dye liquor	17.1	Iron(III) chloride solution	9, 10
Butanone (Methyl-ethyl-ketone)	15	Dyes	18	Isobutyl alcohol	8, 15
Butyl acetate	15	<b>E</b>		Isobutyl ketone	8, 15
Butyl alcohol (butanol)	15	Edible oil	2, 13	Isooctane	8, 15
Butylene	8, 15	Ethane	15	Isopropyl acetate	8, 15
Butyric acid	2, 9, 10	Ethanol (ethyl alcohol)	15	Isopropyl alcohol	8, 15
<b>C</b>		Ether (diethyl ether)	8, 15	Isopropyl ether	8, 15
Calcium acetate	9, 11	Ethyl acetate	8, 15		
Calcium bisulfite lye (sulfite lye)	9, 11				
Calcium chloride	9, 11				



Media	Media group
<b>J</b>	
Jam and marmalade	2
Jet fuel (kerosene JP 4, JP 5)	15
<b>K</b>	
Kerosene	15
<b>L</b>	
Lacquers	18
Lead acetate (lead sugar)	11
Lead sludge	17.2
Lemonades	2
Lignite tar oil	13, 17.1
Liqueurs	2
Liquid manure (slurry)	1.1
Liver oil (fish)	2
<b>M</b>	
Magnesium bisulfite	9, 11
Magnesium hydroxide	11, 12
Maleic acid anhydride	10
Manganese nitrate	9, 11
Mash: hop mash	2
Mazut (heavy heating oil)	13
Meat juices and stocks	2
Mercaptan	16
Mercury(II) nitrate	9, 11
Methane	8
Methanol (methyl alcohol)	15
Methyl chloride	8, 15
Methyl ethyl ketone (MEK)	8, 15
Methylene chloride (dichloromethane)	8, 15
Milk	2
Milk of lime (calcium hydroxide)	1, 12
Mineral oil	13
Mobiltherm® 600	14
Molasses	2, 17.1
<b>N</b>	
N-methyl-2-pyrrolidone (NMP)	15
Naphtha	15
Naphthenic acid	9, 10
Natural gas	5
Nitric acid	
- < 10 % 85 °C	9, 10
- > 10 % 35 °C	10
Nonylphenol	15
<b>O</b>	
Oils	
- animal oils	13
- lubricating oils	13
- plant oils	13
Olive oil	2, 13
Oxalic acid	9, 10
Oxygen (gas, liquid)	7.2
<b>P</b>	
P3° lye	10, 11, 12
Paper pulp	
- fine, tissue paper	17.2
- Photographic paper	9, 11, 17.2
- Plastic	9, 11, 17.2
- Wrapping paper	9, 11, 17.2

Media	Media group
Pentane	8, 15
Perchloric acid	9, 10
Petrol	15
Petroleum ether (gasoline)	8, 15
Phenol (carboic acid)	9, 10
Phenyl ether	8, 15
Phenylhydrazine	8, 15
Phosphoric acid	9, 10
Phosphorus trichloride	9, 10
Phthalic acid (heating)	9, 10
Phthalic anhydride	10
Potassium carbonate	11, 12
Potassium chloride	9, 11
Potassium cyanide (cyanide of potassium)	9, 11
Potassium hypochlorite	9, 11
Potassium nitrate	9, 11
Potassium silicate	9, 11
Potassium sulfate	9, 11
Propane	15
Propanol (propyl alcohol)	8, 15
Propanone (acetone)	8, 15
Propyl acetate (acetic acid ester)	8, 15
Pyridine	15, 16
Pyrrolidone	11, 12
<b>Q</b>	
Quark	2
Quenching oil	13
<b>R</b>	
Rapeseed oil	13
Raw juice (sugar solution)	2
<b>S</b>	
Salicylic acid	9, 10
Saltpetre	9, 11
Sea water	1.2
Silicon tetrachloride (tetrachlorosilane)	9, 10
Silicone greases	13
Silicone oils	13
Silver salts	9
Skin cream	2, 13
Soap solution	1.1
Sodium arsenate	9, 11
Sodium carbonate	1, 12
Sodium chloride (saline)	9, 11
Sodium hydroxide (caustic soda)	11, 12
Sodium hypochlorite	9, 11
Sodium nitrate	9, 11
Sodium phosphate	9, 11
Sodium silicate (water glass)	9, 11
Sodium sulfate (Glauber's salt)	9, 11
Sodium sulfide	9, 11
Sodium sulfite	9, 11
Sodium thiosulfate (antichlor)	9, 11
Starch solutions	17.1
Steam	4.1, 4.2, 4.3
Stearic acid (fatty acid)	9, 10
Styrene (phenyl ethylene)	15
Sulfite lye	9, 11
Sulfuric acid	
- 70-90 % 150 °C	10
- 90-95 % 70 °C	10
Sulfuric acid, fuming (oleum)	10
Sulfurous acid	9, 10

Media	Media group
<b>T</b>	
Table salt (sodium chloride)	9, 11
Table vinegar	9
Tallow	13
Tannic acid	9, 10
Tar	17.1
Test gasoline	15
Tetrachloroethylene	8, 15
Tetrahydrofurane	15
Thick juice (60% sugar solution)	2
Thin juice (sugar solution)	2, 17.1
Toluene	15
Trichloroethane	15
Trichloroethylene (tri)	15
Triethanolamine	11, 16
Trisodium phosphate	9, 11
Turbine oils	18
Turpentine	15
<b>U</b>	
Urea	11, 16
<b>V</b>	
Vegetable paste	2
Vinegar (table vinegar)	9
Vinyl chloride	8
<b>W</b>	
Waste water	1.1
Water from pressed fish	1.1
Water glass (Sodium silicate)	9, 11
Water	
a) Drinking	2
b) Distilled	3
c) Not treated	1.1
d) Boiler feed (hot water, condensate)	3
e) Reactor, radioactive	1.1
f) Heavy	1.1
g) Brackish, sea	1.2
h) Dirty	1.1
Whale oil, train oil	13
Wine	2
Wine spirits	2, 15
Wood pulp	11; 17.2
<b>X</b>	
Xylene	8; 15
<b>Y</b>	
Yeast paste	2
<b>Z</b>	
Zinc chloride	9; 11

## Static seals

EagleBurgmann produces and finishes static seals made from all the commonly used materials. Sheet materials and blank cuts are available in fibrous materials, PTFE, graphite and mica, along with all standard types of metal seal such as spiral-wound gaskets, serrated gaskets, ring-type joint gaskets and metal-jacketed and corrugated ring seals.

The large possible temperature and pressure range and the different materials-specific properties mean that static seals can be found in all industrial sectors. There are many aspects to be considered when selecting the suitable material from the variety of available options, including the flange shape, pressure, temperature and medium.

The required seal thickness must also be taken into account. As a rule, a thinner seal geometry should be preferred to a thicker seal. The operating parameters will have a decisive effect on the choice of correct seal thickness. The more favorable the operating parameters, the thinner the seal can be. It should also be noted that seals made from soft materials (in contrast to metal seals), particularly very narrow seals, can be over-compressed much faster, especially because the soft seals require lower surface pressure.

Material-specific width-height ratios need to be observed to avoid over-compression because seals are too narrow. Failure due to an unfavorable width-height ratio can also be avoided with the aid of a partitioned installation location using tongue-and-groove flanges or similar constructions.

In such a design solution, reducing the PQR value will affect the seal's stability; the bolt force during installation should be taken into account. In general, the seal tightness does not only depend on the selected seal; rather it is the interaction between the screw, flange and proficient fitting of the seal that determines whether the surface pressure required during installation is evenly distributed over the entire periphery of the seal.

### Gaskets with inner eyelet

The biggest safety problem with soft gaskets is "blow-out". In the normal situation, a seal withstands the operating pressure because it is fixed in place with the necessary surface pressure, and not due to its own strength. Blow out can occur when the surface pressure is reduced by a sudden pressure surge caused by lifting of the sealing surfaces, for example.

To counteract this effect and increase the stability of the gasket, a metal edging, known as an inner eyelet, can be used on the inner diameter of the seal. In addition to increased resistance to blow-out, seals with inner eyelet have other properties that increase process reliability. For example, the extensive decoupling between the medium and seal material minimizes cross-sectional leakage. Impurities in the medium due to abrasion or catalytic effects are also avoided more effectively and the seal is easier to handle due to its higher resistance to buckling.

### Recommended storage conditions

- Well packaged in dry storage areas
- Relative humidity: < 65%
- Room temperature < 25 °C
- Protected against contamination and foreign bodies, mechanical damage, and the effects of direct sunlight, temperature and radiation
- Use of the FIFO (first in, first out) storage principle is recommended

### Please note:

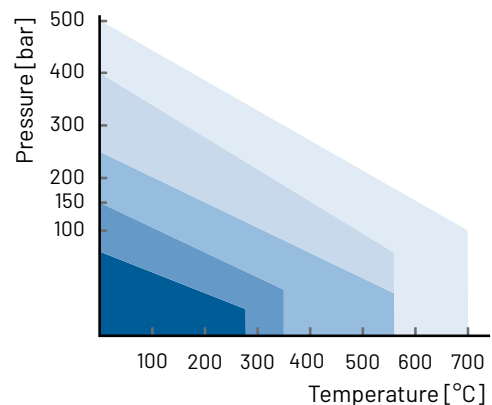
The recommended storage period can be greatly reduced if the room temperature remains more than 10 °C over the recommended value of 25 °C for a long period. This particularly applies to seals made from dry, synthetic materials (plastics not including PTFE).

### Recommended storage period:

The stated times are approximate guide values:

Grease and oil-impregnated seals	2 – 3 years
Rubber-impregnated seals and seals with inorganic filler materials and synthetic elastomers	2 – 3 years
Seals made from dry, synthetic materials (plastics not including PTFE)	2 – 3 years
PTFE-impregnated seals and seals made from mineral and natural fibers	3 – 5 years
Seals made from pure graphite	Practically unlimited

Operating conditions for standard gasket types



- Ring-type joint gaskets
- Spiral-wound gaskets, serrated gaskets
- Graphite seals
- Fiber seals
- PTFE seals

# Selecting a gasket

The range of gasket materials and types is both comprehensive and complex given the number of products currently available. Here are some of the important factors that you will need to take into account in order to select the best gasket for your application.

You will always need to balance the following requirements when you choose a gasket:

- Performance
- Safety
- Reliability
- Service life
- Cost

Gaskets must be able to withstand all the operating conditions for the application – pressure, temperature, temperature change, pressure surges, chemical resistance, safety requirements, etc.

The reliability is of immense significance since the cost of the gasket is relatively low compared to the potential costs associated with a failed seal. And these costs are not always simply the direct replacement costs; they may include consequential costs due to lost production and injury to personnel.

The quality of the material used to manufacture the gaskets directly affects their performance and reliability. For example, expanded graphite of the same nominal purity from different suppliers can contain very different quantities of specific impurities. These influence the service life of the gasket, its volumetric loss rate at increased temperatures and the corrosion effect on metal components in fittings, etc.

The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.

## Installation

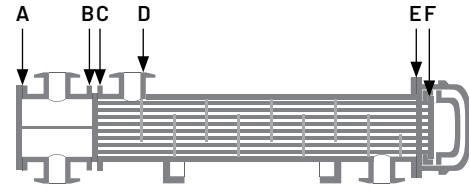
Make sure that seals are dry and undamaged before fitting. The use of lubricants and release agents can cause the seal to fail. The sealing surfaces must be clean and free of seal residues, rust and dirt.

## BAM note

Many of our products are suitable for use in liquid and gaseous oxygen. We have obtained various approvals for these applications via the BAM (German materials testing agency). We will be happy to send you copies of the test reports upon request. Please note, in particular, the oil-free and grease-free handling of the products due to the risk of spontaneous combustion.

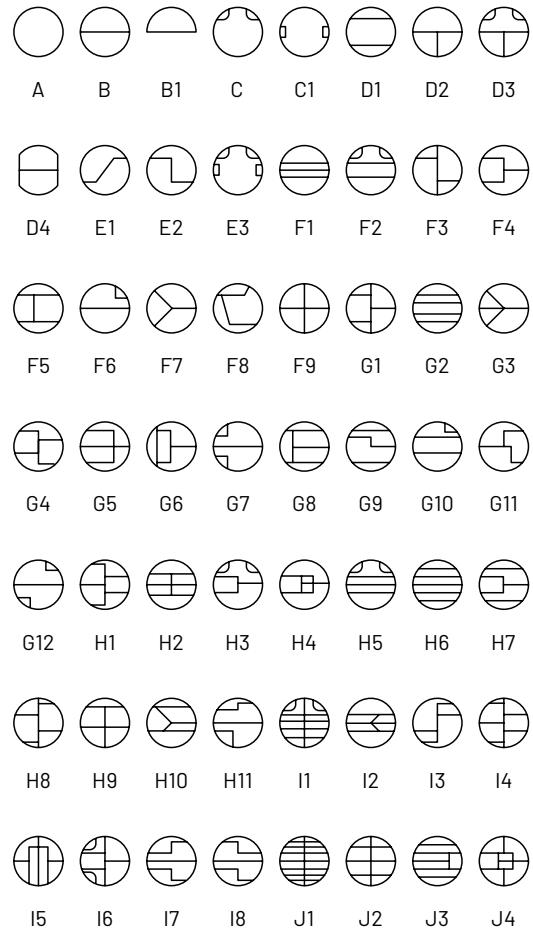


## Examples for heat exchanger applications



- A Tube bundle cover
- B Tube sheet
- C Jacket side
- D Flange
- E Baffle
- F Circulating channel

## Profiles for heat exchanger seals



In addition to Corratherm® corrugated ring seals, the following seals are also suitable for use as heat exchanger seals:

- Fiber or graphite gaskets (see pages 28 and 38)
- Spiral-wound gaskets (see page 62)
- Serrated gaskets (see page 72)
- Metal-jacketed seals (see page 58)

## Rubber-steel seals

### Properties

EagleBurgmann rubber-steel seals are made from a combination of high-grade elastomers and a corrosion-proofed support ring. This support ring can be fully vulcanized in place or may be external; it increases the stability and blow-out resistance of the seal. It also optimizes the handling, particularly with larger seal diameters. Damaged flanges or corrosion pitting can be effectively compensated by the combination of a homogeneous structure with the adaptability of high quality elastomers. They also minimize leakage rates.

The vulcanization method used by EagleBurgmann for fully vulcanized support rings ensures the best possible adhesion to the elastomer shell which, in turn, prevents the seal detaching, moving or blowing out, even under the highest stresses. The actual support ring does not come into contact with the medium.

### Advantages

- High sealing performance, even with low surface pressure
- Can be used in fragile flanged connections
- Uniform stress distribution by special sealing lip geometry
- Easy handling
- High mechanical stability
- High resilience
- Excellent adaptability to surface irregularities and roughness

### Production

EagleBurgmann rubber-steel gaskets are made in two different ways, depending on the seal size. For seals with a diameter of less than 32" or DN 800, the sealing lips are produced by injection molding. This method is superior to the frequently used displacement method as it offers greater dimensional accuracy. For larger seal diameters, the sealing lips are extruded and then shock vulcanized to the installation dimension. With rubber-steel seals in the force shunt, the support ring is reusable since the elastomer sealing ring can be easily replaced.

### Types

EagleBurgmann rubber-steel seals are available in the load-bearing connection (9107/KH) or force shunt (9107/KN), depending on the requirements concerning flange geometry or material. And in the force shunt, the use of the rubber-PVC seal 9117/KN is recommended, particularly for large diameters in excess of 24" or DN 600. This is produced segmented for diameters 24" or above, and the lightweight construction means that it saves space and money during manufacturing and transportation.

### Range of applications

Rubber-steel seals achieve the maximum operational reliability even with very low tightening torques, so they are used particularly in applications with low bolt forces. They are the preferred seal in power plant and building services technology and in the water/waste water industry. The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.





## Overview of rubber-steel seals

		9117/KN	9107/KH	9107/KN
Material	Support ring	PVC	Steel	Galvanized steel
	Sealing element	EPDM (Shore A hardness 70 ± 5)	EPDM (Shore A hardness 70 ± 5)	EPDM (Shore A hardness 70 ± 5)
Design		Mechanically produced PVC support ring with renewable EPDM profiled inner ring < DN800 (32") closed sealing lip > DN800 (32") sealing lip sold by length	Rubber-jacketed steel inner ring	Galvanized support ring with renewable EPDM profiled inner ring < DN800 (32") closed sealing lip > DN800 (32") sealing lip sold by length
Operating pressure (max.)		25 bar	40 bar	64 bar
Temperature EPDM sealing element	Continuous operation up to one hour	-30 °C ... +120 °C	-30 °C ... +120 °C	-30 °C ... +120 °C
	up to one minute (short-term peak temperature)			-30 °C ... +200 °C
Recommended applications		Suitable for shape A flanges, especially glass and plastic-coated pipe connections and coated steel flanges (rubberized).	Suitable for shape A flanges, especially glass and plastic-coated pipe connections and coated steel flanges (rubberized). Especially suitable for use in flue gas desulphurization plants.	Suitable for shape A flanges, especially glass and plastic-coated pipe connections and coated steel flanges (rubberized). Especially suitable for use in flue gas desulphurization plants.
Form as supplied		All sizes for standard flanges available to DIN, ANSI, BS, JIS standards. Guide ring: < DN600 – single component, > DN600 – segmented (assembled on site)	All sizes for standard flanges available to DIN, ANSI, BS, JIS standards	All sizes for standard flanges available to DIN, ANSI, BS, JIS standards





### Advantages

- The elastomer ring can be reused after replacement
- Reduced weight
- Easy handling, even with large diameters
- Segmented construction for optimized transport
- Segments may be assembled on site

## KN Rubber-PVC gasket 9117/KN

### Features

The KN rubber-PVC gasket 9117/KN consists of a PVC support ring and a specially-molded, replaceable elastomer ring which is located in the force shunt after fitting.

### Operating range

Pressure:  $p = 25 \text{ bar}$

Temperature

- Continuous operation:  $t = -30 \text{ °C} \dots +120 \text{ °C}$

Recommended surface

roughness:

$R_z < 100 \text{ }\mu\text{m}$

### Materials

- Sealing lip: EPDM (Shore A hardness  $70 \pm 5$ )
- Outer ring: PVC

### Recommended applications

Industries

- Power plant technology
- Water and waste water technology
- Building services engineering

Components

- Flanged connections
- Pipe connections

### Available dimensions

- Up to DN 600 (24"), the gasket is produced as a single piece.

- Above DN 600 (24"), the seal is produced in easy to transport segments and then assembled.
- Standard dimensions as defined in the EagleBurgmann in-house standard for DIN flanges or for flanges to ANSI B16.5 and MSS SP-4.4 (see page 26)

### How it works

The EPDM sealing lip is fitted on the inner diameter of the PVC ring. The PVC ring acts as both a supporting and a centering ring. It also absorbs the bolt force which is needed particularly when there are high pressures to be sealed, and thus protects the elastomer ring against excessive compression. The PVC ring does not come into contact with the medium.

### Note

Production note:

Up to DN 800 or 32", the sealing lip is produced by injection molding. This is superior to frequently used displacement method with open molds as it offers greater dimensional accuracy. Above DN 800 or 32", the sealing lip is extruded and is sold by length with instant adhesive for on-site assembly.



### Advantages

- High inherent strength
- Optimum sealing characteristics even at low bolt forces

## KH Rubber-steel gasket 9107/KH

### Features

The KH rubber-steel gasket 9107/ KH consists of a fully rubber-jacketed support ring which gives the gasket additional stability. At the same time it guarantees optimum sealing characteristics, even with low bolt forces and particularly for large diameters. So this seal can also be used in soft components such as plastic flanges.

It is a robust seal for installation in load-bearing connection applications.

### Operating range

Pressure:  $p = 40 \text{ bar}$

Temperature

- EPDM:  $t = -30 \text{ °C} \dots +120 \text{ °C}$
- NBR:  $t = -25 \text{ °C} \dots +70 \text{ °C}$
- FPM:  $t = -20 \text{ °C} \dots +200 \text{ °C}$

Shore A hardness:  $70 \pm 5$

(EPDM, NBR, FPM)

Recommended surface

roughness:

$R_z \leq 100 \text{ }\mu\text{m}$

### Materials

Complete seal with support ring made from St 37.

### Recommended applications

Industries

- Power plant technology
- Water and waste water technology
- Building services engineering

### Available dimensions

- Standard dimensions as per DIN EN 1514-1 or EN 12560-1 (see page 48 ff.)

### Note

Other support materials and elastomer grades available upon request.

### KN variants: rubber-PVC gasket 9117/KN

Form as supplied	
Rings	9117/KN
Segments	9117/KNS

### KH rubber-steel gasket 9107/KH variants

Form as supplied	Standard	Special profile
Rings	9107/KH	9107/KHP



#### Advantages

- The outer ring (EPDM) can be reused after replacement
- Uniform distribution of the surface pressure

## KN Rubber-steel gasket 9107/KN

#### Features

The KN rubber-steel gasket 9107/KN consists of a metal support ring and a specially-molded, replaceable elastomer ring which is located in the force shunt after fitting. The support ring also acts as a centering ring and force limiter. It thus both absorbs the bolt forces needed for high pressures and protects the rubber seal against over-compression.

#### Operating range

Pressure:  $p = 64$  bar

Temperature

- Continuous operation:  
 $t = -30\text{ °C} \dots +120\text{ °C}$
- a few hours:  
 $t = -30\text{ °C} \dots +150\text{ °C}$
- a few minutes:  
 $t = -30\text{ °C} \dots +200\text{ °C}$

Recommended surface

roughness:

$R_z \leq 100\text{ }\mu\text{m}$

#### Materials

- Sealing ring: EPDM
- Support ring: St 37 galvanized, chromated or stainless steel

#### Recommended applications

Industries

- Power plant technology
- Water and waste water technology
- Building services engineering

#### Available dimensions

- Standard dimensions as defined in the EagleBurgmann in-house standard for DIN flanges or for flanges to ANSI B16.5 and MSS SP-4.4 (see page 26)

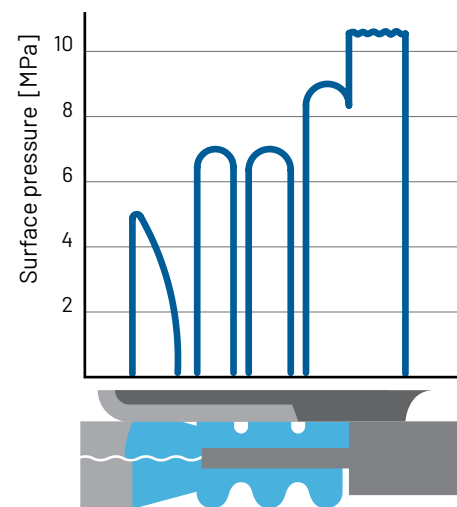
#### Note

With coated flanges, we recommend selecting the outer diameter of the coating so that the sealing lip on the atmospheric side lies in the steel part. If necessary, discuss the dimensions with your EagleBurgmann contact.

#### Load values (q) elastomer seal

The surface pressure acting in the flange block position is:

- at room temperature:  
 $q_{\text{max.}} = \text{approx. } 10\text{ MPa}$
- at  $100\text{ °C}$ :  
 $q_{\text{max.}} = \text{approx. } 6\text{ MPa}$

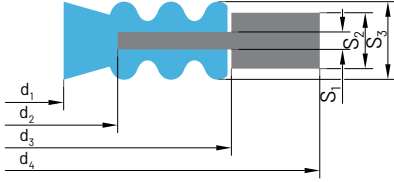


Force distribution or compression forces for rubberized flanged connections using the EagleBurgmann rubber-steel gasket 9107/KN in the force shunt

#### KH rubber-steel gasket 9107/KN variants

Form as supplied	Standard	Special profile
Rings	9107/KN	9107/KNP

Dimensions for rubber-steel seals in the force shunt



As per EagleBurgmann in-house standard WN 39.3 for DIN flanges

DN [mm]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]	d <sub>3</sub> [mm]	d <sub>4</sub> [mm]					s <sub>1</sub> approx. [mm]	s <sub>2</sub> [mm]	s <sub>3</sub> [mm]
				PN 10	PN 16	PN 25	PN 40	PN 64			
10	18	27	36	45	45	45	45	56	4	3	1
15	22	31	41	50	50	50	50	61	4	3	1
20	28	37	49	60	60	60	60	-	4	3	1
25	35	44	57	70	70	70	70	82	5	3.5	1.5
32	43	52	68	82	82	82	82	-	5	3.5	1.5
40	49	58	75	92	92	92	92	103	5	3.5	1.5
50	61	71	90	107	107	107	107	113	5	3.5	1.5
65	76	86	107	127	127	127	127	137	5	3.5	1.5
80	88	98	119	142	142	142	142	148	5	3.5	1.5
100	113	126	147	162	162	168	168	174	7.3	5	2
125	139	152	173	192	192	195	195	210	7.3	5	2
150	167	180	203	218	218	225	225	247	7.3	5	2
175	193	206	233	248	248	255	267	277	7.3	5	2
200	219	232	258	273	273	285	292	309	7.3	5	2
250	270	283	305	328	330	342	353	364	7.3	5	2
300	322	337	357	378	385	402	418	424	7.3	5	2
350	365	380	410	438	445	485	475	486	7.3	5	2
400	415	430	458	490	497	515	547	543	9.3	6.5	2
450	470	485	508	540	557	565	572	-	9.3	6.5	2
500	518	533	561	595	618	625	628	657	9.3	6.5	2
600	618	633	662	695	735	730	745	764	9.3	6.5	2
700	715	738	765	810	805	830	850	879	11.2	8	2
800	815	840	867	915	910	940	970	988	11.2	8	2
900	920	943	970	1,015	1,010	1,040	1,080	1,108	11.2	8	2
1,000	1,020	1,043	1,070	1,120	1,125	1,150	1,190	1,220	11.2	8	2
1,100	1,120	1,143	1,170	1,220	1,225	1,250	1,290	1,220	11.2	8	2
1,200	1,220	1,243	1,270	1,340	1,340	1,360	1,395	1,462	11.2	8	2
1,400	1,420	1,443	1,470	1,545	1,545	1,575	1,615	-	11.2	8	2





As per EagleBurgmann in-house standard WN 39.2 for flanges as defined in ANSI B 16.5 (2009) and MSS SP-4.4

NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]	d <sub>3</sub> [mm]	d <sub>4</sub> [mm]					s <sub>1</sub> approx. [mm]	s <sub>2</sub> [mm]	s <sub>3</sub> [mm]
				Class 150	Class 300	Class 400	Class 600	Class 900			
1/2	16	25	32	45	51	51	51	61	4	3	1
3/4	22	31	39	54	64	64	64	67	4	3	1
1	28	37	45	64	70	70	70	76	4	3	1
1 1/4	35	44	55	73	80	80	80	86	4	3	1
1 1/2	43	52	68	83	93	93	93	95	5	3.5	1.5
2	61	71	82	102	108	108	108	140	4	3	1
2 1/2	77	86	107	121	127	127	127	162	4	3	1
3	88	98	119	134	146	146	146	165	5	3.5	1.5
3 1/2	102	115	128	159	162	159	159	-	5	3.5	1.5
4	113	126	147	172	178	175	191	203	7.3	5	2
5	139	152	173	194	213	210	238	245	7.3	5	2
6	167	180	203	220	248	245	264	286	7.3	5	2
8	219	232	258	277	305	302	318	356	7.3	5	2
10	270	283	305	337	359	356	397	432	7.3	5	2
12	322	337	357	407	419	416	454	496	7.3	5	2
14	365	380	410	448	483	480	489	518	6	5	2
16	415	430	458	512	537	534	562	572	9.3	6.5	2
18	470	485	515	547	594	591	610	635	9.3	6.5	2
20	520	533	561	604	651	645	680	696	9.3	6.5	2
22	560	575	620	658	702	-	-	-	9.3	6.5	2
24	618	633	662	715	772	766	788	835	9.3	6.5	2
26	665	688	715	771	832	822	864	880	11.2	8	2
28	715	738	765	829	895	889	911	943	11.2	8	2
30	770	793	820	880	949	943	968	1,006	11.2	8	2
32	815	840	867	937	1,003	1,000	1,019	1,070	11.2	8	2
34	865	888	915	987	1,054	1,051	1,070	1,133	11.2	8	2
36	920	943	970	1,045	1,114	1,114	1,127	1,197	11.2	8	2
38	965	988	1,015	1,108	1,051	1,070	1,102	1,197	11.2	8	2
40	1,020	1,043	1,070	1,159	1,111	1,124	1,152	1,248	11.2	8	2
48	1,220	1,243	1,270	1,381	1,321	1,343	1,387	1,483	11.2	8	2
52	1,320	1,343	1,380	1,389	1,425	1,451	1,495	-	11.2	8	2

## Burasil and Buratherm gaskets

### Properties

All EagleBurgmann fiber gaskets from the Burasil series are made from high-quality aramid fibers, special fillers and NBR rubber (nitrile butadiene rubber). This combination is supplemented with graphite in the Buratherm seals, creating a high-performance material that outperforms the commonly used Burasil gaskets with respect to temperature and media resistance.

### Advantages

- Easy handling
- Cost-effective sealing solution
- (Very) low gas leakage
- Good media resistance
- Long service life

### Production

The Burasil fiber gasket materials are manufactured in a calendering process. The resulting layered construction allows the technical and physical properties to be optimally matched to the specific application. Buratherm gaskets are manufactured in a multi-stage process.

### Types

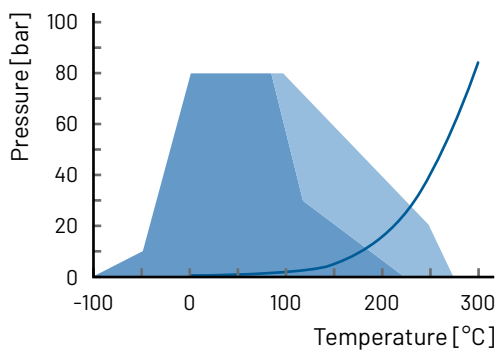
There are two types of fiber gasket which differ in terms of their material composition. The Burasil gaskets use a combination of different fibrous materials, while in the Buratherm products, this combination is supplemented with graphite. Burasil and Buratherm gaskets are available in sheets or in the form of rings, frames, other molded parts or segments. It is also possible to cut the sheets to size on site using suitable tools.

### Range of applications

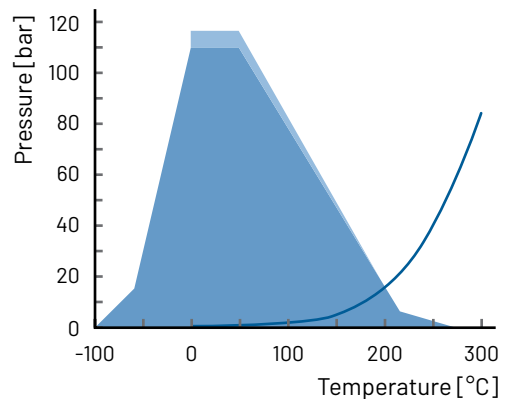
Fiber gaskets are primarily used in the medium temperature and pressure range; they are particularly noted for their non-critical handling and good chemical resistance. Burasil and Buratherm are genuine all-rounders which can be used in almost every industrial sector. With its low chloride and fluoride content, the Burasil universal gasket sheet is also ideal for use in nuclear facilities outside the hot area.

The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.

Pressure/temperature diagram for Burasil Basic 9544/B



Pressure/temperature diagram for Burasil Universal 9544/U



■ Water / water vapor    ■ Other media    ■ Saturated vapor curve

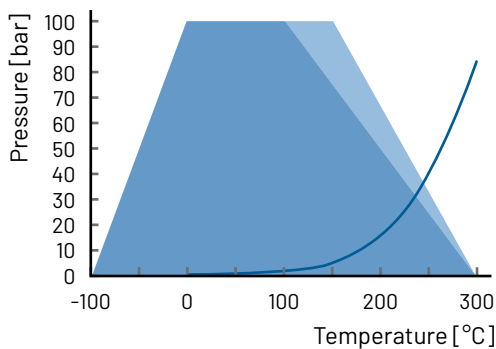
### Key physical characteristics (2.0 mm thick)

		Burasil Basic 9544/B	Burasil Universal 9544/U	Buratherm T 9544/T
ID number	DIN 28 091-2	FA-A1-0	FA-AM1-0	FA-A1-0
Density [g/cm <sup>3</sup> ]	DIN 28 090-2	1.80	1.80	1.00
Tensile strength, lengthwise [MPa]	DIN 52 910	14	27	2.0
Tensile strength, crosswise [MPa]	DIN 52 910	6	10	1.2
Compressive strength $\sigma_{dE/16}$ 175 °C [MPa]	DIN 52 913	25	39	40
Compressive strength $\sigma_{dE/16}$ 300 °C [MPa]	DIN 52 913	-	25	38
Compressibility [%]	ASTM F 36 J	9	6	45
Resiliency [%]	ASTM F 36 J	55	60	8
Cold compressibility $\epsilon_{KSW}$ [%]	DIN 28090-2	8.5	6	6
Cold recovery $\epsilon_{KRW}$ [%]	DIN 28090-2	5.1	3	3
Hot creep $\epsilon_{WSW}$ [%]	DIN 28090-2	25	6	6
Hot recovery $\epsilon_{WRW}$ [%]	DIN 28090-2	1.2	2	2
Recovery R [mm]	DIN 28090-2	0.04	0.04	0.04
Specific leakage rate [mg/(m·s)]	DIN 3535-6	≤0.1	≤0.1	≤0.1
Specific leakage rate $\lambda_{z,0}$ [mg/(m·s)]	DIN 28090-2	0.1	0.1	≤0.1
Chemical resistance ASTM IRM 903 - Change in weight 5 h/150 °C	ASTM F 146	7 %	6 %	≤45 %
Chemical resistance ASTM IRM 903 - Change in thickness 5 h/150 °C	ASTM F 146	8 %	2 %	≤2 %
Chemical resistance ASTM Fuel B - Change in weight 5 h/23 °C	ASTM F 146	9 %	7 %	≤40 %
Chemical resistance ASTM Fuel B - Change in thickness 5 h/23 °C	ASTM F 146	10 %	6 %	≤2 %
Chloride content (water soluble)	Siemens AV-9-014	≤150 ppm	≤100 ppm	≤50 ppm

### m and y factors as defined in ASME Boiler and Pressure Vessel Code

Thickness [mm]	Burasil Basic 9544/B			Burasil Universal 9544/U			Buratherm T 9544/T		
	m	y [psi]	y [MPa]	m	y [psi]	y [MPa]	m	y [psi]	y [MPa]
1.0	-	-	-	2.5	3,625	25	2.8	4,930	34
1.5	2.0	3,626	25	2.5	3,190	22	-	-	-
2.0	2.0	4,206	29	2.5	3,190	22	2.8	5,220	36
3.0	2.2	4,641	32	2.5	4,350	30	2.8	5,655	39

Pressure/temperature diagram for Burasil Universal 9544/T





### Advantages

- Good media resistance
- Low gas leakage
- Good compressive strength
- Cost-effective sealing solution

## Burasil Basic 9544/B

### Features

Burasil Basic 9544/B is a soft gasket made from high-quality aramid fibers, fillers and NBR rubber (nitrile butadiene rubber), with anti-stick coating on one side. Burasil Basic 9544/B is a standard gasket with a balanced mixture of raw materials for flange and flange-like connections in the medium pressure and temperature range.

### Operating range

Pressure:  $p = 80$  bar  
Temperature

- Continuous operation:  $t = -50$  °C ...  $+220$  °C
- transient peak temperature:  $t = +280$  °C

Recommended surface roughness:  
 $R_z = 12.5$  ...  $50$   $\mu\text{m}$

Resistant to a variety of aqueous solutions and various chemicals, fuels, oils, solvents and gaseous media.

### Recommended applications

Industries

- Process industry
- Pulp and paper industry
- Water and waste water technology
- Mining
- Building services engineering
- Shipbuilding
- Metal production and processing

### Standards and releases

- TA Luft
- DVGW
- ELL

### Available dimensions

- Sheets: 1,500 x 1,500 mm  
0.3 / 0.5 / 1.0 / 1.5 / 2.0 / 3.0 / 4.0 / 5.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)



### Advantages

- Good tensile strength
- Universal, can even be used in nuclear applications (not in the hot area)
- PTFE coating on both sides for easy removal

## Burasil Universal 9544/U

### Features

The Burasil Universal 9544/U is a soft gasket made from high-grade aramid fibers and special functional fillers with NBR rubber (nitrile butadiene rubber). The surfaces of Burasil Universal 9544/U gaskets are coated with PTFE on both sides for ease of removal. The Burasil Universal 9544/U is a genuine all-rounder and is particularly suitable for use in sealed connections subject to high thermal and mechanical stresses.

### Operating range

Pressure:  $p = 120$  bar  
Temperature

- Continuous operation:  $t = -100$  °C ...  $+260$  °C
- transient peak temperature:  $t = +380$  °C

Recommended surface roughness:  
 $R_z = 20$  ...  $60$   $\mu\text{m}$

Resistant to water/water vapor, aqueous solutions, acids, lyes, oils/refrigerants, solvents and gases.

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Metal production and processing
- Nuclear facilities

### Standards and releases

- TA Luft
- BAM (upon request)
- DVGW
- ELL
- WRAS
- EC 1935/2004 - W270

### Available dimensions

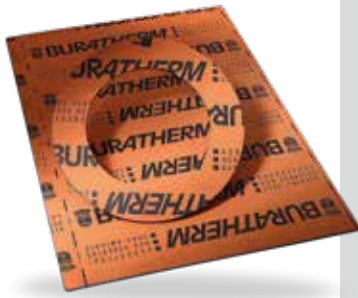
- Sheets: 1,500 x 1,500 mm  
0.3 / 0.5 / 0.75 / 1.0 / 1.5 / 2.0 / 2.5 / 3.0 / 4.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)

### Burasil Basic 9544/B variants

Form as supplied	
Sheets	9544/BP
Rings and molded parts	9544/BR
Rings with inner eyelet	9544/BRIG
Frame	9544/BRA
Segments	9544/BS

### Burasil Universal 9544/U variants

Form as supplied		with PTFE wrapper
Sheets	9544/UP	-
Rings and molded parts	9544/UR	9544/URUTH
Rings with inner eyelet	9544/URIG	-
Frame	9544/URA	9544/URAUTH
Segments	9544/US	-



### Advantages

- The most highly adaptable of all the fiber gaskets due to its low density
- Easy handling
- Easy to process

## Buratherm T 9544/T

### Features

Buratherm T 9544/T is a gasket sheet made from graphite and high-grade aramid fibers with a special anti-stick surface coating.

### Operating range

Pressure:  $p = 150 \text{ bar}$

Temperature

- Continuous operation:  $t = -100 \dots +350^\circ\text{C}$
- Transient peak temperature:  $t = +380^\circ\text{C}$
- Steam:  $t_{\text{max}} = +360^\circ\text{C}$

Recommended surface roughness:

$R_z = 20 \dots 60 \mu\text{m}$

Resistant to oils, water, steam, weak acid and lyes. Particularly suitable for steam applications.

### Recommended applications

Industries

- Process industry
- Chemical industry
- Power plant technology
- Water and waste water technology
- Building services engineering

### Available dimensions

- Sheets:  $2,000 \times 1,500 \text{ mm}$   
0.5 / 1.0 / 1.5 / 2.0 / 3.0 mm thick
- Rings and molded parts:  
Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)



### Buratherm T 9544/T variants

#### Form as supplied

Sheets	9544/TP
Rings and molded parts	9544/TR
Rings with inner eyelet	9544/TRIG
Frame	9544/TRA
Segments	9544/TS



## PTFE gaskets

### Properties

All EagleBurgmann PTFE gaskets are made exclusively from high-grade raw materials that are guaranteed to meet the most stringent requirements in terms of safety and reliability. We distinguish between monodirectional and multidirectional PTFE; these differ both in how they are manufactured and in their sealing properties.

### Advantages

- Highly chemical resistant: pH 0 to 14
- Resistant to ageing
- Excellent adaptability to surface irregularities and roughness
- Good workability – easy to cut and punch
- Temperature stability range from -270 °C to +280 °C transient peaks up to +315 °C
- Monodirectional PTFE is supplied after contraction
- Flame retardant
- Antiadhesive
- Biologically inert
- High mechanical resistance

### Production

Monodirectional PTFE is heated during manufacturing and drawn in one direction; it is then stored for several weeks to allow it to contract. Monodirectional PTFE products from EagleBurgmann are not released for delivery to customers until the contraction process is complete to ensure that there is no further loss of volume.

Multidirectional PTFE is stretched many times in a special method and is joined to create a homogeneous gasket sheet in a heating method. This makes it very strong transversely and longitudinally and thus greatly reduces creep behavior under load and temperature; it also avoids cold flow. Multidirectional PTFE adapts excellently to uneven surfaces and can even compensate for large gaps, depending on the gasket thickness.

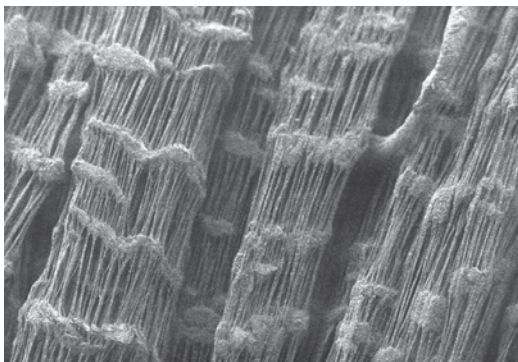
### Types

The EagleBurgmann product portfolio for PTFE gaskets ranges from sheets made from 100% pure PTFE, includes modified materials through to multidirectional expanded gasket sheets and tapes. The filled PTFE products from the Burachem series are specially modified gasket sheets which are combined with various functional fillers to greatly reduce the cold flow typical of PTFE. The resulting material characteristics offer high compressive strength combined with excellent chemical resistance. The expanded PTFE products are divided into monodirectional and multidirectional products. These have different manufacturing methods which create the products' special properties.

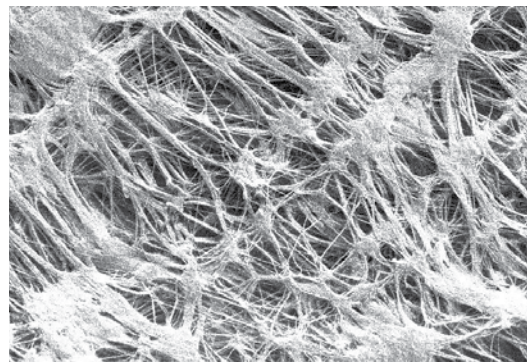
### Range of applications

Due to their outstanding chemical resistance, EagleBurgmann PTFE gaskets are frequently used in demanding applications in the chemical, pharmaceutical and processing industries. The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.

Monodirectional PTFE



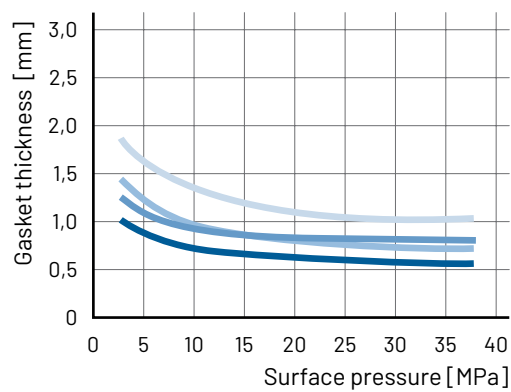
Multidirectional PTFE



### Key physical characteristics (thickness 2.0 mm)

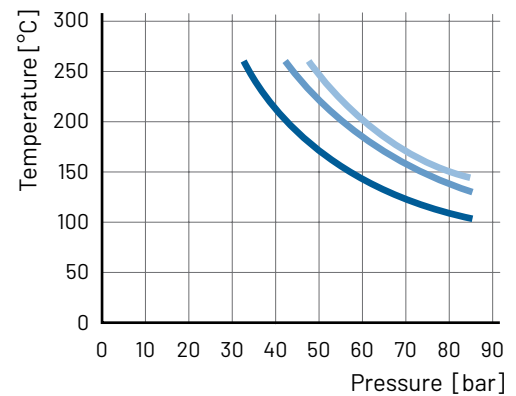
	9655/B	9655/R	9655/W
Color	Blue	Brown	White
Filler	Hollow glass microbeads	Silicate	Barium sulfate
Tolerances - Thickness	DIN 28091-1	DIN 28091-1	DIN 28091-1
ID number	TF - G - 0	TF - M - 0	TF - M - 0
Density [g/cm <sup>3</sup> ]	DIN 28 090-2 1.5	2.1	2.9
Tensile strength [MPa]	DIN 52 910 15	17	18
Compressive strength $\sigma_{dE/16}$ [MPa] (150 °C, 30 MPa, 16 h)	DIN 52 913 14	16	14
Compressibility [%]	ASTM F 36 M 35	5	3
Resiliency [%]	ASTM F 36 J 30	45	45
Cold compressibility $\epsilon_{KSW}$ [%]	DIN 28 090-2 24	3	3
Cold recovery $\epsilon_{KRW}$ [%]	DIN 28 090-2 6	1	1
Hot creep $\epsilon_{WSW}$ [%]	DIN 28 090-2 35	20	40
Hot recovery $\epsilon_{WRW}$ [%]	DIN 28 090-2 6	3	4
Specific leakage rate [mg/(s·m)]	DIN 3535-6 < 0.015	< 0.015	< 0.015

**Burachem Multi 9654/MP – Reduction in thickness in relation to surface pressure and temperature**

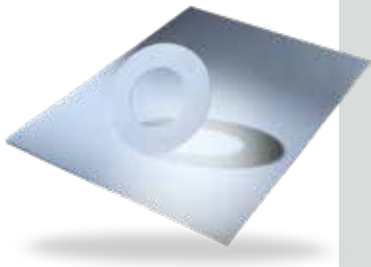


— 3 mm at 20 °C      — 3 mm at 150 °C  
— 2 mm at 20 °C      — 2 mm at 150 °C

**Temperature stability of the Burachem products with filler (Burachem 9655/B, W and R) in relation to pressure and gasket thickness**



— 1 mm      — 2 mm      — 3 mm



### Advantages

- Good adaptability
- Low friction

## Burachem V 9655/V

### Features

Burachem V 9655/V is a gasket sheet based on 100% pure, virgin PTFE. The product contains no added filler or reinforcement.

### Operating range

Pressure: Depends exclusively on the installation and operating parameters (please read our installation and maintenance instructions)

Temperature:

- Continuous operation:  
t = -240 °C ... 260 °C
- transient peak temperature:  
t = +315 °C

Recommended surface

roughness:

R<sub>z</sub> = 12.5 ... 50 µm

Chemical resistance:

pH = 0 ... 14

Universal chemical resistance, so resistant to most acids and alkalis.

Not suitable for use in hydrogen fluoride, fluorine compounds or in molten alkali metals.

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Food industry

### Standards and releases

- FDA

### Available dimensions

- Sheets: 1,500 x 1,500 mm  
1.5 / 2.0 / 3.0 thick  
1,200 x 1,200 mm  
0.5 / 0.8 / 1.0 / 1.5 / 2.0 / 3.0 / 4.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)



### Burachem V 9655/V variants

#### Form as supplied

Sheets	9655/VP
Rings and molded parts	9655/VR
Rings with inner eyelet	9655/VRIG
Frame	9655/VRA
Segments	9655/VS



#### Advantages

- Good adaptability means that only low bolt forces are needed
- Intended for use in enamel flanges

## Burachem Blue 9655/B

#### Features

Burachem Blue 9655/B is a PTFE-based gasket sheet filled with hollow glass microbeads. Burachem B impresses with its high chemical resistance and offers outstanding adaptability compared to similar PTFE-based sheets.

Burachem Blue 9655/B seals with relatively low surface pressure, making it especially suitable for applications that offer only low bolt forces.

#### Operating range

Pressure:  $p = 55$  bar

Temperature

- Continuous operation:  $t = -210\text{ °C} \dots +260\text{ °C}$

Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Universal chemical resistance, so resistant to most acids and alkalis.

Not suitable for use in hydrogen fluoride, fluorine compounds or in molten alkali metals.

#### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Food industry

#### Standards and releases

- FDA
- TA Luft
- Germanischer Lloyd
- EC 1935/2004

#### Available dimensions

- Sheets:  $1,200 \times 1,200$  mm  
1.0 mm thick  
 $1,500 \times 1,500$  mm  
/ 1.5 / 2.0 / 3.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)



#### Advantages

- Ideal gasket for standardization due to wide range of applications

## Burachem Brown 9655/R

#### Features

Burachem Brown 9655/R is a PTFE-based gasket sheet filled with silicate. Burachem Brown 9655/R can be used in considerably higher pressure/temperature ranges compared to conventional PTFE. It is the ideal gasket for standardization as Burachem Brown 9655/R offers a wide range of chemical and mechanical properties.

#### Operating range

Pressure:  $p = 83$  bar

Temperature

- Continuous operation:  $t = -210\text{ °C} \dots +260\text{ °C}$

Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Universal chemical resistance, even to concentrated acids and alkalis.

Not suitable for use in hydrogen fluoride, fluorine compounds or in molten alkali metals.

#### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Food industry

#### Standards and releases

- FDA
- TA Luft
- BAM (upon request)
- DVGW
- Germanischer Lloyd
- EC 1935/2004

#### Available dimensions

- Sheets:  $1,200 \times 1,200$  mm  
1.0 mm thick  
 $1,500 \times 1,500$  mm  
/ 1.5 / 2.0 / 3.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)

### Burachem Blue 9655/B variants

#### Form as supplied

Sheets	9655/BP
Rings and molded parts	9655/BR
Rings with inner eyelet	9655/BRIG
Frame	9655/BRA
Segments	9655/BS

### Buratherm T 9544/T variants

#### Form as supplied

Sheets	9655/RP
Rings and molded parts	9655/RR
Rings with inner eyelet	9655/RRIG
Frame	9655/RRA
Segments	9655/RS



### Advantages

- Minimum cold flow properties
- High density

## Burachem White 9655/W

### Features

Burachem White 9655/W is a PTFE-based gasket sheet with a barium sulfate filler. The material's high density creates the optimum conditions for use in applications subject to high mechanical stresses.

### Operating range

Pressure:  $p = 83$  bar

Temperature

- Continuous operation:  
 $t = -210\text{ °C} \dots +260\text{ °C}$

Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Universal chemical resistance, so resistant to most acids and alkalis.

Not suitable for use in hydrogen fluoride, fluorine compounds or in molten alkali metals.

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Food industry

### Standards and releases

- FDA
- TA Luft
- DVGW
- EC 1935/2004

### Available dimensions

- Sheets:  
1,200 x 1,200 mm  
1.0 mm thick  
1,500 x 1,500 mm  
/ 1.5 / 2.0 / 3.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)



### Advantages

- Maximum adaptability
- High dimensional stability
- Outstanding compressive strength
- Can be easily cut to size using hand tools

## Burachem Multi 9654/M

### Features

Burachem Multi 9654/M gasket sheet made from 100% pure ePTFE. The special manufacturing method creates a multidirectional fibrillated structure (ePTFE) which gives the gasket its exceptional properties.

### Operating range

Pressure:  $p = 200$  bar

Temperature

- Continuous operation:  
 $t = -270\text{ °C} \dots +270\text{ °C}$
- transient peak temperature:  
 $t = +315\text{ °C}$

Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Universal chemical resistance, even to concentrated acids and alkalis.

Not suitable for use in dissolved and molten alkali metals or in elementary fluorine at  $T > 150\text{ °C}$  and  $p > 40$  bar.

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Food industry

Components

- Maintenance seal

### Standards and releases

- FDA
- TA Luft
- BAM (upon request)
- EC 1935/2004
- Blow-out resistance (VDI 2200)

### Available dimensions

- Sheets:  
1,500 x 1,500 mm  
0.5 / 1.0 / 1.5 / 2.0 / 3.0 / 4.0 /  
5.0 / 6.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)

### Burachem White 9655/W variants

#### Form as supplied

Sheets	9655/WP
Rings and molded parts	9655/WR
Rings with inner eyelet	9655/WRIG
Frame	9655/WRA
Segments	9655/WS

### Burachem Multi 9654/M variants

#### Form as supplied

Sheets	9655/MP
Rings and molded parts	9655/MR
Rings with inner eyelet	9655/MRIG
Frame	9655/MRA
Segments	9655/MS





# Statotherm graphite gasket sheets

### Properties

All EagleBurgmann Statotherm products are made from high-purity, expanded graphite that is subject to strictly controlled quality requirements. The graphite used is carefully selected and is produced especially for sealing applications. The performance and service life of graphite seals is determined by a large number of factors, including the seal construction, the operating cycle and the installation method. However, the most critical factors are the effects of impurities that lead to corrosion of metal components and the action of oxygen which, in turn, accelerates the loss of volume of the sealing element.

### Advantages

- Permanently elastic, particularly when exposed to temperature fluctuations
- Does not harden
- Resistant to ageing
- Excellent adaptability to surface irregularities and roughness
- High resilience (recovery = approx. 10 %)
- Tested for fire resistance, up to +900 °C (transient peak value)
- Good heat conductivity
- Good workability – easy to cut and punch
- High compressive strength – according to the seal design up to 1,000 bar
- High temperature stability: -200 °C to +550 °C (+3,000 °C possible in a reducing or inert gas atmosphere)
- Highly chemical resistant: pH 0 to 14

### Production

The manufacturing process for graphite gaskets incorporates multiple sub-steps. First, acids (most commonly sulfuric acid) are intercalated into the molecular structure of the unprocessed graphite. The subsequent thermal shock treatment creates expanded graphite. The result is the formation of loosely held together "graphite worms". The volume of the graphite is thus many times greater, which means it can then be easily compressed or molded. These molded parts are permanently elastic and can be molded without the use of binders. Corrosion inhibitors are added if necessary to extend the service life and protect the environment.



### Types

Graphite sheets can be made unreinforced, metal-reinforced and/or impregnated; they may be reinforced with tanged or expanded metal inserts or smooth stainless steel foils. A special impregnating agent increases the strength, gas tightness and scratch-resistance of the gasket and creates a non-adhesive surface.

The various reinforcements used in the sheets provide different leakage properties of the seals. For example, tanged inserts create force peaks, while expanded metal inserts create closed force lines.

### Range of applications

EagleBurgmann Statotherm products, fillers for Spiraltherm seals and soft material overlays for serrated gaskets have proven to be long-lived and reliable for many years across all industries, even under extreme pressure and temperature conditions. They are primarily used in high temperature and pressure areas. The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.



### Low-emission graphite gaskets

With their extraordinarily low leakage rates, Statotherm products from the category of low-emission graphite gaskets make an active contribution to protecting the environment. This is of particular importance in chemical and petrochemical facilities due to the critical process media. EagleBurgmann low-emission graphite gaskets are high quality sealing products that meet the most stringent requirements of VDI 2290, EN 1591-1 and TA Luft, the German technical instructions on air quality control. The associated key values and certificates can also be consulted online using the seals database of the Physical Engineering Department at Münster Technical College. In addition to the high quality of the sealing element, VDI 2290 also places emphasis on the quality of the seal's installation in practice. EagleBurgmann therefore offers TÜV-certified and EN 1591-4 compliant training courses for the assembly personnel of end customers and service companies.



## Statotherm graphite gasket sheets

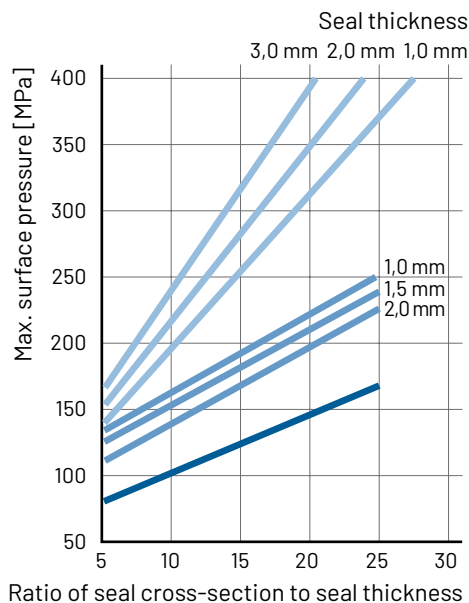
### Key physical characteristics (2.0 mm thick)

		Statotherm P Foil 9591	Statotherm 1P 9593/1	Statotherm S6P 9593/S6
Bulk density of the graphite [g/cm <sup>3</sup> ]		1.0	1.0	1.0
Ash content of the graphite [%]	DIN 51 903	≥ 2.0	≥ 2.0	≥ 2.0
Purity [%]		≥ 98	≥ 98	≥ 98
Total chloride content [ppm]		≥ 25	≥ 25	≥ 50
Total halogen content [ppm]		≥ 100	≥ 100	≥ 200
Total sulfur content [ppm]		< 300	< 300	
Total loss to the air at 670 °C: [%/h]		< 4	< 4	< 4
Oxidation inhibitor		Yes	Yes	Yes
Passive corrosion inhibitor	ASTM F2168-13	Yes	Yes	Yes
Metal insert		-	Stainless steel sheet	Stainless steel tanged insert
ASTM material number		-	316 (L)	316 (L)
Thickness (mm)		-	0.05	0.1
Number		-	1	1
Compressive strength $\sigma_{dE/16}$ [MPa] (300 °C, 50 MPa, 16 h)	DIN 52 913	≥ 47	≥ 45	≥ 45
Cold compressibility $\epsilon_{KSW}$ [%]	DIN 28090-2	45	40	40
Cold recovery $\epsilon_{KRW}$ [%]	DIN 28090-2	5	4	4
Hot creep $\epsilon_{WSW}$ [%]	DIN 28090-2	< 3	< 5	< 4
Hot recovery $\epsilon_{WRW}$ [%]	DIN 28090-2	4	3	4
Compressibility [%]	ASTM F36	45	40	40
Resiliency [%]	ASTM F36	11	12	12

### m and y factors as defined in ASME Boiler and Pressure Vessel Code

Thickness [mm]	Statotherm P Foil 9591			Statotherm 1P 9593/1			Statotherm S6P 9593/S6			Statotherm S5Ppro 9593/S5pro		
	m	y [psi]	y [MPa]	m	y [psi]	y [MPa]	m	y [psi]	y [MPa]	m	y [psi]	y [MPa]
1.0	2.0	1,500	10.34	2.0	900	6.21	2.5	3,000	20.68	-	2,000	13.79
1,5 <sup>1)</sup>	2.0	1,500	10.34	2.0	900	6.21	2.5	3,000	20.68	-	2,000	13.79
2.0	2.0	1,500	10.34	2.0	900	6.21	2.5	3,000	20.68	2.5	2,000	13.79
3.0	2.0	1,500	10.34	2.0	900	6.21	2.5	3,000	20.68	2.5	2,000	13.79

<sup>1)</sup> 1.6 for Statotherm SSTC-TAL 9592/P



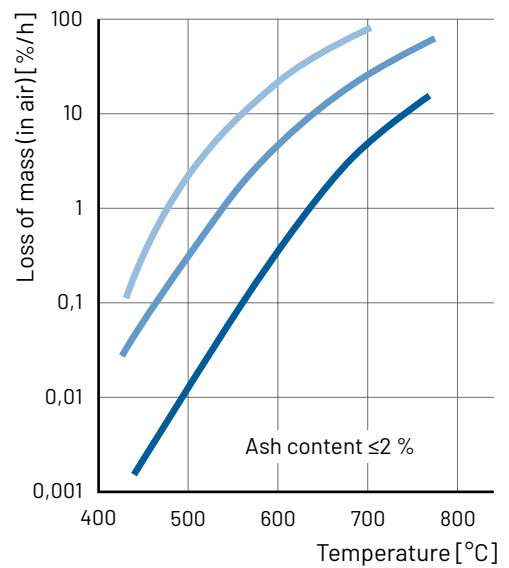
Surface pressure for the various Statotherm grades in relation to the ratio of seal cross-section  $b_D$  to seal thickness  $s$ .

- Statotherm 9593/HD stainless steel insert, without adhesive
- All Statotherm grades, with tanged insert e.g. Statotherm 9593/S6P
- All Statotherm grades:
  - impregnated
  - metal-reinforced or bonded
  - no reinforcement e.g. Statotherm 9593/1P

Statotherm S5pro 9593/S5pro	Statotherm SSTC-TAL 9592	Statotherm HD 9593/HD
1.0	1.37	1.1
≥ 2.0		≥ 0.15
≥ 98	> 99	≥ 99.85
≥ 25	≥ 50	≥ 10
≥ 70		≥ 40
< 300		< 300
< 4		< 4
Yes		Yes
Yes		Yes
Stainless steel tanged insert	Stainless steel expanded metal insert	Stainless steel plain insert
316(L)	316(L)	316(L)
0.1	0.4	0.05
1	1	3
≥ 45	≥ 45	≥ 48
40	36	35
5	5	5
< 5	3	< 3
5	4	4
40	37	35
12	17	15

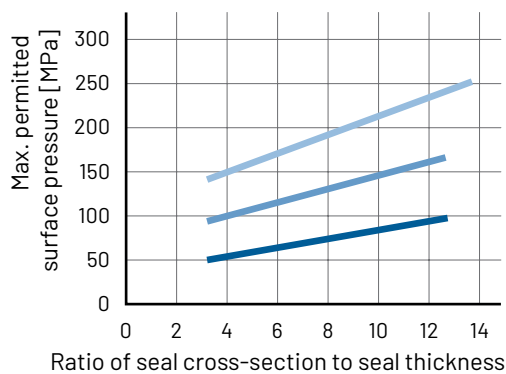
Statotherm SSTC-TAL 9592			Statotherm HDP 9593/HD		
m	y [psi]	y [MPa]	m	y [psi]	y [MPa]
-	-	-	2.5	3,000	20.68
2.3	1,305	9	2.5	3,000	20.68
2.3	1,450	10	2.5	3,000	20.68
2.3	1,885	13	2.5	3,000	20.68

Loss of mass in relation to the prevailing operating temperature illustrated for various graphite grades



- Low grade graphite
- Standard grade graphite
- Top grade graphite

Maximum permitted load on the seal  $\sigma_{B0}$  as per DIN 28090-1 (300 °C)



### Sealing properties

At maximum surface pressure  $Q_{max}$ , Statotherm is compressed to roughly half of its initial thickness, and thus reaches its maximum cross-sectional stability. For gaskets with metal insert the compression relates to the thickness of the graphite layer.

- Statotherm 9593/HD
- Statotherm 9593/S6P
- Statotherm 9593/1P





### Advantages

- High flexibility
- Ease of use
- No measurable cold or warm flow

## Statotherm P Foil 9591

### Features

Statotherm P Foil 9591 is a gasket sheet consisting of unreinforced, flexible graphite foil with a purity of  $\geq 99.85\%$  and a low ash content. Statotherm P foil 9591 a basic gasket material without measurable cold or warm flow, making it usable as a gasket material for fittings and pumps in all branches of industry (especially for emergency repairs and complicated shapes). Equates to the SGL Sigraflex standard.

### Operating range

Pressure:  $p = 40$  bar

Temperature

- Continuous operation:  $t = -250$  °C ...  $+450$  °C
- Steam:  $t_{\max} = +550$  °C

Recommended surface roughness:

$R_z = 12.5 \dots 50 \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $\text{O}_3$ )  $> 150$  °C.

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Water and waste water technology
- Building services engineering
- Shipbuilding
- Metal production and processing

### Standards and releases

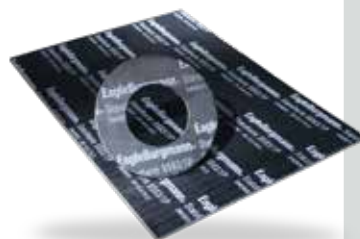
- BAM (upon request)
- DVGW

### Available dimensions

- Sheets:  $1,000 \times 1,000$  mm  
0.5 / 1.0 / 1.5 / 2.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)

### Note

For safe operation, always use seals that are dry and undamaged.



### Advantages

- No embrittlement
- Outstanding oxidation resistance
- Can be used in fragile flanged connections

## Statotherm 1P 9593/1

### Features

Statotherm 1P 9593/1P is a gasket sheet made from flexible, expanded graphite foils (purity  $> 98\%$ ) which can be combined with a stainless steel sheet insert (material: 316 (L), 0.05 mm thick). Statotherm 1P 9593/1P is a gasket with a particularly adaptable graphite overlay that allows it to be used with low surface pressures and in fragile flanged connections.

### Operating range

Pressure:  $p = 40$  bar

Temperature

- Continuous operation:  $t = -200$  °C ...  $+400$  °C
- Steam:  $t_{\max} = +550$  °C
- Inert environment:  $t_{\max} = +550$  °C

Recommended surface roughness:

$R_z = 12.5 \dots 50 \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $\text{O}_3$ )  $> 150$  °C.

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology

### Available dimensions

- Sheets:  $1,000 \times 1,000$  mm and  $1,500 \times 1,500$  mm  
1.0 / 1.5 / 2.0 / 3.0 / 4.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)

### Note

For safe operation, always use seals that are dry and undamaged.

### Statotherm P Foil 9591 variants

Form as supplied	
Sheets	9591/P
Rings and molded parts	9591/R
Rings with inner eyelet	9591/RIG
Frame	9591/RA
Segments	9591/S

### Statotherm 1P 9593/1 variants

Form as supplied	
Sheets	9593/1P
Rings and molded parts	9593/1R
Rings with inner eyelet	9593/1RIG
Frame	9593/1RA
Segments	9593/1S



#### Advantages

- Good oxidation resistance
- High mechanical strength

## Statotherm S6P 9593/S6

#### Features

Statotherm S6 9593/S6 is a gasket sheet made from flexible graphite (purity > 98.0 %), reinforced with stainless steel tanged insert (material 316 (L), 0.1 mm thick). The outstanding properties of the Statotherm S6P 9593/S6P are especially useful in pipe flanges, hand holes and flanged connections on pumps, valves, slide valves and ball valves.

#### Operating range

Pressure:  $p = 100 \text{ bar}$

Temperature

- Continuous operation:  $t = -200 \text{ °C} \dots +500 \text{ °C}$
- Steam:  $t_{\text{max}} = +550 \text{ °C}$

Recommended surface

roughness:

$R_z = 12.5 \dots 50 \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $\text{O}_3$ ) > 150 °C.

#### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Pulp and paper industry
- Mining
- Building services engineering
- Metal production and processing

#### Available dimensions

- Sheets: 1,500 x 1,500 mm  
1.0 / 1.5 / 2.0 / 3.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)



#### Advantages

- Good compressive strength
- Outstanding oxidation resistance
- High seal tightness to reduce emissions

## Statotherm 5pro 9593/5pro

#### Features

Statotherm 5pro 9593/5pro an adhesive-free graphite gasket sheet made from flexible graphite foil reinforced with one or two stainless steel 316 tanged inserts. The gasket sheet is impregnated to improve handling and reduce leakage. Equates to the SGL Sigraflex Universal Pro.

#### Operating range

Pressure:  $p = 100 \text{ bar}$

Temperature

- Continuous operation:  $t = -250 \text{ °C} \dots +450 \text{ °C}$
- Steam:  $t_{\text{max}} = +550 \text{ °C}$

Recommended surface

roughness:

$R_z = 12.5 \dots 50 \mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $\text{O}_3$ ) > 150 °C.

#### Recommended applications

Industries

- Petrochemical industry
- Chemical industry
- Refinery

#### Standards and releases

- TA Luft
- BAM (upon request)
- DVGW
- Fire-safe (API 607)
- Blow-out resistance (TÜV Süd)

#### Available dimensions

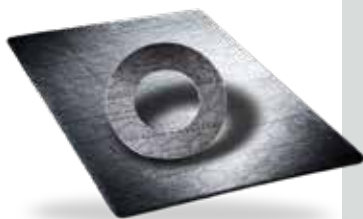
- Sheets: 1,000 x 1,000 mm and 1,500 x 1,500 mm  
1.6 / 2.0 / 3.0 mm thick
- Rings and molded parts: Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)

### Statotherm S6P 9593/S6 variants

Form as supplied	
Sheets	9593/S6P
Rings and molded parts	9593/S6R
Rings with inner eyelet	9593/S6RIG
Frame	9593/6RA
Segments	9593/6S

### Statotherm 5pro 9593/5pro variants

Form as supplied	Adhesive-free	Bonded
Sheets	9593/5proP	9593/5P
Rings and molded parts	9593/5proR	9593/5R
Rings with inner eyelet	9593/5proRIG	9593/5RIG
Frame	9593/5proRA	9593/5RA
Segments	9593/5proS	9593/5S



### Advantages

- Optimum distribution of the surface pressure
- High seal tightness to reduce emissions

## Statotherm SSTC-TAL 9592

### Features

Statotherm SSTC-TAL 9592 is a high-performance seal material made from flexible, expanded graphite (purity > 99 %). It is impregnated with a three-dimensional expanded metal insert made from chromium-nickel steel (1.4404, AISI 316 (L)). The combination of performance-optimised impregnation and expanded metal insert to create a seal allows it to be used universally as defined in the TA Luft. Equates to the Frenzelit Novaphit SSTC-TA-L.

### Operating range

Pressure:  $p = 200$  bar

Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C

Recommended surface roughness:

$R_z = 12.5$  ...  $50$   $\mu$ m

Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $O_3$ ) >  $150$  °C.

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology

### Standards and releases

- TA Luft
- BAM (upon request)
- DVGW
- Fire-safe (API 607, BS6755)
- Blow-out resistance (VDI 2200, class C)
- VP 401

### Available dimensions

- Sheets:  $1,000 \times 1,000$  mm  
1.0 / 1.6 / 2.0 / 3.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)

### Note

For safe operation, always use seals that are dry and undamaged.



### Advantages

- Very high maximum surface pressure
- No embrittlement (contains no adhesive)
- High mechanical strength

## Statotherm HD 9593/HD

### Features

Statotherm HD 9593/HD is a reinforced, multilayer graphite gasket sheet made from 0.5 mm thick layers of high quality impregnated graphite foil (purity  $\geq 99.85$  %) combined without adhesive with 0.05 mm thick stainless steel foil layers (AISI 316 (L)). Statotherm HD 9593/HD is outstanding for use in applications where high surface pressures are combined with high operating pressure. This seal is particularly useful where there are increased requirements in terms of seal tightness and operational safety. Equates to the SGL Sigraflex Hochdruck.

### Operating range

Pressure:  $p = 250$  bar

Temperature

- Continuous operation:  $t = -250$  °C ...  $+450$  °C
- Steam:  $t_{max} = +550$  °C

Recommended surface

roughness:

$R_z = 12.5$  ...  $50$   $\mu$ m

Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

Not suitable for use in highly oxidizing media or in elementary fluorine, bromine, sulfur trioxide or ozone ( $O_3$ ) >  $150$  °C.

### Recommended applications

Industries

- Building services engineering
- Power plant technology

### Standards and releases

- TA Luft in various flanged versions and unflanged for tongue-and-groove flanges
- BAM (upon request)
- DVGW
- Fire-safe (API 607)
- Blow-out resistance (TÜV Süd)
- Germanischer Lloyd
- TRD 401

### Available dimensions

- Sheets:  $1,000 \times 1,000$  mm,  $1,500 \times 1,500$  mm  
1.0 / 1.5 / 2.0 / 3.0 / 4.0 mm thick
- Rings and molded parts:  
Standard dimensions  
as per DIN EN 1514-1 or  
ASME B16.21 (see page 48 ff.)
- Manhole gasket  
to TRD 401, 3.0 mm thick

### Note

For safe operation, always use seals that are dry and undamaged.

### Statotherm SSTC-TAL 9592 variants

Form as supplied	Standard	Special impregnating agent conforming to TA Luft
Sheets	9592/MP	9592/P
Rings and molded parts	9592/MR	9592/R
Rings with inner eyelet	9592/MRIG	9592/RIG
Frame	9592/MRA	9592/RA
Segments	9592/MS	9592/S

### Statotherm HD 9593/HD variants

Form as supplied	Standard	Special impregnating agent conforming to TA Luft
Sheets	9593/HDP	9593/HDproP
Rings and molded parts	9593/HDR	9593/HDproR
Rings with inner eyelet	9593/HDRIG	9593/HDproRIG
Frame	9593/HDRA	9593/HDproRA
Segments	9593/HDS	9593/HDproS
Manhole gasket	9593/HDMH	9593/HDproMH



Sulfur < 200 ppm,  
Water-soluble sulfates < 100 ppm

Sulfur < 200 ppm,  
Water-soluble sulfates < 50 ppm

9593/HDOP	-
9593/HDOR	9593/HDXRR
9593/HDORIG	-
9593/HDORA	-
9593/HDOS	-
9593/HDOMH	-



## Statotherm mica gaskets

### Production

Mica gaskets are manufactured from phlogopite mica paper impregnated with a silicone binder. It has a lamellar, non-fibrous structure; the silicate layer lattice makes it highly fissile.

### Advantages

- Optimum temperature stability
- Non-combustible
- Weight loss of less than 5% at 800 °C
- Resistant to chemicals even in gaseous media

### Types

Corrugated ring inserts, eyelets and/or tanged inserts made from particularly heat-resistant steel can be used to reinforce the gasket mechanically, thus achieving greater stability. Mica gaskets are available in sheets or in the form of rings, frames, other molded parts or segments. It is also possible to cut the sheets to size on site using suitable tools.

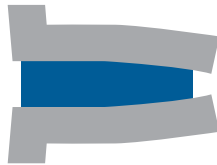
### Range of applications

EagleBurgmann mica gaskets were developed for applications with particularly high temperatures of up to 1,200 °C and tend to be used in hot gas areas. Mica gaskets are therefore used in the automotive industry, in gas turbines, oil burners and heat exchangers. In areas of application with aggressive substances, the chemical resistance of both the mica and the metal reinforcing and flanging elements must be taken into account, however.

The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.



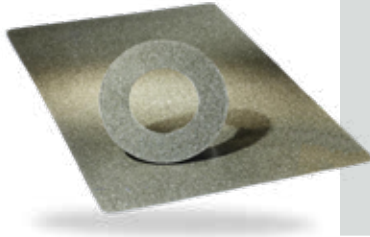
Condition of the flange before operation



Condition of the flange in use, subject to the effects of temperature







### Advantages

- Extreme temperature stability
- Active expansion behavior when exposed to high temperatures
- Good chemical resistance

## Statotherm HT 9560

### Features

Statotherm HT 9560 is a gasket made from particularly heat-resistant natural mica. The outstanding thermoactive sealing behavior (from around 600 °C) is achieved through a specially developed treatment. The material's expansion ratio actively counteracts any loss of surface pressure, which in turn guarantees the tightness and stability that the gasket needs for sealing even extreme conditions.

### Operating range

Pressure: p = 5 bar

Temperature

- Continuous operation:  $t_{max} = +950\text{ °C}$
- Inert environment:  $t_{max} > 1,200\text{ °C}$

Recommended surface roughness:

$R_z = 40 \dots 60\ \mu\text{m}$

Guaranteed chemical resistance even in many gaseous media.

### Material

- Soft gasket made from mica compound
- Tanged insert from 1.4828 or 1.4401

### Recommended applications

Industries

- Aviation and aerospace industry
- Power plant technology
- Metal production and processing

### Available dimensions

- Unreinforced sheets:  
1,000 x 1,016 mm  
0.4 mm thick  
1,500 x 1,000 mm  
0.7 / 1.0 mm thick
- Sheets with tanged insert in 1.4828:  
1,500 x 1,000 mm  
1.3 / 1.7 mm thick
- Sheets with tanged insert in 1.4401: 1,200 x 1,000 mm  
1.3 / 1.7 / 2.0 mm thick
- Rings and molded parts:  
Standard dimensions as per DIN EN 1514-1 or ASME B16.21 (see page 48 ff.)

### Sealing parameters

Thermal conductivity coefficient of sealant at 400 °C:  $\lambda = 0,35\text{ W/mK}$   
Compressive strength for sealant to DIN 52913 (16 hours at 300 °C): 35 ... 40 MPa

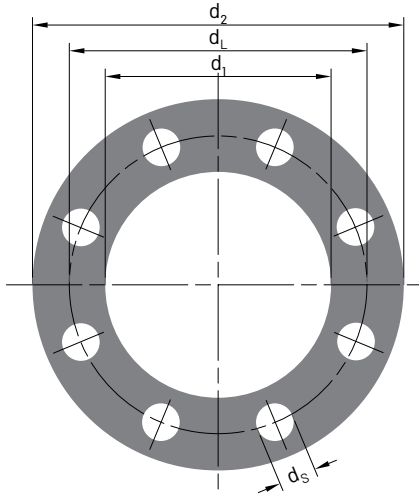
### Installation notes

The gasket is normally installed between flat sealing surfaces. Please note that the seal thickness is set during installation as a result of the bolt-tightening forces acting on the flange. The standard thickness of 1.3 mm when new settles to around 1.05 mm with surface pressure of 15 MPa at room temperature. Once this adaption has taken place, there is no further significant settling or flow.

### Statotherm HT 9560 variants

Form as supplied	unreinforced	with tanged insert in 1.4828	with tanged insert in 1.4401
Sheets	9560/P	9560/2P	9560/3P
Rings with inner eyelet	9650/RIG	9650/2RIG	9650/3RIG
Frame	9560/RA	9560/2RA	9560/3RA
Segments	9560/S	9560/2S	9560/3S

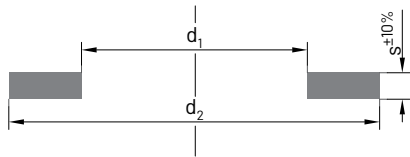
Dimensions for gaskets as per DIN EN 1514-1 (1997)



FF shape

for flanges with flat sealing surface (full face)

DN [mm]	$d_1$ [mm]	$d_2$ [mm]					Number of bolt holes:					Bolt hole diameter $d_s$ [mm]					Pitch circle diameter $d_L$ [mm]				
		PN 2.5/6	PN 10	PN 16	PN 25	PN 40	PN 2.5/6	PN 10	PN 16	PN 25	PN 40	PN 2.5/6	PN 10	PN 16	PN 25	PN 40	PN 2.5/6	PN 10	PN 16	PN 25	PN 40
10	18	75	90	90	90	90	4	4	4	4	4	11	14	14	14	14	50	60	60	60	60
15	22	80	95	95	95	95	4	4	4	4	4	11	14	14	14	14	55	65	65	65	65
20	27	90	105	105	105	105	4	4	4	4	4	11	14	14	14	14	65	75	75	75	75
25	34	100	115	115	115	115	4	4	4	4	4	11	14	14	14	14	75	85	85	85	85
32	43	120	140	140	140	140	4	4	4	4	4	14	18	18	18	18	90	100	100	100	100
40	49	130	150	150	150	150	4	4	4	4	4	14	18	18	18	18	100	110	110	110	110
50	61	140	165	165	165	165	4	4	4	4	4	14	18	18	18	18	110	125	125	125	125
60 <sup>1)</sup>	72	150	175	175	175	175	4	8	8	8	8	14	18	18	18	18	120	135	135	135	135
65	77	160	185	185	185	185	4	8	8	8	8	14	18	18	18	18	130	145	145	145	145
80	89	190	200	200	200	200	4	8	8	8	8	18	18	18	18	18	150	160	160	160	160
100	115	210	220	220	235	235	4	8	8	8	8	18	18	18	22	22	170	180	180	190	190
125	141	240	250	250	270	270	8	8	8	8	8	18	18	18	26	26	200	210	210	220	220
150	169	265	285	285	300	300	8	8	8	8	8	18	22	22	26	26	225	240	240	250	250
200	220	320	340	340	360	375	8	8	12	12	12	18	22	22	26	30	280	295	295	310	320
250	273	375	395	405	425	450	12	12	12	12	12	18	22	26	30	33	335	350	355	370	385
300	324	440	445	460	485	515	12	12	12	16	16	22	22	26	30	33	395	400	410	430	450
350	356	490	505	520	555	580	12	16	16	16	16	22	22	26	33	36	445	460	470	490	510
400	407	540	565	580	620	660	16	16	16	16	16	22	26	30	36	39	495	515	525	550	585
450	458	595	615	640	670	685	16	20	20	20	20	22	26	30	36	39	550	565	585	600	610
500	508	645	670	715	730	755	20	20	20	20	20	22	26	33	36	42	600	620	650	660	670
600	610	755	780	840	845	890	20	20	20	20	20	26	30	36	39	48	705	725	770	770	795
700	712	-	895	910	960	-	-	24	24	24	-	-	30	36	42	-	-	840	840	875	-
800	813	-	1,015	1,025	1,085	-	-	24	24	24	-	-	33	39	48	-	-	950	950	990	-
900	915	-	1,115	1,125	1,185	-	-	28	28	28	-	-	33	39	48	-	-	1,050	1,050	1,090	-
1,000	1,016	-	1,230	1,255	1,320	-	-	28	28	28	-	-	36	42	56	-	-	1,160	1,170	1,210	-
1,100	1,120	-	1,340	1,355	1,420	-	-	32	32	32	-	-	39	42	56	-	-	1,270	1,270	1,310	-
1,200	1,220	-	1,455	1,485	1,530	-	-	32	32	32	-	-	39	48	56	-	-	1,380	1,390	1,420	-
1,400	1,420	-	1,675	1,685	1,755	-	-	36	36	36	-	-	42	48	62	-	-	1,590	1,590	1,640	-
1,500	1,520	-	1,785	1,820	1,865	-	-	36	36	36	-	-	42	56	62	-	-	1,700	1,710	1,750	-
1,600	1,620	-	1,915	1,930	1,975	-	-	40	40	40	-	-	48	56	62	-	-	1,820	1,820	1,860	-
1,800	1,820	-	2,115	2,130	2,195	-	-	44	44	44	-	-	48	56	70	-	-	2,020	2,020	2,070	-
2,000	2,020	-	2,325	2,345	2,425	-	-	48	48	48	-	-	48	62	70	-	-	2,230	2,230	2,300	-



## IBC shape

for raised-face flanges

DN [mm]	d <sub>1</sub> [mm]		d <sub>2</sub> [mm]						
	PN 2.5-40	PN 63	PN 2.5	PN 6	PN 10	PN 16	PN 25	PN 40	PN 63
10	18	18	39	39	46	46	46	46	56
15	22	21	44	44	51	51	51	51	61
20	27	25	54	54	61	61	61	61	72
25	34	30	64	64	71	71	71	71	82
32	43	41	76	76	82	82	82	82	88
40	49	47	86	86	92	92	92	92	103
50	61	59	96	96	107	107	107	107	113
60 <sup>1)</sup>	72	68	106	106	117	117	117	117	123
65	77	73	116	116	127	127	127	127	138
80	89	86	132	132	142	142	142	142	148
100	115	110	152	152	162	162	168	168	174
125	141	135	182	182	192	192	194	194	210
150	169	163	207	207	218	218	224	224	247
200	220	210	262	262	273	273	284	290	309
250	273	264	317	317	328	328	340	352	364
300	324	314	373	373	378	384	400	417	424
350	356	360	423	423	438	444	457	474	486
400	407	415	473	473	489	495	514	546	543
450	458	-	528	528	539	555	564	571	-
500	508	-	578	578	594	617	624	628	-
600	610	-	679	679	695	734	731	747	-
700	712	-	784	784	810	804	833	-	-
800	813	-	890	890	917	911	942	-	-
900	915	-	990	990	1,017	1,011	1,042	-	-
1,000	1,016	-	1,090	1,090	1,124	1,128	1,154	-	-
1,100	1,120	-	-	-	1,231	1,228	1,254	-	-
1,200	1,220	-	1,290	1,307	1,341	1,342	1,364	-	-
1,400	1,420	-	1,490	1,524	1,548	1,542	1,578	-	-
1,500	1,520	-	-	-	1,658	1,654	1,688	-	-
1,600	1,620	-	1,700	1,724	1,772	1,764	1,798	-	-
1,800	1,820	-	1,900	1,931	1,972	1,964	2,000	-	-
2,000	2,020	-	2,100	2,138	2,182	2,168	2,230	-	-
2,200	2,220	-	2,307	2,348	2,384	-	-	-	-
2,400	2,420	-	2,507	2,558	2,594	-	-	-	-
2,600	2,620	-	2,707	2,762	2,794	-	-	-	-
2,800	2,820	-	2,924	2,972	3,014	-	-	-	-
3,000	3,020	-	3,124	3,172	3,228	-	-	-	-
3,200	3,220	-	3,324	3,382	-	-	-	-	-
3,400	3,420	-	3,524	3,592	-	-	-	-	-
3,600	3,620	-	3,734	3,804	-	-	-	-	-
3,800	3,820	-	3,931	-	-	-	-	-	-
4,000	4,020	-	4,131	-	-	-	-	-	-

## TG shape

for flanges with tongue and groove

DN [mm]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]
	PN 10-40	PN 10-40
10	24	34
15	29	39
20	36	50
25	43	57
32	51	65
40	61	75
50	73	87
65	95	109
80	106	120
100	129	149
125	155	175
150	183	203
200	239	259
250	292	312
300	343	363
350	395	421
400	447	473
450	497	523
500	549	575
600	649	675
700 <sup>2)</sup>	751	777
800 <sup>2)</sup>	856	882
900 <sup>2)</sup>	961	987
1,000 <sup>2)</sup>	1,062	1,092

## SR shape

for projection and recess flanges

DN [mm]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]
	PN 10-160	PN 10-160
10	18	34
15	22	39
20	27	50
25	34	57
32	43	65
40	49	75
50	61	87
65	77	109
80	89	120
100	115	149
125	141	175
150	169	203
200	220	259
250	273	312
300	324	363
350	356	421
400	407	473
450	458	523
500	508	575
600	610	675
700 <sup>2)</sup>	712	777
800 <sup>2)</sup>	813	882
900 <sup>2)</sup>	915	987
1,000 <sup>2)</sup>	1,016	1,092

<sup>1)</sup> Only for cast iron flanges

<sup>2)</sup> Up to PN 25

Dimensions for gaskets as per ASME B16.21 (2011)  
for flanges as defined in ASME B16.5

FF shape

for flanges with flat sealing surface (full face)

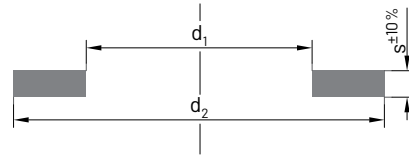
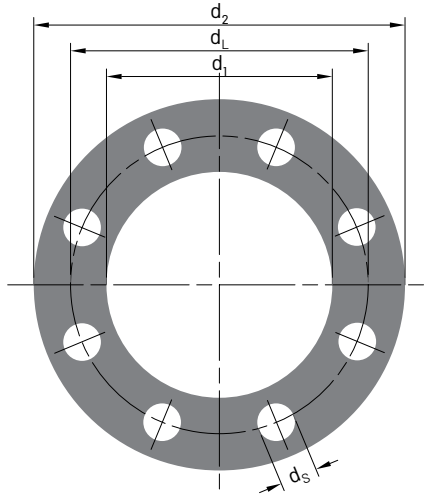
NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]		Number of bolt holes:		d <sub>S</sub> [mm]		d <sub>L</sub> [mm]	
		Class 150	Class 300	Class 150	Class 300	Class 150	Class 300	Class 150	Class 300
1/2	21	89	95	4	4	5/8	5/8	60.3	66.7
3/4	27	98	117	4	4	5/8	3/4	69.9	82.6
1	33	108	124	4	4	5/8	3/4	79.4	88.9
1 1/4	42	117	133	4	4	5/8	3/4	88.9	98.4
1 1/2	48	127	156	4	4	5/8	7/8	98.4	114.3
2	60	152	165	4	8	3/4	3/4	120.7	127.0
2 1/2	73	178	191	4	8	3/4	7/8	139.7	149.2
3	89	191	210	4	8	3/4	7/8	152.4	168.3
3 1/2	102	216	229	8	8	3/4	7/8	177.8	184.2
4	114	229	254	8	8	3/4	7/8	190.5	200.0
5	141	254	279	8	8	7/8	7/8	215.9	235.0
6	168	279	318	8	12	7/8	7/8	241.3	269.9
8	219	343	381	8	12	7/8	1	298.5	330.2
10	273	406	-	12	-	1	-	362.0	-
12	324	483	-	12	-	1	-	431.8	-

IBC shape

for raised-face flanges

NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]			
		Class 300	Class 400	Class 600	Class 900
1/2	21	54	54	54	64
3/4	27	67	67	67	70
1	33	73	73	73	79
1 1/4	42	83	83	83	89
1 1/2	49	95	95	95	98
2	60	111	111	111	143
2 1/2	73	130	130	130	165
3	89	149	149	149	168
3 1/2	102	165	162	162	-
4	114	181	178	194	206
5	141	216	213	241	248
6	168	251	248	267	289
8	219	308	305	321	359
10	273	362	359	400	435
12	324	422	419	457	498
14	356	486	483	492	521
16	406	540	537	565	575
18	457	597	594	613	638
20	508	654	648	683	699
24	610	775	768	791	838

**Dimensions for gaskets as per ASME B16.21 (2011)  
for flanges as defined in ASME B16.47**



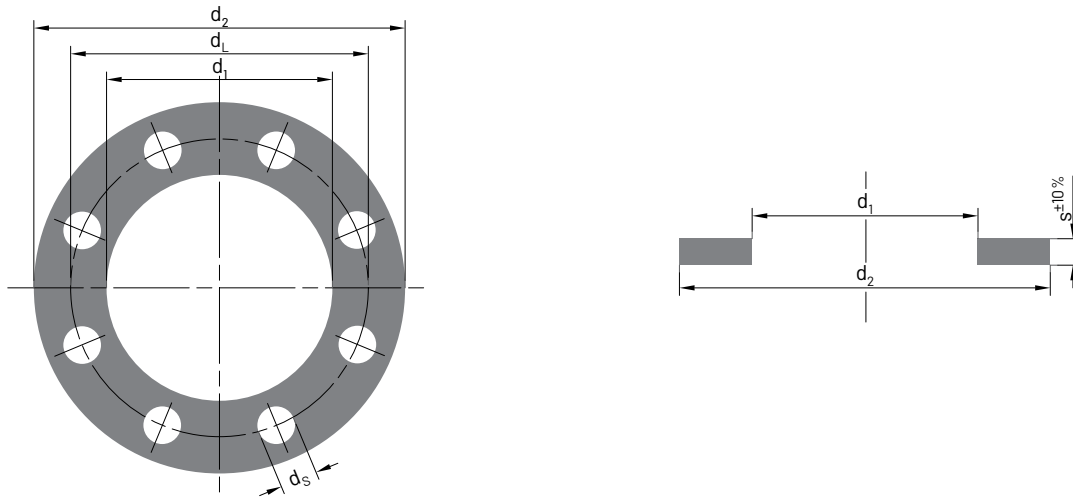
**Flange shape A**

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]			
			Class 150	Class 300	Class 400	Class 600
550	22	559	660	705	702	733
650	26	660	775	835	832	867
700	28	711	832	899	892	914
750	30	762	883	953	946	972
800	32	813	940	1,006	1,003	1,022
850	34	864	991	1,057	1,054	1,073
900	36	914	1,048	1,118	1,118	1,130
950	38	965	1,111	1,054	1,073	1,105
1,000	40	1,016	1,162	1,114	1,127	1,156
1,050	42	1,067	1,219	1,165	1,178	1,219
1,100	44	1,118	1,276	1,219	1,232	1,270
1,150	46	1,168	1,327	1,273	1,289	1,327
1,200	48	1,219	1,384	1,324	1,346	1,391
1,250	50	1,270	1,435	1,378	1,403	1,448
1,300	52	1,321	1,492	1,429	1,454	1,499
1,350	54	1,372	1,549	1,492	1,518	1,556
1,400	56	1,422	1,607	1,543	1,568	1,613
1,450	58	1,473	1,664	1,594	1,619	1,664
1,500	60	1,524	1,715	1,645	1,683	1,721

**Flange shape B**

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]				
			Class 75	Class 150	Class 300	Class 400	Class 600
650	26	660	708	725	772	746	765
700	28	711	759	776	826	800	819
750	30	762	810	827	886	857	879
800	32	813	860	881	940	911	933
850	34	864	911	935	994	962	997
900	36	914	973	987	1,048	1,022	1,048
950	38	965	1,024	1,045	1,099	-	-
1,000	40	1,016	1,075	1,095	1,149	-	-
1,050	42	1,067	1,126	1,146	1,200	-	-
1,100	44	1,118	1,181	1,197	1,251	-	-
1,150	46	1,168	1,232	1,256	1,318	-	-
1,200	48	1,219	1,283	1,307	1,368	-	-
1,250	50	1,270	1,334	1,357	1,419	-	-
1,300	52	1,321	1,387	1,408	1,470	-	-
1,350	54	1,372	1,438	1,464	1,530	-	-
1,400	56	1,422	1,495	1,514	1,594	-	-
1,450	58	1,473	1,546	1,580	1,656	-	-
1,500	60	1,524	1,597	1,630	1,705	-	-

## Dimensions for gaskets as per EN 12560-1 (2001) for flanges as defined in EN 1759-1



### FF shape

for flanges with flat sealing surface (full face)

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]	Number of bolt holes	d <sub>s</sub> [mm]	d <sub>s</sub> [mm]	d <sub>L</sub> [mm]
			Class 150		Class 150		
15	1/2	22	89	4	15.9	5/8	60.3
20	3/4	27	98	4	15.9	5/8	69.8
25	1	34	108	4	15.9	5/8	79.4
32	1 1/4	43	117	4	15.9	5/8	88.9
40	1 1/2	49	127	4	15.9	5/8	98.4
50	2	61	152	4	19.0	3/4	120.6
65	2 1/2	73	178	4	19.0	3/4	139.7
80	3	89	190	4	19.0	3/4	152.4
100	4	115	229	8	19.0	3/4	190.5
125	5	141	254	8	22.2	7/8	215.9
150	6	169	279	8	22.2	7/8	241.3
200	8	220	343	8	22.2	7/8	298.4
250	10	273	406	12	25.4	1	362.0
300	12	324	483	12	25.4	1	431.8
350	14	356	533	12	28.6	1 1/8	476.2
400	16	407	597	16	28.6	1 1/8	539.8
450	18	458	635	16	31.8	1 1/4	577.8
500	20	508	698	20	31.8	1 1/4	635.0
600	24	610	813	20	34.9	1 3/8	749.3



## IBC shape

for raised-face flanges

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]			
			Class 150	Class 300	Class 600	Class 900
15	1/2	22	47.5	54.0	34.0	63.5
20	3/4	27	57.0	66.5	66.5	69.5
25	1	34	66.5	73.0	73.0	79.0
32	1 1/4	43	76.0	82.5	82.5	89.0
40	1 1/2	49	85.5	95.0	95.0	98.0
50	2	61	104.5	111.0	111.0	142.5
65	2 1/2	73	124.0	130.0	130.0	165.0
80	3	89	136.5	149.0	149.0	168.0
100	4	115	174.5	181.0	193.5	206.0
125	5	141	196.5	216.0	241.0	247.5
150	6	169	222.0	251.0	266.5	289.0
200	8	220	279.0	308.0	320.5	358.5
250	10	273	339.5	362.0	400.0	435.0
300	12	324	409.5	422.0	457.0	498.5
350	14	356	450.5	485.5	492.0	520.5
400	16	407	514.0	539.5	565.0	574.5
450	18	458	549.0	597.0	612.5	638.0
500	20	508	606.5	654.0	682.5	698.5
600	24	610	717.5	774.5	790.5	838.0

## TG shape

for flanges with tongue and groove

DN [mm]	NPS [inch]	d <sub>2</sub> [mm]	
		Class 300-900	Class 300-900
15	1/2	25.5	35.0
20	3/4	33.5	43.0
25	1	38.0	51.0
32	1 1/4	47.5	64.0
40	1 1/2	54.0	73.0
50	2	73.0	92.0
65	2 1/2	85.5	105.0
80	3	108.0	127.0
100	4	132.0	157.0
125	5	160.5	186.0
150	6	190.5	216.0
200	8	238.0	270.0
250	10	286.0	324.0
300	12	343.0	381.0
350	14	374.5	413.0
400	16	425.5	470.0
450	18	489.0	533.0
500	20	533.5	584.0
600	24	641.5	692.0

## SR shape

for projection and recess flanges

DN [mm]	NPS [inch]	d <sub>2</sub> [mm]	
		Class 300-900	Class 300-900
15	1/2	22	35.0
20	3/4	27	43.0
25	1	34	51.0
32	1 1/4	43	64.0
40	1 1/2	49	73.0
50	2	61	92.0
65	2 1/2	73	105.0
80	3	89	127.0
100	4	115	157.0
125	5	141	186.0
150	6	169	216.0
200	8	220	270.0
250	10	273	324.0
300	12	324	381.0
350	14	356	413.0
400	16	407	470.0
450	18	458	533.0
500	20	508	584.0
600	24	610	692.0

## Corrugated ring seals

### Properties

Corratherm corrugated gaskets are two-component gaskets consisting of a corrugated stainless steel profile ring with overlays on both sides made from flexible expanded Statotherm 9591 graphite foils or high-quality PTFE. The corrugated gasket's special geometry allows it to hold firmly to the overlay. The thickness and density of the overlay is precisely matched to the stainless steel base plate, guaranteeing an overlap by the corrugated surface that results in a very low diffusion cross-section. At the same time, the graphite or PTFE overlay in this area is very highly compressed.

### Advantages

- Robust, less easy to damage
- Easy handling
- No subsequent tightening required
- Long lasting, no ageing or embrittlement
- Excellent gas and fluid tightness, even with lower surface pressure
- Excellent adaptability to surface irregularities and roughness
- Good resilience
- No media contamination with version with inner eyelet

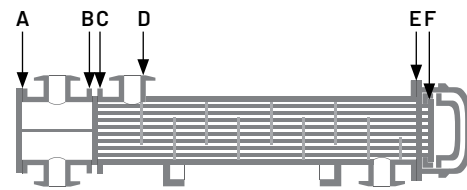
### Types

EagleBurgmann Corratherm gaskets are supplied with a graphite or PTFE overlay on both sides to suit the requirements of the application. The gasket can be produced with an inner eyelet to prevent the overlay being affected by the operating medium or the medium being affected by the sealing system. The corrugated gasket can generally be produced in any style or geometry, and all the possible variants can be supplied as a heat exchanger seal. Gaskets up to 1,000 mm are produced in a single piece, while for larger dimensions, the metal base plate is produced in multiple segments and welded together.

### Range of applications

Corrugated gaskets are used in heat exchangers, pipes, appliances and tanks. They are a well-established sealing system in the chemical and petrochemical industries and in both conventional and nuclear power stations. In contrast to spiral-wound gaskets, corrugated gaskets require a significantly lower surface pressure and have no particular requirements with respect to the surface of the raised face. For this reason, they can also be used to seal very soft or deformed raised flange faces. The key values as defined in EN 13555 can be found on our website <https://www.eagleburgmann.com>.

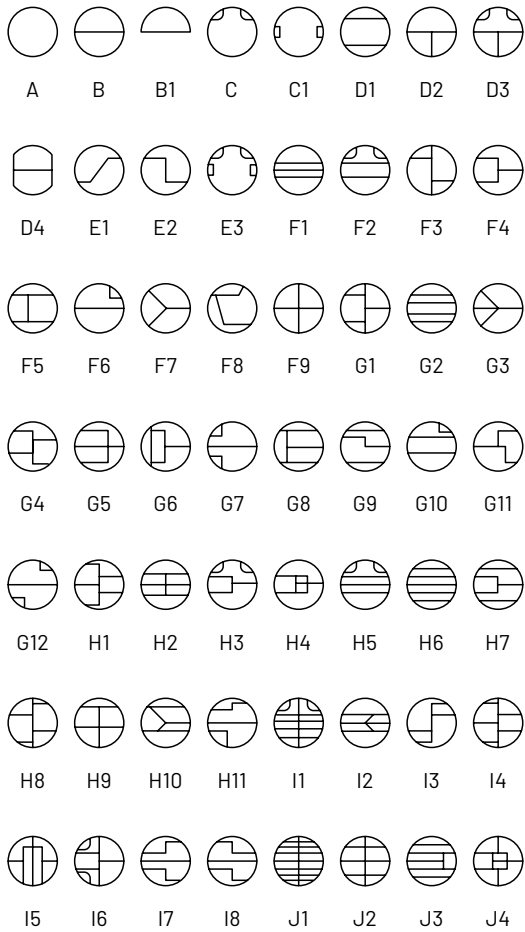
### Examples for heat exchanger applications



- A Tube bundle cover
- B Tube sheet
- C Jacket side
- D Flange
- E Baffle
- F Circulating channel



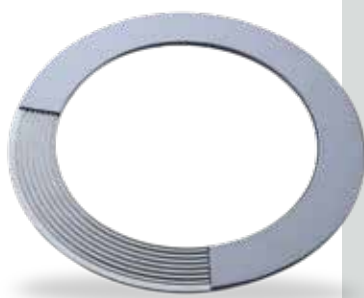
## Profiles for heat exchanger seals



In addition to Corratherm® corrugated ring seals, the following seals are also suitable for use as heat exchanger seals:

- Fiber or graphite gaskets (see pages 28 and 38)
- Spiral-wound gaskets (see page 62)
- Serrated gaskets (see page 72)
- Metal-jacketed seals (see page 58)





### Advantages

- High gas tightness
- High compressive strength
- High compressibility
- Excellent resiliency even at a continuous operating temperature of 400 °C
- High blow-out resistance
- Easy to handle

## Corratherm 9631/P

### Features

The Corratherm 9631/P corrugated gasket is a high-quality two-component gasket made from flexible graphite and stainless steel. Its core is made of a corrugated stainless steel profile ring with flexible expanded Statotherm graphite foil (purity ≥ 99.85 %) on both sides. Gaskets with an outer diameter up to 1,000 mm are produced in a single piece, while for larger dimensions, the metal base plate must be produced in multiple segments and welded together.

### Operating range

Pressure: p = 100 bar

Temperature

- Continuous operation: t = -200°C ... +500 °C

Recommended surface roughness:

R<sub>z</sub> = 25 ... 50 µm

Chemical resistance:

pH = 0 ... 14

### Materials

Corrugated metal base plate in 1.4571 (AISI/ASTM 316Ti)

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Shipbuilding

### Standards and releases

- TA Luft
- Blow-out resistance (VDI 2200)

### Available dimensions

- Standard dimensions as per DIN EN 1514-4 and DIN EN 12560-6 (see page 57)



### Advantages

- High chemical resistance
- High compressibility
- Easy to handle

## Corrachem 9631/T

### Features

The Corrachem 9631/T corrugated gasket is a high-quality two-component gasket made from PTFE and stainless steel. Its core consists of a corrugated stainless steel profile ring with PTFE on both sides. Gaskets with an outer diameter up to 1,000 mm are produced in a single piece, while for larger dimensions, the metal base plate must be produced in multiple segments and welded together.

### Operating range

Pressure: p = 100 bar

Temperature

- Continuous operation: t = -200°C ... +250°C

Recommended surface roughness:

R<sub>z</sub> = 25 ... 50 µm

Chemical resistance:

pH = 0 ... 14

### Materials

Corrugated metal base plate in 1.4571 (AISI/ASTM 316Ti)

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Shipbuilding

### Available dimensions

- Standard dimensions as per DIN EN 1514-4 and DIN EN 12560-6 (see page 57)

### Corratherm 9631/P variants

#### Form as supplied

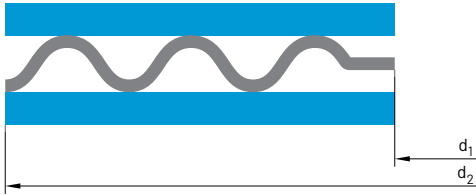
Rings	9631/P
Rings with inner eyelet	9631/PRIG

### Corrachem 9631/T variants

#### Form as supplied

Rings	9631/T
Rings with inner eyelet	9631/TRIG

## Dimensions for corrugated ring seals

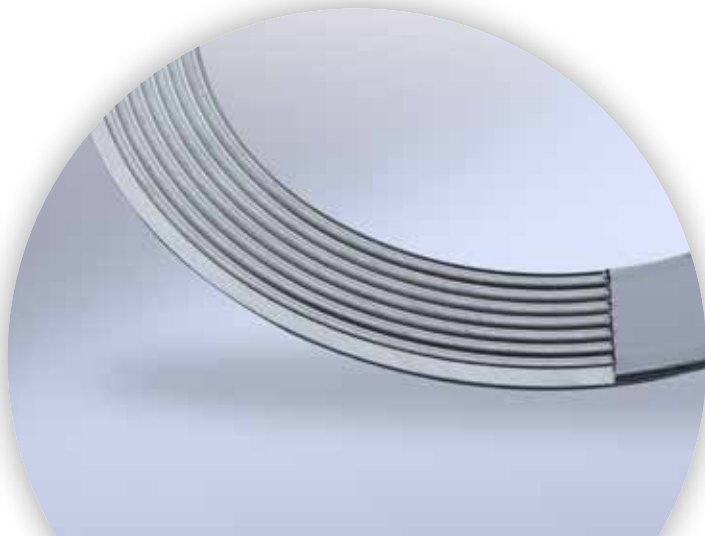


Conforms to DIN EN 1514-4 (1997) for flanges as defined in EN 1092-1

DN [mm]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]					
		PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
10	18	48	48	48	48	58	58
15	22	53	53	53	53	63	63
20	27	63	63	63	63	74	74
25	34	73	73	73	73	84	84
32	43	84	84	84	84	90	90
40	49	94	94	94	94	105	105
50	61	109	109	109	109	115	121
65	77	129	129	129	129	140	146
80	89	144	144	144	144	150	156
100	115	164	164	170	170	176	183
125	141	194	194	196	196	213	220
150	169	220	220	226	226	250	260
200	220	275	275	286	293	312	327
250	273	330	331	343	355	367	394
300	324	380	386	403	420	427	461
350	356	440	446	460	477	489	515
400	407	491	498	517	549	546	575
450	458	541	558	567	574	-	-
500	508	596	620	627	631	660	708
600	610	698	737	734	750	768	819
700	712	813	807	836	-	883	956
800	813	920	914	945	-	994	-
900	915	1020	1014	1045	-	1114	-

Conforms to DIN EN 12560-4 (2001) for flanges as defined in ASME B16.5

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]					
			Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
15	½	22	47.6	54.0	54.0	63.5	63.5	69.9
20	¾	27	57.2	66.7	66.7	69.9	69.9	76.2
25	1	34	66.7	73.0	73.0	79.4	79.4	85.7
32	1¼	43	76.2	82.6	82.6	88.9	88.9	104.8
40	1½	49	85.7	95.3	95.3	98.4	98.4	117.5
50	2	61	104.8	111.1	111.1	142.9	142.9	146.1
65	2½	73	123.8	130.2	130.2	165.1	165.1	168.3
80	3	89	136.5	149.2	149.2	168.3	174.6	196.9
100	4	115	174.6	181.0	193.7	206.4	209.6	235.0
125	5	141	196.9	215.9	241.3	247.7	254.0	279.4
150	6	169	222.3	250.8	266.7	288.9	282.6	317.5
200	8	220	279.4	308.0	320.7	358.8	352.4	387.4
250	10	273	339.7	362.0	400.1	435.0	435.0	476.3
300	12	324	409.6	422.3	457.2	498.5	520.7	549.3
350	14	356	450.9	485.8	492.1	520.7	577.9	-
400	16	407	514.4	539.8	565.2	574.7	641.4	-
450	18	458	549.3	596.9	612.8	638.2	704.9	-
500	20	508	606.4	654.1	682.6	698.5	755.7	-
600	24	610	717.6	774.7	790.6	838.2	901.7	-





## Metal-jacketed seals

### Properties

EagleBurgmann metal-jacketed seals are two-component seals consisting of a soft aramid fiber or graphite core with a metal jacket. When selecting the jacketing metal, the material should be as soft and bendable as possible since the necessary surface roughness of the flange depends on the choice of jacketing. Remember that the harder the jacketing, the finer the flange surface must be. The insert material serves to overcome any existing surface irregularities or unevenness of the flange and makes the gasket slightly more flexible. The harder the selected insert, the better the surface quality and evenness of the flange must be.

### Advantages

- Easy to handle
- Suitable for confined installation spaces
- Preferred for use in hot blast areas at temperatures in excess of 500 °C

### Types

Metal-jacketed gaskets can be produced with a fiber or graphite filler and metal jacket to suit the requirements of the application. This may be, for example, a soft metal, e.g. aluminum, or a very hard metal, e.g. stainless steel. For heat exchanger applications, the metal-jacketed gasket is supplied with welded ribs.

### Range of applications

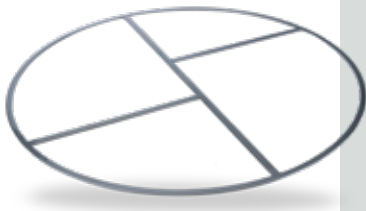
Metal-jacketed seals are primarily used in appliances in the temperature range up to 550 °C. Within this range, however, the metal-jacketed seal is starting to be replaced with serrated gaskets, which offer increased durability. In hot blast areas at temperatures in excess of 500 °C, metal-jacketed seals continue to hold their own against other sealing solutions.

### Surface details

Jacketing	Surface roughness $R_z$ (flange surface)
Aluminum	25 ... 50 $\mu\text{m}$
Copper	12.5 ... 25 $\mu\text{m}$
Tinplate	12.5 ... 25 $\mu\text{m}$
Steel	2.5 ... 6.3 $\mu\text{m}$
304 or 304L	2.5 ... 6.3 $\mu\text{m}$
316 or 316L	2.5 ... 6.3 $\mu\text{m}$
321	2.5 ... 6.3 $\mu\text{m}$
Hastelloy B or C-276	2.5 ... 6.3 $\mu\text{m}$
Inconel 600	2.5 ... 6.3 $\mu\text{m}$
Monel 400	2.5 ... 6.3 $\mu\text{m}$







### Advantages

- High pressure resistance
- High temperature stability
- Easy to handle
- Suitable for confined installation spaces

## Buralloy Heat exchanger seal 2500

### Features

The Buralloy heat exchanger seal 2500 is a semi-metal gasket with a soft core and metal jacketing. The Buralloy 2500 thus combines the benefits of a compressible soft seal with the mechanical strength of a metal seal. As a result, it can be produced in many different material combinations and in different styles to suit the application.

### Operating range

Pressure, temperature and corrosion resistance in relation to the combination of materials used.

### Materials

Filler materials

- Aramid fiber sheets
  - Graphite
- Metal jacketing
- Aluminum
  - Copper
  - Tinplate (tin)
  - Steel
  - 304 or 304L
  - 316 or 316L
  - 321
  - Hastelloy B or C-276
  - Inconel 600
  - Monel 400

### Recommended applications

Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Building services engineering









Mechanical units

- Heat exchanger
- Reactors
- Process boilers

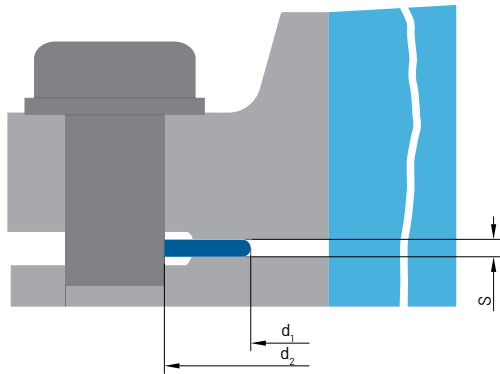
### Available dimensions

- Seal sizing to suit individual requirements
- Standard dimensions as per ASME B16.20 or DIN standard (see page 60/61)
- More detailed specifications as per standard and individual drawing

### Buralloy heat exchanger seal 2500 variants

Form as supplied	Type	Recommended applications	
Molded parts	 Metal gasket	Suitable for use in valve caps, heat exchangers and tongue-and-groove flanged connections. High bolt force required.	2500/BHX200
	 Metal gasket with graphite jacketing	Suitable for use in butterfly valves and heat exchangers. The graphite used gives the gasket excellent adaptability.	2500/BHX210
	 French style - Jacketed on one side	Suitable for use in compressed air applications. Can also be used in applications with confined installation space. Gasket cross-section s < 5 mm.	2500/BHX220
	 French style - Jacketed on both sides	For gaskets with cross-section s > 5 mm	2500/BHX230
	 Jacketed on one side - Open	Similar to BHX220. For gaskets with cross-section s > 5 mm.	2500/BHX240
	 Jacketed on one side - Closed	Suitable for applications in which the filler material must be protected against the effects of the medium.	2500/BHX250
	 Jacketed on both sides - Closed	Available in almost all sizes and can be used in many applications. Suitable for use in standard flanges, particularly when fiber seal materials cannot be used because the surface pressure is too high.	2500/BHX260
	 Double sided jacketing with double wrapper - Closed	Similar to the BHX220, robust sealing solution suitable for high surface pressures.	2500/BHX270

Dimensions for metal-jacketed seals



Conforms to ASME B16.20 (2017) for flanges as defined in ASME B16.5

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]						
			Class 150	Class 300	Class 400	Class 600	Class 900	Class 1,500	Class 2,500
15	1/2	22.4	44.5	50.8	50.8	50.8	60.5	60.5	66.8
20	3/4	28.7	54.1	63.5	63.5	63.5	66.8	66.8	73.2
25	1	38.1	63.5	69.9	69.9	69.9	76.2	76.2	82.6
32	1 1/4	47.8	73.2	79.5	79.5	79.5	85.9	85.9	101.6
40	1 1/2	54.1	82.6	92.2	92.2	92.2	95.3	95.3	114.3
50	2	73.2	101.6	108.0	108.0	108.0	139.7	139.7	143.0
65	2 1/2	85.9	120.7	127.0	127.0	127.0	162.1	162.1	165.1
80	3	108.0	133.4	146.1	146.1	146.1	165.1	171.5	193.8
100	4	131.8	171.5	177.8	174.8	190.5	203.2	206.5	231.9
125	5	152.4	193.8	212.9	209.6	238.3	244.6	251.0	276.4
150	6	190.5	219.2	247.7	244.6	263.7	285.8	279.4	314.5
200	8	238.2	276.4	304.8	301.8	317.5	355.6	349.3	384.3
250	10	285.8	336.6	358.9	355.6	397.0	431.8	431.8	473.2
300	12	342.9	406.4	419.1	416.1	454.2	495.3	517.7	546.1
350	14	374.7	447.8	482.6	479.6	489.0	517.7	574.8	-
400	16	425.5	511.3	536.7	533.4	562.1	571.5	638.3	-
450	18	489.0	546.1	593.9	590.6	609.6	635.0	701.8	-
500	20	533.4	603.3	651.0	644.7	679.5	695.5	752.6	-
600	24	641.4	714.5	771.7	765.3	787.4	835.2	898.7	-

**Conforms to ASME B16.20 (2017) for flanges as defined in ASME B16.47, style A**

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]				
			Class 150	Class 300	Class 400	Class 600	Class 900
650	26	673.1	771.7	831.9	828.8	863.6	879.6
700	28	723.9	828.8	895.4	889.0	911.4	943.1
750	30	774.7	879.6	949.5	943.1	968.5	1,006.6
800	32	825.5	936.8	1,003.3	1,000.3	1,019.3	1,070.1
850	34	876.3	987.6	1,054.1	1,051.1	1,070.1	1,133.6
900	36	927.1	1,044.7	1,114.6	1,114.6	1,127.3	1,197.1
950	38	977.9	1,108.2	1,051.1	1,070.1	1,101.9	1,197.1
1,000	40	1,028.7	1,159.0	1,111.3	1,124.0	1,152.7	1,247.9
1,050	42	1,079.5	1,216.2	1,162.1	1,174.8	1,216.2	1,298.7
1,100	44	1,130.3	1,273.3	1,216.2	1,228.9	1,267.0	1,365.3
1,150	46	1,181.1	1,324.1	1,270.0	1,286.0	1,324.1	1,432.1
1,200	48	1,231.9	1,381.3	1,320.8	1,343.2	1,387.6	1,482.9
1,250	50	1,282.7	1,432.1	1,374.9	1,400.3	1,444.8	-
1,300	52	1,333.5	1,489.2	1,425.7	1,451.1	1,495.6	-
1,350	54	1,384.3	1,546.4	1,489.2	1,514.6	1,552.7	-
1,400	56	1,435.1	1,603.5	1,540.0	1,565.4	1,603.5	-
1,450	58	1,485.9	1,660.7	1,590.8	1,616.2	1,660.7	-
1,500	60	1,536.7	1,711.5	1,641.6	1,679.7	1,730.5	-

**Conforms to ASME B16.20 (2017) for flanges as defined in ASME B16.47, style B**

DN [mm]	NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]				
			Class 150	Class 300	Class 400	Class 600	Class 900
650	26	673.1	722.4	768.4	743.0	762.0	835.2
700	28	723.9	773.2	822.5	797.1	816.1	898.7
750	30	774.7	824.0	882.7	854.2	876.3	955.8
800	32	825.5	877.8	936.8	908.1	930.4	1,013.0
850	34	876.3	931.9	990.6	958.9	993.9	1,070.1
900	36	927.1	984.3	1,044.7	1,019.3	1,044.7	1,120.9
950	38	977.9	1,041.4	1,095.5	1,070.1	1,101.9	1,197.1
1,000	40	1,028.7	1,092.2	1,146.3	1,124.0	1,152.7	1,247.9
1,050	42	1,079.5	1,143.0	1,197.1	1,174.8	1,216.2	1,298.7
1,100	44	1,130.3	1,193.8	1,247.9	1,228.9	1,267.0	1,365.3
1,150	46	1,181.1	1,252.5	1,314.5	1,286.0	1,324.1	1,432.1
1,200	48	1,231.9	1,303.3	1,365.3	1,343.2	1,387.6	1,482.9
1,250	50	1,282.7	1,354.1	1,416.1	1,400.3	1,444.8	-
1,300	52	1,333.5	1,404.9	1,466.9	1,451.1	1,495.6	-
1,350	54	1,384.3	1,460.5	1,527.3	1,514.6	1,552.7	-
1,400	56	1,435.1	1,511.3	1,590.8	1,565.4	1,603.5	-
1,450	58	1,485.9	1,576.3	1,652.5	1,616.2	1,660.7	-
1,500	60	1,536.7	1,627.1	1,703.3	1,679.7	1,730.5	-

## Spiral-wound gaskets

### Properties

Spiraltherm gaskets combine the benefits of soft material and metal seals in a unique way. They consist of an alternating spiral-wound combination of graphite, PTFE or mica with a profiled stainless steel tape. This interaction between the soft, non-metallic filler material and high quality metal makes EagleBurgmann Spiraltherm the ideal gasket for applications with high temperature differences and the associated tension differences, bolt loosening and flange distortion. In addition, a support ring can be attached to the inner diameter or a centering ring can be attached to the outer diameter of the gasket for specific applications.

### Advantages

- High operational reliability
- Suitable for high pressure applications
- Guaranteed sealing, even under extreme operating conditions or load cycles
- Excellent force distribution
- Ease of installation
- No ageing or embrittlement
- Suitable for rough flanges
- High stability and good gas tightness

### Production

To manufacture the spiral-wound gasket, a V-shaped metal tape and a non-metallic filler material (graphite, PTFE or mica) are wound together. The ends of the metal are spot-welded to stabilize the ring. If an inner or outer ring is needed, this is then attached.

### Types

Spiraltherm gaskets are available in various styles, geometries and material combinations. Depending on the requirements of the application, spiral-wound gaskets are produced

- without inner or outer ring (NF for tongue and groove flanges or VR for projection and recess flanges) or
- with an inner ring (VRI for projection and recess flanges) to regulate the compression or avoid over-compression or
- with an outer ring (GA for uneven flanged connections) or
- with inner and outer ring (GIA for uneven flanged connections) to improve the surface pressure while, at the same time, avoiding over-compression under extreme pressures.

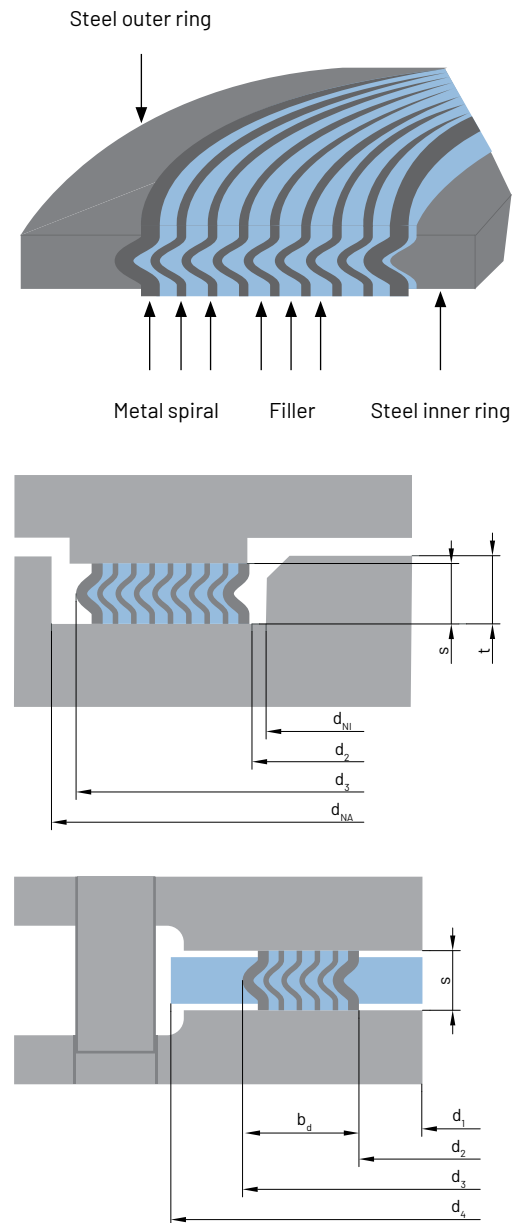
As standard, the inner ring is made from the same material as the metal sealing tape in the spiral. On the other hand, the outer ring generally consists of galvanized steel as it is not in direct contact with the medium to be sealed.

The middle layer or spiral of the seal is made from 98% or 99.85% graphite, PTFE or mica, depending on the application.

### Range of applications

The large number of variants means that the spiral-wound gasket can be found in almost every area of industry. It is used especially in high-pressure applications and wherever there are critical operating conditions that need to be safely controlled. They can be found, in particular, in refineries, petrochemical and chemical facilities and in conventional and nuclear power stations. They are also used in water treatment plants and pipeline construction.

Spiral-wound gaskets for applications in the load-bearing connection



Spiral-wound gaskets can be used in both load-bearing connection and force shunt applications.

DN [mm]	d <sub>2</sub> [mm]	d <sub>3</sub> [mm]
≤ 600	d <sub>NI</sub> <sup>+0.5</sup>	d <sub>NA</sub> <sup>-0.5</sup>
> 600	d <sub>NI</sub> <sup>+1.0</sup>	d <sub>NA</sub> <sup>-1.0</sup>

### Gaskets in the load-bearing connection

In the load-bearing connection, the gasket lies between the raised faces; when installed it transmits the full preload force. In operation, the surface pressure of the gasket is significantly changed by external loads, such as the internal pressure, pipe forces and moments, differences in thermal expansion and by plastic deformation of the individual components (flanges, bolts, gasket).

The force/deformation ratios that occur in a flanged connection under various operating conditions can be illustrated in a force/extension graph.

### Gasket in the force shunt

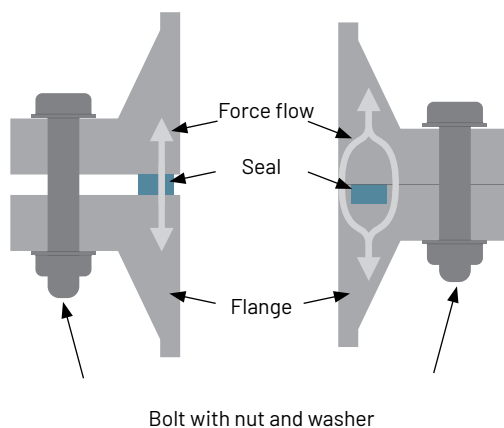
The gasket in the force shunt lies in a groove or there is a special sealing element (seal with base plate) lying between the smooth raised faces. The gasket or sealing element transfers just a (small) part of the preload force, specifically the part that is needed to achieve contact between the metal surfaces (fully tensioned position) while preloading. Any greater preload force will be dissipated via the metal surfaces. The preload force must be sufficient to ensure that the fully tensioned position is not left in any operating state. The gasket's surface pressure can only be changed in operation by relaxation of the gasket.

Flanged connections not only include flange/flange connections; they also mean flange/cover, flange/housing and housing/cover connections.

### Sealing solutions for tongue-and-groove flanges

Load-bearing connection

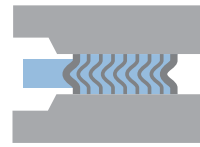
Force shunt



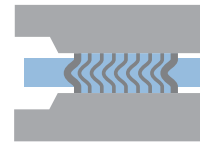
Spiral-wound gaskets for applications in the load-bearing connection in the /NF or /VR, /VRI, /GIA and /GA styles.

The standard dimensions of spiral-wound gaskets are shown in the tables on pages 68ff. Your EagleBurgmann contact will be happy to discuss any designs that differ from the standard.

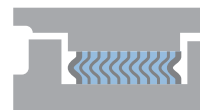
## Product variations



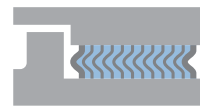
**Spiraltherm .../GA**  
Spiral-wound gasket with outer ring.  
Standard solution for uneven flanged connections.



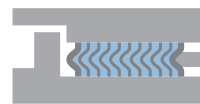
**Spiraltherm .../GIA**  
Spiral-wound gasket with inner and outer ring.  
Optimum solution for uneven flanged connections.  
Avoids excessive compressive load under extremes of pressure.  
Reduced turbulence in the flange area and protection against both corrosion and erosion.  
Improved distribution of the compressive load over the entire sealing surface.



**Spiraltherm .../NF**  
Spiral-wound gasket without inner and outer ring.  
This gasket variant is primarily used in load-bearing connection applications, e.g. in tongue-and-groove flanges.



**Spiraltherm .../VR**  
Spiral-wound gasket without inner and outer ring.  
The main application is flanges with projection and recess.



**Spiraltherm .../VRI**  
Spiral-wound gasket with inner ring.  
The main application is flanges with projection and recess. To regulate the compression of the gasket, this variant can only be used with an inner ring.

## Spiral-wound gaskets

### Spiral-wound gaskets for applications in the force shunt

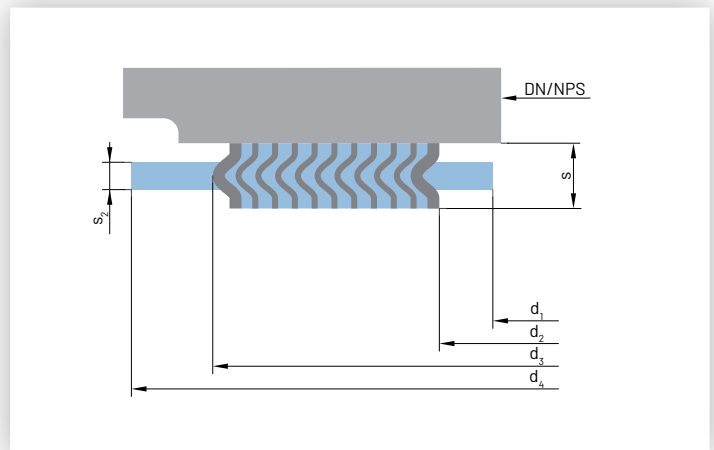
For Spiraltherm .../NF gaskets in the force shunt, no further compression of the gasket is possible once the flanges touch one another. For this reason, the sealing groove and gasket dimensions must be sized extremely accurately. In the past there have been no standards for spiral-wound gaskets in the force shunt, so application of the values contained in the table below is recommended.

The ratio between the gasket volume and groove volume must be sized appropriately to achieve optimum sealing characteristics. This is guaranteed by application of the following formula:

$$\frac{b_D}{b_N} \approx 0.86 \quad \text{If } b_D < 6.5 = 0.85$$

We can provide you with calculations (gasket dimensions, bolt force, etc.) and compressive load data, if necessary.

s <sub>1</sub> [mm] nominal	s <sub>2</sub> [mm]
2.5	1
3.5	2
4.5	3
6.5	5



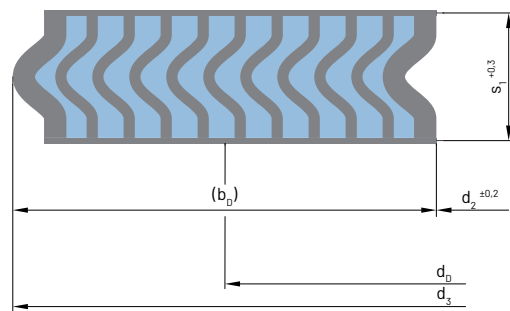
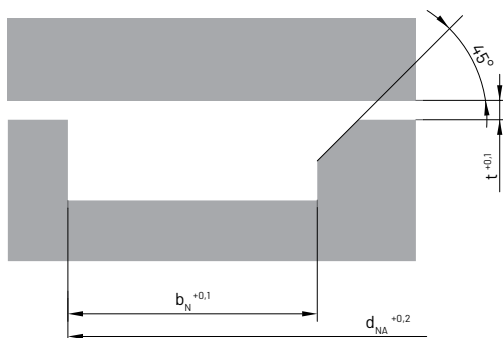
### Manufacturing tolerances for filler materials and springs [mm]

Tolerances	ASME B16.20 <sup>1)</sup>	EN 1514 <sup>1)</sup>	EagleBurgmann international standard
s (including filler material)	+0.07 / +0.063	+0.4 / +1.1	+0.2 / +0.8
s <sub>1</sub> (for metal spiral)	+0.13	+0.3	+0.3
Filler material overlap total / on both sides	Overlap	+0.4 / +0.8	+0.2 / +0.5
s <sub>2</sub> (for outer, centering and inner ring)	+0.33 / -0.03	±0.25	+0.25 / -0.05
for gasket dimensions	See ASME standard	See EagleBurgmann works standard	See EagleBurgmann works standard

<sup>1)</sup> Only applies to load-bearing connection applications

### Seal sizing

Spiraltherm gaskets	Groove						
d <sub>3</sub>	b <sub>D</sub>	d <sub>2</sub>	S <sub>1</sub> <sup>+0.3</sup>	d <sub>NA</sub>	b <sub>N</sub>	d <sub>NI</sub>	t <sub>N</sub>
< 300	≥ 7	d <sub>3</sub> - 2 x b <sub>D</sub>	3.5	d <sub>3</sub> + 0.5	b <sub>D</sub> /0.86	d <sub>NA</sub> - 2b <sub>N</sub>	2.5 <sup>+0.1</sup>
< 1,000	≥ 7		3.5	d <sub>3</sub> + 1.0		d <sub>NA</sub> - 2b <sub>N</sub>	2.5 <sup>+0.1</sup>
< 300	≥ 7		4.5	d <sub>3</sub> + 0.5		d <sub>NA</sub> - 2b <sub>N</sub>	3.3 <sup>+0.1</sup>
< 1,000	≥ 7		4.5	d <sub>3</sub> + 1.0		d <sub>NA</sub> - 2b <sub>N</sub>	3.3 <sup>+0.1</sup>
< 1,000	≥ 7	d <sub>D</sub> - b <sub>D</sub>	6.5	d <sub>3</sub> + 1.0		d <sub>NA</sub> - 2b <sub>N</sub>	4.7 <sup>+0.1</sup>



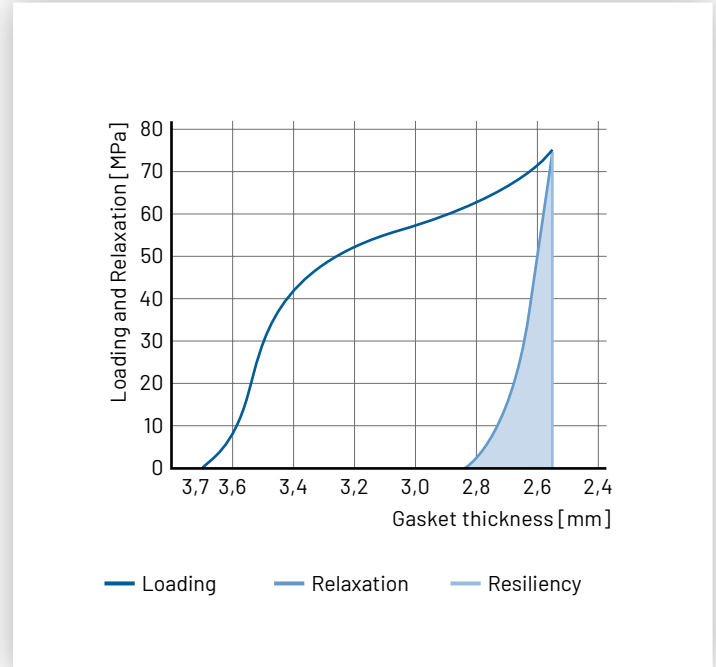


### Specimen compression curve diagram

Compression curve for Spiraltherm (47 x 55 x 3.7 mm) in the force shunt. The diagram shows the load and recovery of the gasket under constant flange contact (fully tensioned = 75 MPa) with subsequent relaxation.

#### Notes on installation:

An outer support and centering ring is required if the flange does not have a groove or recess. A very precise design calculation and measurement of both gasket and groove are needed. This is because, for Spiraltherm .../NF gaskets in the force shunt, no further compression of the gasket is possible once the flanges touch one another, resulting in metal-to-metal contact.



## Color coding for spiral-wound gaskets

### Color coding for spiral-wound gaskets as per DIN EN 1514-2 (2014)

Material	Material number	Abbreviation	Color code
<b>Metal materials for outer ring</b>			
Unalloyed steel		CRS	Silver
X4CrNi 18-10	1.4301	304	Yellow
X2CrNi 19-11	1.4306	304 L	Colorless <sup>1)</sup>
X15CrNiSi 20-12	1.4828	309	Colorless <sup>1)</sup>
X15CrNiSi 25-20	1.4841	310	Colorless <sup>1)</sup>
X5CrNiMo 17-12-2	1.4401	316	Green
X2CrNiMo 17-12-2	1.4404	316 L	Green
X6CrNiNb 18-10	1.4550	347	Blue
X6CrNiTi 18-10	1.4541	321	Turquoise
X6Cr 17	1.4016	430	Colorless <sup>1)</sup>
NiCu30Fe	2.4360	MON	Orange
Ni99.2	2.4066	NI	Red
Titanium		TI	Purple
NiCr20CuMo	2.4660	A-20	Black
NiMo28	2.4617	HAST B	Brown
NiMo 16Cr15W	2.4819	HAST C	Beige
NiCr15Fe	2.4816	INC 600	Gold
NiCr22Mo9Nb	2.4856	INC 625	Gold
NiCr15Fe7TiAl	2.4669	INX	Colorless <sup>1)</sup>
X10NiCrAlTi 32-20	1.4876	IN 800	White
NiCr21Mo	2.4858	IN 825	White
Zirconium		ZIRC	Colorless <sup>1)</sup>
<b>Non-metallic filler materials</b>			
Polytetrafluorethylene		PTFE	White stripes
Mica graphite		Manufacturer's designation	Pink stripes
Flexible graphite		FG	Gray stripes
Ceramic		CER	Light green stripes

### Color coding for spiral-wound gaskets as per ASME B16.20 (2017)

Material	OD color code
<b>Metal materials for outer ring</b>	
304 Steel	Yellow
316L Steel	Green
317L Steel	Chestnut brown
321 Steel	Turquoise
347 Steel	Blue
Monel	Orange
Nickel	Red
Titanium	Purple
Alloy 20	Black
Inconel 600	Gold
Hastelloy B	Brown
Hastelloy C	Beige
Incoloy 800	White
<b>Non-metallic filler materials</b>	
Graphite	Gray stripes
PTFE	White stripes
Ceramic	Light green stripes
Mica	Pink stripes

<sup>1)</sup> To avoid confusion between gaskets with the same gasket style, but with different materials, we recommend that a color coding be agreed between the gasket supplier and customer.



## Advantages

- Universal industrial grade
- Easy to handle

## Spiraltherm Graphite S 9584

### Features

Spiraltherm Graphite S 9584 is a flange seal made from a V-shaped profiled stainless steel tape with spiral-wound graphite middle layer (purity > 98 %). The ends of the stainless steel tape are spot-welded.

### Operating range

Pressure:  $p = 400$  bar

Temperature

- Continuous operation:  $t = -200 \dots +550$  °C
- Inert environment: Contact us to discuss higher temperatures

Recommended surface roughness:

$R_z = 12.5 \dots 50$  µm

Chemical resistance:  
pH = 0 ... 14

### Materials

- Filler material: 98% pure graphite
  - Metal spiral: 1.4541 (321) or 1.4571 (316 Ti)
  - 9584/...R variants: Sulfur content < 100 ppm, soluble sulfates < 100 ppm
- Other materials upon request

### Recommended applications

Industries

- Chemical industry
- Petrochemical industry
- Power stations

### Standards and releases

- TA Luft (9584/GIA only)
- BAM (on request)
- Fire-safe API 607 (9584/GIA only)

### Available dimensions

- Standard dimensions as per DIN EN 1514-2 or ASME B16.20 (see page 68)

### Sealing parameters

AD Directive B7

- $k_0 \times K_0 = 65 \times b_d$
  - $k_1 = 1,4 \times b_d$
- ASME Code
- Gasket factor:  $m = 2.5$
  - Minimum surface pressure:  $y = 10,000$  psi,  $y = 70$  MPa



## Advantages

- Suitable for nuclear applications
- High purity graphite

## Spiraltherm Graphite H 9594

### Features

Spiraltherm Graphite H 9594 is a flange seal made from a V-shaped profiled stainless steel tape with spiral-wound graphite middle layer (purity > 99.85 %). The ends of the stainless steel tape are spot-welded.

### Operating range

Pressure:  $p = 400$  bar

Temperature

- Continuous operation:  $t = -200 \dots +550$  °C
- Inert environment: Contact us to discuss higher temperatures

Recommended surface roughness:

$R_z = 12.5 \dots 50$  µm

Chemical resistance:  
pH = 0 ... 14

### Materials

- Filler material: 99.85 % pure graphite
  - Metal spiral: 1.4541 (321) or 1.4571 (316 Ti)
  - 9594/...R variants: Sulfur content < 100 ppm, soluble sulfates < 100 ppm
- Other materials upon request

### Recommended applications

Industries

- Chemical industry
- Petrochemical industry
- Power stations

### Standards and releases

- BAM (on request)

### Available dimensions

- Standard dimensions as per DIN EN 1514-2 or ASME B16.20 (see page 68)

### Sealing parameters

AD Directive B7

- $k_0 \times K_0 = 65 \times b_d$
  - $k_1 = 1,4 \times b_d$
- ASME Code
- Gasket factor:  $m = 2.5$
  - Minimum surface pressure:  $y = 10,000$  psi,  $y = 70$  MPa

### Spiraltherm Graphite S 9584 variants

Form as supplied	Standard	Sulfur content < 100 ppm
Rings	for tongue-and-groove flanges	9584/NF 9584/NFR
	for tongue-and-groove flanges, with compression curve	9584/NFS 9584/NFSR
	for projection and recess flanges	9584/VR 9584/VRR
	for projection and recess flanges, with inner ring	9584/VRI 9584/VRIR
	for raised-face flanges, with outer ring	9584/GA 9584/GAR
	for raised-face flanges, with inner and outer ring	9584/GIA 9584/GIAR

### Spiraltherm Graphite H 9594 variants

Form as supplied	Standard	Sulfur content < 100 ppm
Rings	for tongue-and-groove flanges	9594/NF 9594/NFR
	for tongue-and-groove flanges, with compression curve	9594/NFS 9594/NFSR
	for projection and recess flanges	9594/VR 9594/VRR
	for projection and recess flanges, with inner ring	9594/VRI 9594/VRIR
	for raised-face flanges, with outer ring	9594/GA 9594/GAR
	for raised-face flanges, with inner and outer ring	9594/GIA 9594/GIAR
Manhole gasket	9594/MH	9594/MHR



#### Advantages

- High chemical resistance
- No product contamination by PTFE possible

## Spiraltherm PTFE 9595

#### Features

Spiraltherm PTFE 9595 is a flange seal made from a V-shaped profiled stainless steel tape with spiral-wound pure PTFE middle layer. The ends of the stainless steel tape are spot-welded.

#### Operating range

Pressure:  $p = 400$  bar

Temperature

- Continuous operation:  $t = -200 \dots +280$  °C

Recommended surface

roughness:

$R_z = 12.5 \dots 50$  µm

Chemical resistance:

$pH = 0 \dots 14$

#### Standards and releases

- FDA

#### Materials

- Filler material: pure PTFE
  - Metal spiral: 1.4541 (321) or 1.4571 (316 Ti)
- Other materials upon request

#### Recommended applications

Industries

- Chemical industry
- Food industry

#### Standards and releases

- FDA

#### Available dimensions

- Standard dimensions as per DIN EN 1514-2 or ASME B16.20 (see page 68)

#### Sealing parameters

AD Directive B7

- $k_0 \times K_D = 65 \times b_d$

- $k_1 = 1,4 \times b_d$

ASME Code

- Gasket factor:  $m = 2.5$
- Minimum surface pressure:  $y = 10,000$  psi,  $y = 70$  MPa



#### Advantages

- Very high temperature stability
- Preferred use in the exhaust gas area

## Spiraltherm Mica 9596

#### Features

Spiraltherm Mica 9596 is a flange seal made from a V-shaped profiled stainless steel tape with spiral-wound mica middle layer. The ends of the stainless steel tape are spot-welded.

#### Operating range

Pressure:  $p = 10$  bar

Temperature

- Continuous operation:  $t = +600 \dots +900$  °C

Recommended surface

roughness:

$R_z = 12.5 \dots 50$  µm

Chemical resistance:

$pH = 0 \dots 14$

#### Materials

- Filler material: 98% mica
  - Metal spiral: 1.4541 (321) or 1.4571 (316 Ti)
- Other materials upon request

#### Recommended applications

Industries

- Chemical industry
- Petrochemical industry
- Nuclear power stations

#### Available dimensions

- Standard dimensions as per DIN EN 1514-2 or ASME B16.20 (see page 68)

#### Sealing parameters

AD Directive B7

- $k_0 \times K_D = 65 \times b_d$

- $k_1 = 1,4 \times b_d$

ASME Code

- Gasket factor:  $m = 2.5$
- Minimum surface pressure:  $y = 10,000$  psi,  $y = 70$  MPa

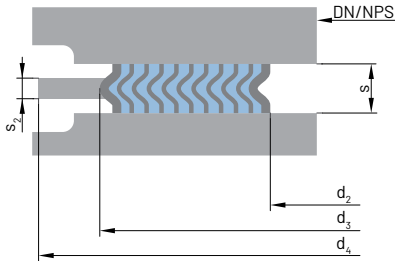
### Spiraltherm PTFE 9595 variants

Form as supplied	Standard
Rings for tongue-and-groove flanges	9595/NF
for projection and recess flanges	9595/VR
for projection and recess flanges, with inner ring	9595/VRI
for raised-face flanges, with outer ring	9595/GA
for raised-face flanges, with inner and outer ring	9595/GIA

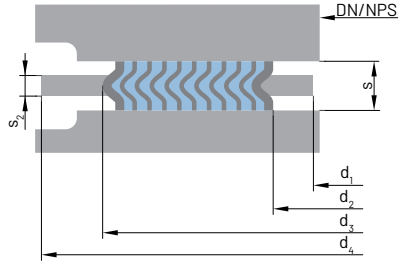
### Spiraltherm Mica 9596 variants

Form as supplied	Standard
Rings for tongue-and-groove flanges	9596/NF
for projection and recess flanges	9596/VR
for projection and recess flanges, with inner ring	9596/VRI
for raised-face flanges, with outer ring	9596/GA
for raised-face flanges, with inner and outer ring	9596/GIA

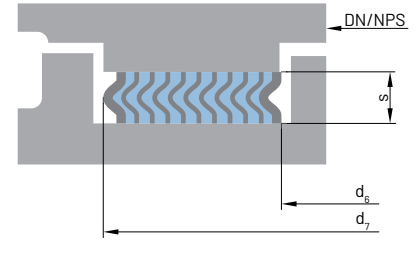
## Dimensions for spiral-wound gaskets as per DIN EN 1514-2 (2014) for flanges with flat sealing surface or recess



Spiraltherm .../GA



Spiraltherm .../GIA

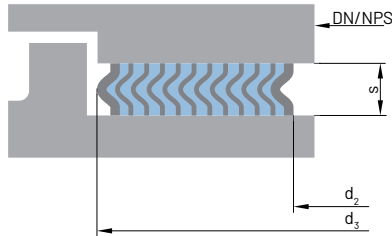


Spiraltherm .../NF

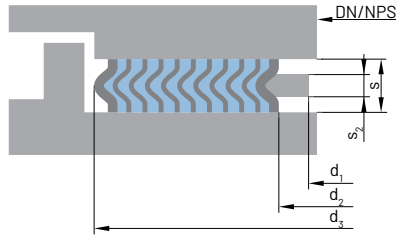
DN [mm]	d <sub>1</sub> [mm]		d <sub>2</sub> [mm]		d <sub>3</sub> [mm]		d <sub>4</sub> [mm]								
	PN 10-320	PN 10-320	PN 10-40	PN 64-160	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250 <sup>1)</sup>	PN 320 <sup>1)</sup>	PN 400 <sup>1)</sup>	
10	18	24	34	34	46	46	46	46	56	56	56	67	67	67	
15	23	29	39	39	51	51	51	51	61	61	61	72	72	78	
20	28	34	46	-	61	61	61	61	-	-	-	77	77	0	
25	35	41	53	53	71	71	71	71	82	82	82	83	92	104	
32	43	49	61	-	82	82	82	82	87	87	87	100	0	0	
40	50	56	68	68	92	92	92	92	103	103	103	109	119	135	
50	61	70	86	86	107	107	107	107	113	119	119	124	134	150	
65	77	86	102	106	127	127	127	127	137	143	143	153	170	192	
80	90	99	115	119	142	142	142	142	148	154	154	170	190	207	
100	115	127	143	147	162	162	168	168	174	180	180	202	229	256	
125	140	152	172	176	192	192	194	194	210	217	217	242	274	301	
150	167	179	199	203	218	218	224	224	247	257	257	284	311	348	
200	216	228	248	252	273	273	284	290	309	324	324	358	398	442	
250	267	279	303	307	327	329	340	352	364	391	388	442	488		
300	318	330	354	358	377	384	400	417	424	458	458	538			
350	360	376	400	404	437	444	457	474	486	512					
400	410	422	450	456	488	495	514	546	543	572					
500	510	522	550	556	593	617	624	628	657	704					
600	610	622	650	656	695	734	731	747	764	813					
700	710	722	756	762	810	804	833	852	879	950					
800	810	830	864	870	917	911	942	974	988						
900	910	930	964	970	1,017	1,011	1,042	1,084	1,108						
1,000	1,010	1,030	1,074	1,080	1,124	1,128	1,154	1,194	1,220						
1,200 <sup>1)</sup>	1,210	1,230	1,280	1,290	1,341		1,364	1,398	1,452						
1,400 <sup>1)</sup>	1,420	1,450	1,510		1,548		1,578	1,618							
1,600 <sup>1)</sup>	1,630	1,660	1,720		1,772		1,798	1,830							
1,800 <sup>1)</sup>	1,830	1,860	1,920		1,972		2,000								
2,000 <sup>1)</sup>	2,020	2,050	2,120		2,182		2,230								
2,200 <sup>1)</sup>	2,230	2,260	2,330		2,384										
2,400 <sup>1)</sup>	2,430	2,480	2,530		2,594										
2,600 <sup>1)</sup>	2,630	2,660	2,730		2,794										
2,800 <sup>1)</sup>	2,830	2,860	2,930		3,014										
3,000 <sup>1)</sup>	3,030	3,060	3,130		3,228										

<sup>1)</sup> EagleBurgmann works standard for larger dimensions and pressures.

## Dimensions for spiral-wound gaskets as per EN 12560-2 and ASME B16.20 (2007) for flanges as defined in ASME B16.5



Spiraltherm .../VR

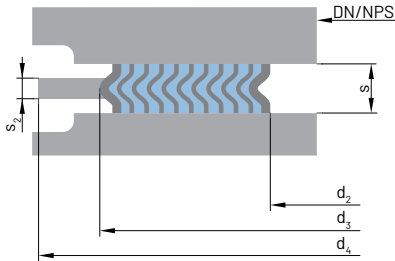


Spiraltherm .../VRI

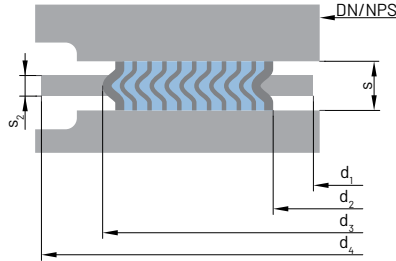
DN [mm]	NPS [inch]	d <sub>1</sub> [mm]					d <sub>2</sub> [mm]				
		Class 150-300	Class 600	Class 900	Class 1,500	Class 2,500	Class 150-300	Class 600	Class 900	Class 1,500	Class 2,500
15	1/2	14.2	14.2	14.2	14.2	14.2	19.1	19.1	19.1	19.1	19.1
20	3/4	20.6	20.6	20.6	20.6	20.6	25.4	25.4	25.4	25.4	25.4
25	1	26.9	26.9	26.9	26.9	26.9	31.8	31.8	31.8	31.8	31.8
32	1 1/4	38.1	38.1	33.3	33.3	33.3	47.8	47.8	39.6	39.6	39.6
40	1 1/2	44.5	44.5	41.4	41.4	41.4	54.1	54.1	47.8	47.8	47.8
50	2	55.6	55.6	52.3	52.3	52.3	69.9	69.9	58.7	58.7	58.7
65	2 1/2	66.5	66.5	63.5	63.5	63.5	82.6	82.6	69.9	69.9	69.9
80	3	81.0	81.0	78.7	78.7	78.7	101.6	101.6	95.3	92.2	92.2
100	4	106.4	102.6	102.6	97.8	97.8	127.0	120.7	120.7	117.6	117.6
125	5	131.8	128.3	128.3	124.5	124.5	155.7	147.6	147.6	143.0	143.0
150	6	157.2	154.9	154.9	147.3	147.3	182.6	174.8	174.8	171.5	171.5
200	8	215.9	205.7	196.9	196.9	196.9	233.4	225.6	222.3	215.9	215.9
250	10	268.2	255.3	246.1	246.1	246.1	287.3	274.6	276.4	266.7	270.0
300	12	317.5	307.3	292.1	292.1	292.1	339.9	327.2	323.9	323.9	317.5
350	14	349.3	342.9	320.8	320.8	-	371.6	362.0	355.6	362.0	-
400	16	400.1	389.9	374.7	368.3	-	422.4	412.8	412.8	406.4	-
450	18	449.3	438.2	425.5	425.5	-	474.7	469.9	463.6	463.6	-
500	20	500.1	489.0	482.6	476.3	-	525.5	520.7	520.7	514.4	-
600	24	603.3	590.6	590.6	577.9	-	628.7	628.7	628.7	616.0	-

DN [mm]	NPS [inch]	d <sub>3</sub> [mm]		d <sub>4</sub> [mm]					
		Class 150-600	Class 900-2,500	Class 150	Class 300	Class 600	Class 900	Class 1,500	Class 2,500
15	1/2	31.8	31.8	47.8	54.1	54.1	63.5	63.5	69.9
20	3/4	39.6	39.6	57.2	66.8	66.8	69.9	69.9	76.2
25	1	47.8	47.8	66.8	73.2	73.2	79.5	79.5	85.9
32	1 1/4	60.5	60.5	76.2	82.6	82.6	88.9	88.9	104.9
40	1 1/2	69.9	69.9	85.9	95.3	95.3	98.6	98.6	117.6
50	2	85.9	85.9	104.9	111.3	111.3	143.0	143.0	146.1
65	2 1/2	98.6	98.6	124.0	130.3	130.3	165.1	165.1	168.4
80	3	120.7	120.7	136.7	149.4	149.4	168.4	174.8	196.9
100	4	149.4	149.4	174.8	181.1	193.8	206.5	209.6	235.0
125	5	177.8	177.8	196.9	215.9	241.3	247.7	254.0	279.4
150	6	209.6	209.6	222.3	251.0	266.7	289.1	282.7	317.5
200	8	263.7	257.3	279.4	308.1	320.8	358.9	352.6	387.4
250	10	317.5	311.2	339.9	362.0	400.1	435.1	435.1	476.3
300	12	374.7	368.3	409.7	422.4	457.2	498.6	520.7	549.4
350	14	406.4	400.1	450.9	485.9	492.3	520.7	577.9	-
400	16	463.6	457.2	514.4	539.8	565.2	574.8	641.4	-
450	18	527.1	520.7	549.4	596.9	612.9	638.3	704.9	-
500	20	577.9	571.5	606.6	654.1	682.8	698.5	755.7	-
600	24	685.8	679.5	717.6	774.7	790.7	838.2	901.7	-

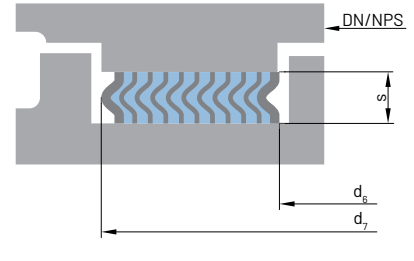
Dimensions for spiral-wound gaskets as per ASME B16.20 (2012)  
for flanges as defined in ASME B16.47



Spiraltherm .../GA



Spiraltherm .../GIA



Spiraltherm .../NF

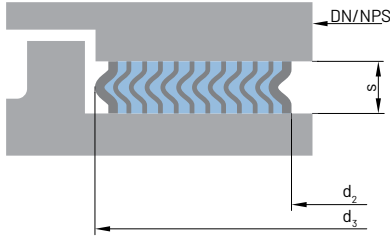
Series A

NPS [inch]	d <sub>1</sub> [mm]					d <sub>2</sub> [mm]				
	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
26	654.1	654.1	660.4	647.7	660.4	673.1	685.8	685.8	685.8	685.8
28	704.9	704.9	711.2	698.5	711.2	723.9	736.6	736.6	736.6	736.6
30	755.7	755.7	755.7	755.7	768.4	774.7	793.8	793.8	793.8	793.8
32	806.5	806.5	812.8	812.8	812.8	825.5	850.9	850.9	850.9	850.9
34	857.3	857.3	863.6	863.6	863.6	876.3	901.7	901.7	901.7	901.7
36	908.1	908.1	917.7	917.7	920.8	927.1	955.8	955.8	955.8	958.9
38	958.9	952.5	952.5	952.5	1,009.7	977.9	977.9	971.6	990.6	1,035.1
40	1,009.7	1,003.3	1,000.3	1,009.7	1,060.5	1,028.7	1,022.4	1,025.7	1,047.8	1,098.6
42	1,060.5	1,054.1	1,051.1	1,066.8	1,111.3	1,079.5	1,073.2	1,076.5	1,104.9	1,149.4
44	1,111.3	1,104.9	1,104.9	1,111.3	1,155.7	1,130.3	1,130.3	1,130.3	1,162.1	1,206.5
46	1,162.1	1,152.7	1,168.4	1,162.1	1,219.2	1,181.1	1,178.1	1,193.8	1,212.9	1,270.0
48	1,212.9	1,209.8	1,206.5	1,219.2	1,270.0	1,231.9	1,235.2	1,244.6	1,270.0	1,320.8
50	1,263.7	1,244.6	1,257.3	1,270.0	-	1,282.7	1,295.4	1,295.4	1,320.8	-
52	1,314.5	1,320.8	1,308.1	1,320.8	-	1,333.5	1,346.2	1,346.2	1,371.6	-
54	1,358.9	1,352.6	1,352.6	1,378.0	-	1,384.3	1,403.4	1,403.4	1,428.8	-
56	1,409.7	1,403.4	1,403.4	1,428.8	-	1,435.1	1,454.2	1,454.2	1,479.6	-
58	1,460.5	1,447.8	1,454.2	1,473.2	-	1,485.9	1,511.3	1,505.0	1,536.7	-
60	1,511.3	1,524.0	1,517.7	1,530.4	-	1,535.7	1,562.1	1,568.5	1,593.9	-

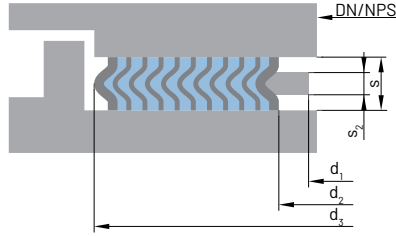
Series B

NPS [inch]	d <sub>1</sub> [mm]					d <sub>2</sub> [mm]				
	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
26	654.1	654.1	654.1	644.7	666.8	673.1	673.1	666.8	663.7	692.2
28	704.9	704.9	701.8	685.8	717.6	723.9	723.9	714.5	704.9	743.0
30	755.7	755.7	752.6	752.6	781.1	774.7	774.7	765.3	778.0	806.5
32	806.5	806.5	800.1	793.8	838.2	825.5	825.5	812.8	831.9	863.6
34	857.3	857.3	850.9	850.9	895.4	876.3	876.3	866.9	889.0	920.8
36	908.1	908.1	898.7	901.7	920.8	927.1	927.1	917.7	939.8	946.2
38	958.9	971.6	952.5	952.5	1,009.7	974.9	1,009.7	971.6	990.6	1,035.1
40	1,009.7	1,022.4	1,000.3	1,009.7	1,060.5	1,022.4	1,060.5	1,025.7	1,047.8	1,098.6
42	1,060.5	1,085.9	1,051.1	1,066.8	1,111.3	1,079.5	1,111.3	1,076.5	1,104.9	1,149.4
44	1,111.3	1,124.0	1,104.9	1,111.3	1,155.7	1,124.0	1,162.1	1,130.3	1,162.1	1,206.5
46	1,162.1	1,178.1	1,168.4	1,162.1	1,219.2	1,181.1	1,216.2	1,193.8	1,212.9	1,270.0
48	1,212.9	1,231.9	1,206.5	1,219.2	1,270.0	1,231.9	1,263.7	1,244.6	1,270.0	1,320.8
50	1,263.7	1,267.0	1,257.3	1,270.0	-	1,282.7	1,317.8	1,295.4	1,320.8	-
52	1,314.5	1,317.8	1,308.1	1,320.8	-	1,335.5	1,368.6	1,346.2	1,371.6	-
54	1,365.3	1,365.3	1,352.6	1,378.0	-	1,384.3	1,403.4	1,403.4	1,428.8	-
56	1,422.4	1,428.8	1,403.4	1,428.8	-	1,444.8	1,479.6	1,454.2	1,479.6	-
58	1,478.0	1,484.4	1,454.2	1,473.2	-	1,500.1	1,535.2	1,505.0	1,536.7	-
60	1,535.2	1,557.3	1,517.7	1,530.4	-	1,557.3	1,589.0	1,568.5	1,593.9	-





Spiraltherm .../VR



Spiraltherm .../VRI

d <sub>3</sub> [mm]					d <sub>4</sub> [mm]				
Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
704.9	736.6	736.6	736.6	736.6	774.7	835.2	831.9	866.9	882.7
755.7	787.4	787.4	787.4	787.4	831.9	898.7	892.3	914.4	946.2
806.5	844.6	844.6	844.6	844.6	882.7	952.5	946.2	971.6	1,009.7
860.6	901.7	901.7	901.7	901.7	939.8	1,006.6	1,003.3	1,022.4	1,073.2
911.4	952.5	952.5	952.5	952.5	990.6	1,057.4	1,054.1	1,073.2	1,136.7
968.5	1,006.6	1,006.6	1,006.6	1,009.7	1,047.8	1,117.6	1,117.6	1,130.3	1,200.2
1,019.3	1,016.0	1,022.4	1,041.4	1,085.9	1,111.3	1,054.1	1,073.2	1,104.9	1,200.2
1,070.1	1,070.1	1,076.5	1,098.6	1,149.4	1,162.1	1,114.6	1,127.3	1,155.7	1,251.0
1,124.0	1,120.9	1,127.3	1,155.7	1,200.2	1,219.2	1,165.4	1,178.1	1,219.2	1,301.8
1,178.1	1,181.1	1,181.1	1,212.9	1,257.3	1,276.4	1,219.2	1,231.9	1,270.0	1,368.6
1,228.9	1,228.9	1,244.6	1,263.7	1,320.8	1,327.2	1,273.3	1,289.1	1,327.2	1,435.1
1,279.7	1,286.0	1,295.4	1,320.8	1,371.6	1,384.3	1,324.1	1,346.2	1,390.7	1,485.9
1,333.5	1,346.2	1,346.2	1,371.6	-	1,435.1	1,378.0	1,403.4	1,447.8	-
1,384.3	1,397.0	1,397.0	1,422.4	-	1,492.3	1,428.8	1,454.2	1,498.6	-
1,435.1	1,454.2	1,454.2	1,479.6	-	1,549.4	1,492.3	1,517.7	1,555.8	-
1,485.9	1,505.0	1,505.0	1,530.4	-	1,606.6	1,543.1	1,568.5	1,612.9	-
1,536.7	1,562.1	1,555.8	1,587.5	-	1,663.7	1,593.9	1,619.3	1,663.7	-
1,587.5	1,612.9	1,619.3	1,644.7	-	1,714.5	1,644.7	1,682.8	1,733.6	-

d <sub>3</sub> [mm]					d <sub>4</sub> [mm]				
Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
698.5	711.2	698.5	714.5	749.3	725.4	771.7	746.3	765.3	838.2
749.3	762.0	749.3	755.7	800.1	776.2	825.5	800.1	819.2	901.7
800.1	812.8	806.5	828.8	857.3	827.0	886.0	857.3	879.6	958.9
850.9	863.6	860.6	882.7	914.4	881.1	939.8	911.4	933.5	1,016.0
908.1	914.4	911.4	939.8	971.6	935.0	993.9	962.2	997.0	1,073.2
958.9	965.2	965.2	990.6	997.0	987.6	1,047.8	1,022.4	1,047.8	1,124.0
1,009.7	1,047.8	1,022.4	1,041.4	1,085.9	1,044.7	1,098.6	1,073.2	1,104.9	1,200.2
1,063.8	1,098.6	1,076.5	1,098.6	1,149.4	1,095.5	1,149.4	1,127.3	1,155.7	1,251.0
1,114.6	1,149.4	1,127.3	1,155.7	1,200.2	1,146.3	1,200.2	1,178.1	1,219.2	1,301.8
1,165.4	1,200.2	1,181.1	1,212.9	1,257.3	1,197.1	1,251.0	1,231.9	1,270.0	1,368.6
1,224.0	1,254.3	1,244.6	1,263.7	1,320.8	1,255.7	1,317.8	1,289.1	1,327.2	1,435.1
1,270.0	1,311.4	1,295.4	1,320.8	1,371.6	1,306.6	1,368.6	1,346.2	1,390.7	1,485.9
1,325.6	1,355.9	1,346.2	1,371.6	-	1,357.4	1,419.4	1,403.4	1,447.8	-
1,376.4	1,406.7	1,397.0	1,422.4	-	1,408.2	1,470.2	1,454.2	1,498.6	-
1,422.4	1,454.2	1,454.2	1,479.6	-	1,463.8	1,530.4	1,517.7	1,555.8	-
1,478.0	1,524.0	1,505.0	1,530.4	-	1,514.6	1,593.9	1,568.5	1,612.9	-
1,528.8	1,573.3	1,555.8	1,587.5	-	1,579.6	1,655.8	1,619.3	1,663.7	-
1,586.0	1,630.4	1,619.3	1,644.7	-	1,630.4	1,706.6	1,682.8	1,733.6	-

## Serrated gaskets

### Properties

EagleBurgmann serrated gaskets consist of a metal base plate machined with a comb-shaped profile and a soft overlay which may be made from graphite, PTFE, fiber-reinforced materials, silver or other soft material depending on the sealing requirements. The specific properties of the metal and soft material are thus combined and create high mechanical stability in the gasket which is also highly adaptable. The tips of the comb in the metal gasket create high surface pressure, thus improving the tightness while the "valleys" compartmentalize the seal material and reduce cold flow.

### Advantages

- High blow-out resistance due to the gasket's geometry
- High operational reliability
- The serrated base plate can be reused
- Very high operational pressures are possible
- Low surface pressure is needed
- Very suitable for applications with pressure and temperature cycles
- Very low leakage rates for fluids and gases
- No ageing or embrittlement
- Excellent for handling during transportation, assembly and removal

### Types

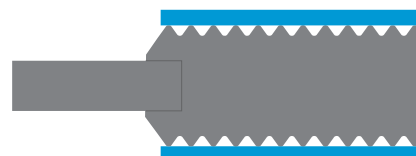
The product portfolio comprises serrated gaskets without, with integral (style IR) and with loose centering ring (style LR). A centering ring is used during assembly to center the gasket centrally in the flange in order to avoid a reduction in pipe cross-section. The integrated centering ring has a defined breaking point that breaks in the event of vibration on the gasket, thus protecting the sealing element against cracking or breaking.

The EagleBurgmann portfolio also includes convex, serrated gaskets. With these, the profile depth of the "valleys" gradually decreases towards the center of the profile which improves the sealing behavior compared to standard profiles. The convex style makes the soft sealing overlay thicker in the middle of the profile than at the inner and outer edges of the gasket. Here, the surface pressure - which is most effective in the middle of the profile - helps the sealing overlay to flow particularly well into any irregularities on the flange. For this reason, convex serrated gaskets are preferred where the flange face tilt is severe under changing pressures and temperatures.

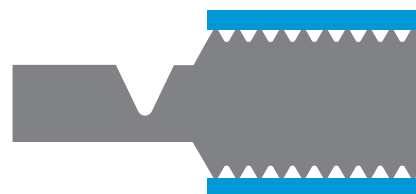
### Range of applications

Serrated gaskets are used wherever there are high pressures and temperatures that need to be safely controlled. Thus they can be found in both conventional and nuclear power stations, for example in the form of a heat exchanger, valve cover or manhole cover seal. EagleBurgmann serrated gaskets are also used in the chemical and petrochemical industries.

### Serrated gaskets with centering ring

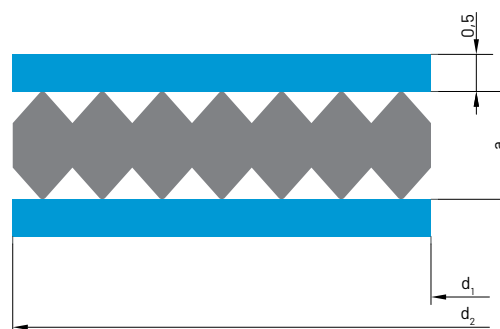


Serrated gaskets with loose centering ring (style LR)

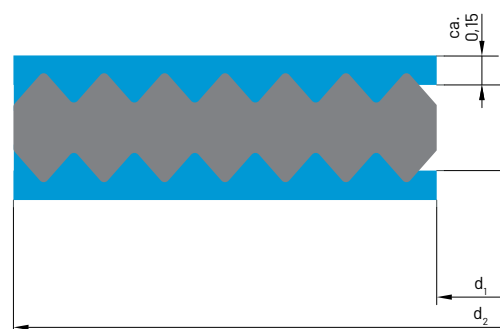


Serrated gaskets with integral (style IR) with defined breaking point

### Installation notes



Condition of gasket before fitting



Condition of gasket in use / after fitting



### Advantages

- Maximum compressive strength
- Low minimum surface pressure required
- High temperature stability
- Ideal for withstanding temperature/pressure cycling

## Camprofile serrated gasket 9598 / 9588

### Features

The serrated gasket 9598 has a concentrically-machined profile based on a 4 mm thick stainless steel base plate. This is coated on both sides with a 0.5 mm thick layer of pure graphite (purity  $\geq 99.85\%$  or  $> 98\%$ ). Thicker layers are available on request. The serrated gasket 9598 is easy to handle and is particularly suitable for applications in the chemical and petrochemical industries and in power station technology.

### Operating range

Pressure:  $p = 400$  bar  
Higher pressures available on request  
Temperature

- Continuous operation:  
 $t = -200 \dots +550$  °C

Recommended surface roughness:  
 $R_z = 12.5 \dots 50$   $\mu\text{m}$

Chemical resistance:  
 $\text{pH} = 0 \dots 14$

### Materials

- Serrated ring:  
Standard 1.4541 and 1.4571
- Gasket overlay: Statotherm pure graphite, purity  $\geq 99.85\%$  or  $> 98\%$

### Recommended applications

#### Industries

- Process industry
- Oil & gas industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Building services engineering

#### Mechanical units

- Heat exchanger
- Covers
- Tank hatches
- Process boilers
- Flanged connections
- Pipe connections
- Furnaces
- Maintenance seal

### Standards and releases

- TA Luft
- Fire-safe (API 607)

### Available dimensions

- Standard dimensions as per DIN EN 1514-6, EN 12560-6 or ASME B16.20 (see page 74)

### Note

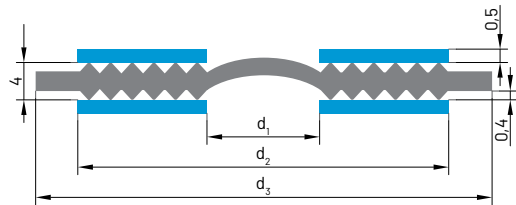
After the initial warm-up, we recommend retightening the bolts (with the system depressurized) in order to compensate for any minor settling of the overlay material and thus maintain optimum surface pressure.

If the gasket is replaced, the undamaged serrated profile ring can be reused.

### Serrated gasket 9598 variants

Form as supplied	Graphite purity	
	99.85 %	> 98 %
Rings		
with graphite overlay, without centering ring - style NO	9598/P	9588/P
with graphite overlay, with centering ring - style IR or LR	9598/PZ	9588/PZ
with graphite overlay, convex style	9598/PB	9588/PB
with silver overlay, 0.5 mm silver, for $T < 700$ °C	9598/S	9588/S
with sintered PTFE as overlay, 0.5 mm	9598/T	9588/T
Serrated ring made from material 1.4828 with mica overlay for $T < 950$ °C	9598/HT	9588/HT

Dimensions for serrated gaskets



Conforms to DIN EN 1514-6 (2004)

DN [mm]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]			d <sub>3</sub> [mm]										
		PN 10-40	PN 64-160	PN 250-400	PN 10	PN 16	PN 25	PN 40	PN 64	PN 100	PN 160	PN 250	PN 320	PN 400	
10	22	36	36	36	46	46	46	46	56	56	56	67	67	67	
15	26	42	42	42	51	51	51	51	61	61	61	72	72	-	
20	31	47	47	47	61	61	61	61	-	-	-	-	-	-	
25	36	52	52	52	71	71	71	71	82	82	82	83	92	104	
32	46	62	62	66	82	82	82	82	-	-	-	-	-	-	
40	53	69	69	73	92	92	92	92	103	103	103	109	119	135	
50	65	81	81	87	107	107	107	107	113	119	119	124	134	150	
65	81	100	100	103	127	127	127	127	137	143	143	153	170	192	
80	95	115	115	121	142	142	142	142	148	154	154	170	190	207	
100	118	138	138	146	162	162	168	168	174	180	180	202	229	256	
125	142	162	162	178	192	192	194	194	210	217	217	242	274	301	
150	170	190	190	212	217	217	224	224	247	257	257	284	311	348	
175	195	215	215	245	247	247	254	265	277	287	284	316	358	402	
200	220	240	248	280	272	272	284	290	309	324	324	358	398	442	
250	270	290	300	340	327	328	340	352	364	391	388	442	488	-	
300	320	340	356	400	377	383	400	417	424	458	458	536	-	-	
350	375	395	415	-	437	443	457	474	486	512	-	-	-	-	
400	426	450	474	-	489	495	514	546	543	572	-	-	-	-	
450	480	506	-	-	539	555	-	571	-	-	-	-	-	-	
500	530	560	588	-	594	617	624	628	657	704	-	-	-	-	
600	630	664	700	-	695	734	731	747	764	813	-	-	-	-	
700	730	770	812	-	810	804	833	852	879	950	-	-	-	-	
800	830	876	886	-	917	911	942	974	988	-	-	-	-	-	
900	930	982	994	-	1,017	1,011	1,042	1,084	1,108	-	-	-	-	-	
1,000	1,040	1,098	1,110	-	1,124	1,128	1,154	1,194	1,220	-	-	-	-	-	
1,200	1,250	1,320	1,334	-	1,341	1,342	1,364	1,398	1,452	-	-	-	-	-	
1,400	1,440	1,522	-	-	1,548	1,542	1,578	1,618	-	-	-	-	-	-	
1,600	1,650	1,742	-	-	1,772	1,764	1,798	1,830	-	-	-	-	-	-	
1,800	1,850	1,914	-	-	1,972	1,964	2,000	-	-	-	-	-	-	-	
2,000	2,050	2,120	-	-	2,182	2,168	2,230	-	-	-	-	-	-	-	
2,200	2,250	2,328	-	-	2,384	2,378	-	-	-	-	-	-	-	-	
2,400	2,460	2,512	-	-	2,594	-	-	-	-	-	-	-	-	-	
2,600	2,670	2,728	-	-	2,794	-	-	-	-	-	-	-	-	-	
2,800	2,890	2,952	-	-	3,014	-	-	-	-	-	-	-	-	-	
3,000	3,100	3,166	-	-	3,228	-	-	-	-	-	-	-	-	-	

**Conforms to DIN EN 12560-6 for flanges as defined in ASME B16.5**

NPS [inch]	d <sub>1</sub> [mm]	d <sub>2</sub> [mm]	d <sub>3</sub> [mm]						
			Class 150	Class 300	Class 400	Class 600	Class 900	Class 1500	Class 2500
1/2	23.0	33.3	44.4	50.8	50.8	50.8	60.3	60.3	66.7
3/4	28.6	39.7	53.9	63.5	63.5	63.5	66.7	66.7	73.0
1	36.5	47.6	63.5	69.8	69.8	69.8	76.2	76.2	82.5
1 1/4	44.4	60.3	73.0	79.4	79.4	79.4	85.7	85.7	101.6
1 1/2	52.4	69.8	82.5	92.1	92.1	92.1	95.2	95.2	114.3
2	69.8	88.9	101.6	108.0	108.0	108.0	139.7	139.7	142.8
2 1/2	82.5	101.6	120.6	127.0	127.0	127.0	161.9	161.9	165.1
3	98.4	123.8	133.4	146.1	146.1	146.1	165.1	171.5	193.7
3 1/2	111.1	136.5	158.8	161.9	158.7	-	-	-	-
4	123.8	154.0	171.5	177.8	174.6	190.5	203.2	206.4	231.7
5	150.8	182.6	193.7	212.7	209.5	238.1	244.5	250.8	276.2
6	177.8	212.7	219.1	247.7	244.5	263.5	285.8	279.4	314.3
8	228.6	266.7	276.2	304.8	301.6	317.5	355.6	349.3	384.1
10	282.6	320.7	336.5	358.8	355.6	396.9	431.8	431.8	473.0
12	339.7	377.8	406.4	419.1	415.9	454.0	495.3	517.1	546.1
14	371.5	409.6	447.7	482.6	479.4	488.9	517.5	574.7	-
16	422.3	466.7	511.2	536.6	533.4	561.9	571.5	638.1	-
18	479.4	530.2	546.1	593.7	590.5	609.6	635.0	701.7	-
20	530.2	581.0	603.2	650.9	644.5	679.5	695.3	752.4	-
22	581.0	631.8	657.2	701.7	698.5	730.3	-	-	-
24	631.8	682.6	714.4	771.5	765.2	787.4	835.0	898.5	-

**Conforms to ASME B16.20 for flanges as defined in ASME B16.47, series A**

NPS [inch]	d <sub>1</sub> [mm]					d <sub>2</sub> [mm]					d <sub>3</sub> [mm]				
	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
26	673	686	686	686	686	705	737	737	737	737	775	835	832	867	883
28	724	737	737	737	737	756	787	787	787	787	832	899	892	914	946
30	775	794	794	794	794	807	845	845	845	845	883	953	946	972	1010
32	826	851	851	851	851	861	902	902	902	902	940	1007	1003	1022	1073
34	876	902	902	902	902	911	953	953	953	953	991	1057	1054	1073	1137
36	927	956	956	956	959	969	1007	1007	1007	1010	1048	1118	1118	1130	1200
38	978	978	972	991	1035	1019	1016	1022	1041	1086	1111	1054	1073	1105	1200
40	1029	1022	1026	1048	1099	1070	1070	1077	1099	1149	1162	1115	1127	1156	1251
42	1080	1073	1077	1105	1149	1124	1121	1127	1156	1200	1219	1165	1178	1219	1302
44	1130	1130	1130	1162	1207	1178	1181	1181	1213	1257	1276	1219	1232	1270	1369
46	1181	1178	1194	1213	1270	1229	1229	1245	1264	1321	1327	1273	1289	1327	1435
48	1232	1235	1245	1270	1321	1280	1286	1295	1321	1372	1384	1324	1346	1391	1486
50	1283	1295	1295	1321	-	1334	1346	1346	1372	-	1435	1378	1403	1448	-
52	1334	1346	1346	1372	-	1384	1397	1397	1422	-	1492	1429	1454	1499	-
54	1384	1403	1403	1429	-	1435	1454	1454	1480	-	1549	1492	1518	1556	-
56	1435	1454	1454	1480	-	1486	1505	1505	1530	-	1607	1543	1569	1613	-
58	1486	1511	1505	1537	-	1537	1562	1556	1588	-	1664	1594	1619	1664	-
60	1537	1562	1569	1594	-	1588	1613	1619	1645	-	1715	1645	1683	1734	-

**Conforms to ASME B16.20 for flanges as defined in ASME B16.47, series B**

NPS [inch]	d <sub>1</sub> [mm]					d <sub>2</sub> [mm]					d <sub>3</sub> [mm]				
	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900	Class 150	Class 300	Class 400	Class 600	Class 900
26	673	673	667	664	692	699	699	699	715	749	725	772	746	765	838
28	724	724	715	705	743	749	749	749	756	800	776	826	800	819	902
30	775	775	765	778	807	800	800	807	829	857	827	886	857	880	959
32	826	826	813	832	864	851	851	861	883	914	881	940	911	934	1016
34	876	876	867	889	921	908	908	911	940	972	935	994	962	997	1073
36	927	927	918	940	946	959	959	965	991	997	988	1048	1022	1048	1124
38	975	1010	972	991	1035	1010	1010	1022	1041	1086	1045	1099	1073	1105	1200
40	1022	1061	1026	1048	1099	1064	1064	1077	1099	1149	1096	1149	1127	1156	1251
42	1080	1111	1077	1105	1149	1115	1115	1127	1156	1200	1146	1200	1178	1219	1302
44	1124	1162	1130	1162	1207	1165	1165	1181	1213	1257	1197	1251	1232	1270	1369
46	1181	1216	1194	1213	1270	1224	1224	1245	1264	1321	1256	1318	1289	1327	1435
48	1232	1264	1245	1270	1321	1270	1270	1295	1321	1372	1307	1369	1346	1391	1486
50	1283	1318	1295	1321	-	1326	1326	1346	1372	-	1357	1419	1403	1448	-
52	1334	1369	1346	1372	-	1376	1376	1397	1422	-	1408	1470	1454	1499	-
54	1384	1403	1403	1429	-	1422	1422	1454	1480	-	1464	1530	1518	1556	-
56	1445	1480	1454	1480	-	1478	1478	1505	1530	-	1515	1594	1569	1613	-
58	1501	1535	1505	1537	-	1529	1529	1556	1588	-	1580	1656	1619	1664	-
60	1557	1589	1569	1594	-	1586	1586	1619	1645	-	1630	1707	1683	1734	-

## Ring-type joint gaskets

### Properties

Buralloy ring-type joint gaskets are all-metal turned seals which deform plastically under axial compressive load and thus flow into the flange groove. The load-bearing surface of the ring type joint is relatively small, so a very high surface pressure results between the sealing surfaces of the sealing ring and the groove.

### Advantages

- Very high tightness, considered to be technically leak-proof
- Very easy to handle during transportation, assembly and removal
- Very robust
- Suitable for extreme pressure and temperature requirements
- Certified quality

### Production

The material for Buralloy ring-type joint gaskets should be selected and ordered to match the hardness required. When selecting the material, remember that the ring-type joint gasket must never be harder than the flange as this could damage the flange. When we manufacture the seal, the hardness of the material is monitored in detail; we ensure that the surface hardness of the sealing rings is sufficient to guarantee a fully working seal that will not damage the flange. When we turn the seal, if it proves to be harder than required, the hardness can be reduced by soft annealing.

### Types

Buralloy ring-type joint gaskets are manufactured with oval or octagonal shapes for flanges with flat sealing surfaces or flanges with osculating radius. We distinguish between the following ring-type joint gasket styles:

- R (oval)
- ROK (octagonal)
- RX (octagonal, significantly larger than ROK)
- BX (octagonal, with pressure equalization hole)
- SBX (octagonal, with pressure equalization hole, as per API 17D)
- SRX (oval, with pressure equalization hole, as per API 17D)

### Range of applications

Buralloy ring-type joint gaskets are used wherever high internal pressures and temperatures need to be safely controlled. Depending on the material used, they can be found in the chemical and petrochemical industries and in both conventional and nuclear power stations.

### Materials in Buralloy ring-type joint gaskets 2961

Material	Material code	DIN specification	DIN material code	BS	AISI-ASTM UNS	Maximum hardness	
						Brinell HB	Rockwell B HRB
Soft iron	D	-	-	-	-	90	56
Steel (low-carbon)	S	S 235	-	-	-	120	68
F5	F5	12CrMo19 5	1.7362	-	A 182 F5	130	72
SS 304	S304	X5Cr Ni 18	1.4301	304S15/16/13	304	160	83
SS 304L	S304L	X2 Cr Ni 18.9	1.4306	304S11	304L	160	83
SS309	S309	X15 Cr Ni Si 20.12	1.4828	304S24	309	160	83
SS 316	S316	X5 Cr Ni Mo 18.10	1.4401	316S16	316	160	83
SS 316L	S316L	X2 Cr Ni Mo 18.10	1.4404	316S11/13	316 L	160	83
SS 316Ti	S316Ti	X10 Cr Ni Mo Ti 18.10	1.4571	320S31	316Ti	160	83
SS 321	S321	X10 Cr Ni Ti 18.9	1.4541	321S12/49/87	321	160	83
SS 347	S347	X10 Cr Ni Nb 18.9	1.4550	347S31	347	160	83
SS 410	S410	X6 Cr 13	1.4000	410S21	410	170	86
254SMO	S 254	X1 Cr Ni Mo Cu N 20.18.7	1.4547	-	S31254	180	89
Duplex	S 803	X2 Cr Ni Mo N 22.5.3	1.4462	31853	S31803/32205	230	approx. 99
Super Duplex	S 750	X2 Cr Ni Mo N 25.6.3	1.4410	-	S32750	230	approx. 99
Aluminum	AL 1050	Al 99.5	3.0255	1B	A91050	30	-
Silver	Ag	-	-	-	-	28 (HV)	-
Copper	Cu	SF-CU	2.0090	CI06	C12200	80 approx.	-
Brass	CuZn37	Cu Za 37 (M563)	2.0321	CZ108	C27200	60 approx.	-
Nickel 200	Ni 200	Ni 99.2	2.4066	3072-70 NA11	NO2200	110	62
Monel 400	N 400	Ni Cu 30 Fe	2.4360	3072-76 NA13	NO4400	150	80
Inconel 600	N 600	Ni Cu 15 Fe	2.4816	3072-76 NA14	NO6600	150	80
Inconel 625	N 625	Ni Cr 22 Mo 9 Mb	2.4856	3072-76 NA21	NO6625	150	80
Incoloy 800	N 800	X10 Ni Cr Al Ti 3220	1.4876	3072-76 NA15	NO8800	150	80
Incoloy 825	N 825	Ni Cr 21 Mo	2.4858	3072-76 NA16	NO8825	195	92
Hastelloy B2	B2	Ni Mo 28	2.4617	-	NI0665	230	99
Hastelloy C276	C276	Ni Mo 16 Cr 15W	2.4819	-	NI0276	210	95
Type 904	N 904	X1 Ni Cr Mo Cu 25.20.5	1.7440	904S13	NO8904	160	83
Titanium	Ti2	Ti 99.8	3.7025	TA2	R50400	-	-





**R style**  
oval

Style R gaskets can be used for flanges with a flat-bottomed groove. Tensioning the flanges deforms the oval ring-type joint gasket, creating linear contact between flange and seal. This area of contact widens as the surface pressure increases. The size of the sealing surface is thus dependent on the force applied while fitting. The oval shape is preferred for the ring-type joint gasket where bolt forces are low and the extent of radial stretching or misalignment differs.



**BX style**  
octagonal, with pressure equalization hole

Just like the RX, the BX style is another pressure-optimized version of the ring-type joint gasket. The BX can only be used in flanges conforming to API 6A, however, which means it cannot be replaced by style ROK or RX ring-type joint gaskets. The BX has a hole which serves to equalize the pressure between the two sides of the flange.



**ROK style**  
octagonal

ROK style seals can also be used for flanges with a flat-bottomed groove and a 23° angle to the groove wall. By its very nature, the octagonal form of the ring creates a distributed load so the size of the sealing surface is independent of the force applied while fitting. The octagonal ring-type joint gasket is used in most cases.



**SBX style**  
octagonal, with pressure equalization hole, as per API 17D

The SBX style is a variant of the BX which meets the special requirements of API 17D and is thus suitable for use in drilling equipment for subsea applications and Christmas tree equipment (special valve arrangement for regulating the flow rate when drilling for crude oil and natural gas).



**RX style**  
octagonal, significantly larger than ROK

Just like the ROK, the RX style gasket is used for flanges with a flat-bottomed groove and a 23° angle to the groove wall. The optimized shape allows the RX to utilize the energy from the applied pressure which has a positive impact on the sealing characteristics.



**SRX style**  
oval, with pressure equalization hole, as per API 17D

The SRX style is a variant of the RX which meets the special requirements of API 17D and is thus suitable for use in drilling equipment for subsea applications and Christmas tree equipment (special valve arrangement for regulating the flow rate when drilling for crude oil and natural gas).



## Advantages

- Metal-to-metal contact creates a reliable seal
- Suitable for extreme pressure and temperature requirements
- Certified quality (including surface hardness)

## Buralloy Ring Type Joint 2961

### Features

Buralloy ring-type joint 2961 (RTJ) gaskets are manufactured from metallic materials in compliance with American standard ASME B 16.20 and the API specification. Detailed monitoring of every manufacturing step guarantees that the sealing rings offer the necessary surface hardness.

This creates a functional seal without damage to the flanges. This gasket type is used successfully in downstream refinery applications, for example.

RTJ gaskets are also commonly used in high-pressure valves and the associated pipe connections and in pressure vessel joints.

### Operating range

The pressure and temperature depend on the combination of materials used.

Chemical resistance: The corrosion resistance depends on the selected ring material.

### Materials

RTJ gaskets are available as standard in soft metal and in 304, 316 and stainless steels. Versions in other materials on request.

### Recommended applications

Industries

- Oil & gas industry
- Petrochemical industry

### Standards and releases

All RTJ gaskets are manufactured to API standards, guaranteeing consistent quality.

### Available dimensions







- Standard dimensions as per DIN EN 12560-5 or ASME B16.20 (see page 80)
- RTJ gaskets are available from stock in ½" to 36" and 15 mm to 900 mm sizes, and in the commonly available materials to suit most ASME and DIN flange dimensions. Larger sizes and special requirements are available to order.

### How it works

Under axial compressive load, ring type joints plastically deform and flow into the irregularities of the flange groove. Since the contact area of the ring type joint is relatively small, a very high compressive load results between the sealing surface of the ring type joint and the flange groove. This surface pressure is further increased especially by the RX and BX RTJ variants. Both variants are able to seal extremely high internal pressures. RTJ gaskets are produced from metal, so they remain in their compressed form, even when the surface pressure is relaxed. The sealing function of the RTJ gasket is reinforced by the axial forces acting on the sealing surfaces.

## Buralloy ring-type joint 2961 variants

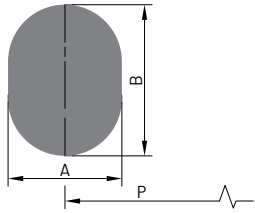
### Form as supplied

Rings	Style	Part Number
	oval style	2961/R
	octagonal style	2961/ROK
	octagonal style with larger flange make-up distance	2961/RX
	octagonal style with hole for equalizing the resulting pressure	2961/BX
	octagonal style with hole for equalizing the resulting pressure as per API 17D	2961/SBX
	octagonal style with larger flange make-up distance and hole for equalizing the resulting pressure as per API 17D	2961/SRX

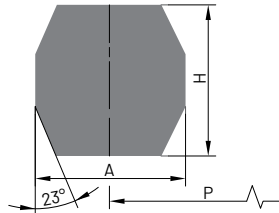


Dimensions for ring-type joint gaskets

Type R



Type ROK



Tolerances (inch)

Ring cross-section	A	±0,008
Ring height	B, H	±0,020
Average ring spacing	P	±0,007
Angle/chamfer	23°	±0,5°

Dimensions for Buralloy type R and ROK ring-type joint gaskets as per DIN EN 12560-5 (2001) or ASME B16.20 (2017) for flanges as defined in ASME B16.5 and B16.47, style A

Ring number	NPS [inch]	class	Center diameter P		Cross-section A		Oval height, B		Octagonal height, H	
			[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
R-11	1/2	300 to 600	34.14	1.344	6.35	0.250	11.2	0.44	9.7	0.38
R-12	1/2	900, 1,500	39.70	1.563	7.95	0.313	14.2	0.56	12.7	0.50
R-13	1/2	2,500	42.88	1.688	7.95	0.313	14.2	0.56	12.7	0.50
	3/4	300 to 600								
R-14	3/4	900, 1,500	44.45	1.750	7.95	0.313	14.2	0.56	12.7	0.50
R-15	1	150	47.63	1.875	7.95	0.313	14.2	0.56	12.7	0.50
R-16	3/4	2,500	50.80	2.000	7.95	0.313	14.2	0.56	12.7	0.50
	1	300 to 1,500								
R-17	1 1/4	150	57.15	2.250	7.95	0.313	14.2	0.56	12.7	0.50
R-18	1	2,500	60.33	2.375	7.95	0.313	14.2	0.56	12.7	0.50
	1 1/4	300 to 1,500								
R-19	1 1/2	150	65.10	2.563	7.95	0.313	14.2	0.56	12.7	0.50
R-20	1 1/2	300 to 1,500	68.28	2.688	7.95	0.313	14.2	0.56	12.7	0.50
R-21	1 1/4	2,500	72.24	2.844	11.13	0.438	17.5	0.69	16.0	0.63
R-22	2	150	82.55	3.250	7.95	0.313	14.2	0.56	12.7	0.50
R-23	1 1/2	2,500	82.55	3.250	11.13	0.438	17.5	0.69	16.0	0.63
	2	300 to 600								
R-24	2	900, 1,500	95.25	3.750	11.13	0.438	17.5	0.69	16.0	0.63
R-25	2 1/2	250	101.60	4.000	7.95	0.313	14.2	0.56	12.7	0.50
R-26	2	2,500	101.60	4.000	11.13	0.438	17.5	0.69	16.0	0.63
	2 1/2	300 to 600								
R-27	2 1/2	900, 1,500	107.95	4.250	11.13	0.438	17.5	0.69	16.0	0.63
R-28	2 1/2	2,500	111.13	4.375	12.70	0.500	19.1	0.75	17.5	0.69
R-29	3	150	114.30	4.500	7.95	0.313	14.2	0.56	12.7	0.50
R-30	3	300 to 600	117.48	4.625	11.13	0.438	17.5	0.69	16.0	0.63
R-31	3	300 to 900	123.83	4.875	11.13	0.438	17.5	0.69	16.0	0.63
R-32	3	2,500	127.00	5.000	12.70	0.500	19.1	0.75	17.5	0.69
R-33	3 1/2	150	131.78	5.188	7.95	0.313	14.2	0.56	12.7	0.50
R-34	3 1/2	300 to 600	131.78	5.188	11.13	0.438	17.5	0.69	16.0	0.63
R-35	3	1,500	136.53	5.375	11.13	0.438	17.5	0.69	16.0	0.63
R-36	4	150	149.23	5.875	7.95	0.313	14.2	0.56	12.7	0.50
R-37	4	300 to 900	149.23	5.875	11.13	0.438	17.5	0.69	16.0	0.63
R-38	4	2,500	157.18	6.188	15.88	0.625	22.4	0.88	20.6	0.81
R-39	4	1,500	161.93	6.375	11.13	0.438	17.5	0.69	16.0	0.63
R-40	5	150	171.45	6.750	7.95	0.313	14.2	0.56	12.7	0.50
R-41	5	300 to 900	180.98	7.125	11.13	0.438	17.5	0.69	16.0	0.63
R-42	5	2,500	190.50	7.500	19.05	0.750	25.4	1.00	23.9	0.94
R-43	6	150	193.68	7.625	7.95	0.313	14.2	0.56	12.7	0.50
R-44	5	1,500	193.68	7.625	11.13	0.438	17.5	0.69	16.0	0.63
R-45	6	300 to 900	211.15	8.313	11.13	0.438	17.5	0.69	16.0	0.63
R-46	6	1,500	211.15	8.313	12.70	0.500	19.1	0.75	17.5	0.69

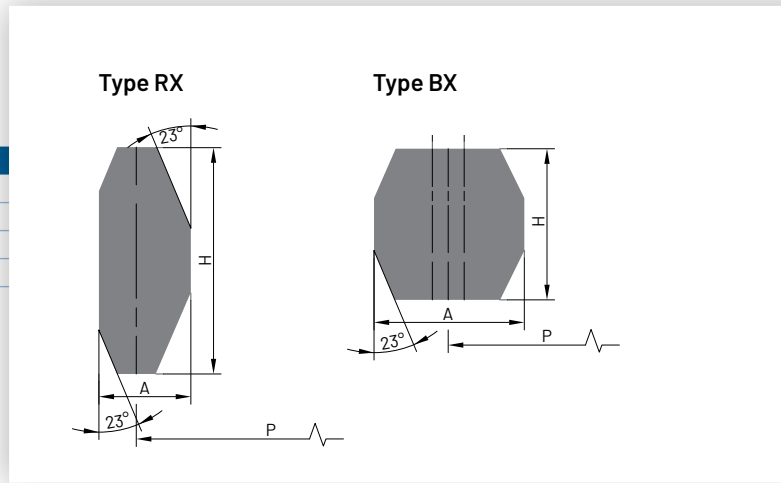
**Dimensions for Buralloy type R and ROK ring-type joint gaskets as per DIN EN 12560-5 (2001) or ASME B16.20 (2017)  
for flanges as defined in ASME B16.5 and B16.47, style A**

Ring number	NPS [inch]	class	Center diameter P		Cross-section A		Oval height, B		Octagonal height, H	
			[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
R-47	6	2,500	228.60	9.000	19.05	0.750	25.4	1.00	23.9	0.94
R-48	8	150	247.65	9.750	7.95	0.313	14.2	0.56	12.7	0.50
R-49	8	300 to 900	269.88	10.625	11.13	0.438	17.5	0.69	16.0	0.63
R-50	8	1,500	269.88	10.625	15.88	0.625	22.4	0.88	20.6	0.81
R-51	8	2,500	279.40	11.000	22.23	0.875	28.7	1.13	26.9	1.06
R-52	10	150	304.80	12.000	7.95	0.313	14.2	0.56	12.7	0.50
R-53	10	300 to 900	323.85	12.750	11.13	0.438	17.5	0.69	16.0	0.63
R-54	10	1,500	323.85	12.750	15.88	0.625	22.4	0.88	20.6	0.81
R-55	10	2,500	342.90	13.500	28.58	1.125	36.6	1.44	35.1	1.38
R-56	12	150	381.00	15.000	7.95	0.313	14.2	0.56	12.7	0.50
R-57	12	300 to 900	381.00	15.000	11.13	0.438	17.5	0.69	16.0	0.63
R-58	12	1,500	381.00	15.000	22.23	0.875	28.7	1.13	26.9	1.06
R-59	14	150	396.88	15.625	7.95	0.313	14.2	0.56	12.7	0.50
R-60	12	2,500	406.40	16.000	31.75	1.250	39.6	1.56	38.1	1.50
R-61	14	300 to 600	419.10	16.500	11.13	0.438	17.5	0.69	16.0	0.63
R-62	14	900	419.10	16.500	15.88	0.625	22.4	0.88	20.6	0.81
R-63	14	1,500	419.10	16.500	25.40	1.000	33.3	1.31	31.8	1.25
R-64	16	150	454.03	17.875	7.95	0.313	14.2	0.56	12.7	0.50
R-65	16	300 to 600	469.90	18.500	11.13	0.438	17.5	0.69	16.0	0.63
R-66	16	900	469.90	18.500	15.88	0.625	22.4	0.88	20.6	0.81
R-67	16	1,500	469.90	18.500	28.58	1.125	36.6	1.44	35.1	1.38
R-68	18	150	517.53	20.375	7.95	0.313	14.2	0.56	12.7	0.50
R-69	18	300 to 600	533.40	21.000	11.13	0.438	17.5	0.69	16.0	0.63
R-70	18	900	533.40	21.000	19.05	0.750	25.4	1.00	23.9	0.94
R-71	18	1,500	533.40	21.000	28.58	1.125	36.6	1.44	35.1	1.38
R-72	20	150	558.80	22.000	7.95	0.313	14.2	0.56	12.7	0.50
R-73	20	300 to 600	584.20	23.000	12.70	0.500	19.1	0.75	17.5	0.69
R-74	20	900	584.20	23.000	19.05	0.750	25.4	1.00	23.9	0.94
R-75	20	1,500	584.20	23.000	31.75	1.250	39.6	1.56	38.1	1.50
R-76	24	150	673.10	26.500	7.95	0.313	14.2	0.56	12.7	0.50
R-77	24	300 to 600	692.15	27.250	15.88	0.625	22.4	0.88	20.6	0.81
R-78	24	900	692.15	27.250	25.40	1.000	33.3	1.31	31.8	1.25
R-79	24	1,500	692.15	27.250	34.93	1.375	44.5	1.75	41.3	1.63
R-80	22	150	615.95	24.250	7.95	0.313	-	-	12.7	0.50
R-81	22	300 to 600	635.00	25.000	14.30	0.563	-	-	19.1	0.75
R-82	1	10,000	57.15	2.250	11.13	0.438	-	-	16.0	0.63
R-84	1 1/2	10,000	63.50	2.500	11.13	0.438	-	-	16.0	0.63
R-85	2	10,000	79.38	3.125	12.70	0.500	-	-	17.5	0.69
R-86	2 1/2	10,000	90.50	3.563	15.88	0.625	-	-	20.6	0.81
R-87	3	10,000	100.03	3.938	15.88	0.625	-	-	20.6	0.81
R-88	4	10,000	123.83	4.875	19.05	0.750	-	-	23.9	0.94
R-89	3 1/2	10,000	114.30	4.500	19.05	0.750	-	-	23.9	0.94
R-90	5	10,000	155.58	6.125	22.23	0.875	-	-	26.9	1.06
R-91	10	10,000	260.35	10.250	31.75	1.250	-	-	38.1	1.50
R-92			228.60	9.000	11.13	0.438	17.5	0.69	16.0	0.63
R-93 <sup>1)</sup>	26	300, 400, 600	749.30	29.500	19.05	0.750	-	-	23.9	0.94
R-94 <sup>1)</sup>	28	300, 400, 600	800.10	31.500	19.05	0.750	-	-	23.9	0.94
R-95 <sup>1)</sup>	30	300, 400, 600	857.25	33.750	19.05	0.750	-	-	23.9	0.94
R-96 <sup>1)</sup>	32	300, 400, 600	914.40	36.000	22.23	0.875	-	-	26.9	1.06
R-97 <sup>1)</sup>	34	300, 400, 600	965.20	38.000	22.23	0.875	-	-	26.9	1.06
R-98 <sup>1)</sup>	36	300, 400, 600	1,022.35	40.250	22.23	0.875	-	-	26.9	1.06
R-99 <sup>1)</sup>	8	2,000, 3,000	234.95	9.250	11.13	0.438	-	-	16.0	0.63
R-100 <sup>1)</sup>	26	900	749.30	29.500	28.58	1.125	-	-	35.1	1.38
R-101 <sup>1)</sup>	28	900	800.10	31.500	31.75	1.250	-	-	38.1	1.50
R-102 <sup>1)</sup>	30	900	857.25	33.750	31.75	1.250	-	-	38.1	1.50
R-103 <sup>1)</sup>	32	900	914.40	36.000	31.75	1.250	-	-	38.1	1.50
R-104 <sup>1)</sup>	34	900	965.20	38.000	34.93	1.375	-	-	41.4	1.63
R-105 <sup>1)</sup>	36	900	1,022.35	40.250	34.93	1.375	-	-	41.4	1.63

<sup>1)</sup> For flanges as defined in ASME B16.47, style A

Dimensions for ring-type joint gaskets

Tolerances (inch)		
Ring cross-section	A	+0.008 ... 0.000
Ring height	B, H	+0.008 ... 0.000
Ring outer diameter	OD	+0.020 ... 0.000
Angle/chamfer	23°	±0,5°

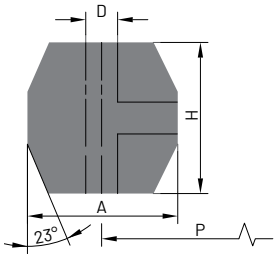


Dimensions for ring-type joint gaskets type RX to ASME B16.20 (2017) for flanges as defined in B16.5 and B16.47, style A

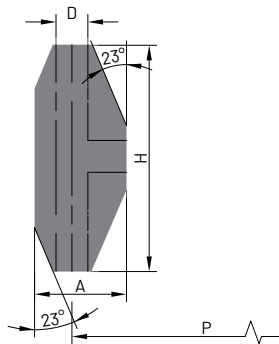
Ring number	NPS [inch]	Class	Ring diameter OD		Ring width A		Ring height H	
			[mm]	[in]	[mm]	[in]	[mm]	[in]
RX-20	1 1/2	2,000, 3,000, 5,000	76.20	3.000	8.74	0.344	19.05	0.750
RX-23	2	2,000	93.27	3.672	11.91	0.469	25.40	1.000
RX-24	2	3,000, 5,000	105.97	4.172	11.91	0.469	25.40	1.000
RX-25	3 1/8	5,000	109.55	4.313	8.74	0.344	19.05	0.750
RX-26	2 1/2	2,000	111.91	4.406	11.91	0.469	25.40	1.000
RX-27	2 1/2	3,000, 5,000	118.26	4.656	11.91	0.469	25.40	1.000
RX-31	3	2,000, 3,000	134.54	5.297	11.91	0.469	25.40	1.000
RX-35	3	5,000	147.24	5.797	11.91	0.469	25.40	1.000
RX-37	4	2,000, 3,000	159.94	6.297	11.91	0.469	25.40	1.000
RX-39	4	5,000	172.64	6.797	11.91	0.469	25.40	1.000
RX-41	5	2,000, 3,000	191.69	7.547	11.91	0.469	25.40	1.000
RX-44	5	5,000	204.39	8.047	11.91	0.469	25.40	1.000
RX-45	6	2,000, 3,000	221.84	8.734	11.91	0.469	25.40	1.000
RX-46	6	5,000	222.25	8.750	13.49	0.531	28.58	1.125
RX-47	8	Crossover flange	245.26	9.656	19.84	0.781	41.28	1.625
RX-49	8	2,000, 3,000	280.59	11.047	11.91	0.469	25.40	1.000
RX-50	8	5,000	283.36	11.156	16.66	0.656	31.75	1.250
RX-53	10	2,000, 3,000	334.57	13.172	11.91	0.469	25.40	1.000
RX-54	10	5,000	337.34	13.281	16.66	0.656	31.75	1.250
RX-57	12	2,000, 3,000	391.72	15.422	11.91	0.469	25.40	1.000
RX-63	14	5,000	441.73	17.391	27.00	1.063	50.80	2.000
RX-65	16	2,000	480.62	18.922	11.91	0.469	25.40	1.000
RX-66	16	3,000	483.39	19.031	16.66	0.656	31.75	1.250
RX-69	18	2,000	544.12	21.422	11.91	0.469	25.40	1.000
RX-70	20	3,000	550.06	21.656	19.84	0.781	41.28	1.625
RX-73	20	2,000	596.11	23.469	13.49	0.531	31.75	1.250
RX-74	20	3,000	600.86	23.656	19.84	0.781	41.28	1.625
RX-82	1	10,000	67.87	2.672	11.91	0.469	25.40	1.000
RX-84	1 1/2	10,000	74.22	2.922	11.91	0.469	25.40	1.000
RX-85	2	10,000	90.09	3.547	13.49	0.531	25.40	1.000
RX-86	2 1/2	10,000	103.58	4.078	15.09	0.594	28.58	1.125
RX-87	3	10,000	113.11	4.453	15.09	0.594	28.58	1.125
RX-88	4	10,000	139.29	5.484	17.48	0.688	31.75	1.250
RX-89	3 1/2	10,000	129.77	5.109	18.26	0.719	31.75	1.250
RX-90	5	10,000	174.63	6.875	19.84	0.781	44.45	1.750
RX-91	10	10,000	286.94	11.297	30.18	1.188	45.24	1.781
RX-99	8	2,000, 3,000	245.67	9.672	11.91	0.469	25.40	1.000
RX-201	1 1/4	5,000	51.46	2.026	5.74	0.226	11.30	0.445
RX-205	1 3/4	5,000	62.31	2.453	5.56	0.219	11.10	0.437
RX-210	2 1/2	5,000	97.64	3.844	9.53	0.375	19.05	0.750
RX-215	4	5,000	140.89	5.547	11.91	0.469	25.40	1.000



Type SBX



Type SRX



Tolerances (inch)

Ring cross-section	A	+0.008 ... 0.000
Overall size	D	±0,02
Ring height	H	+0.008 ... 0.000
Ring outer diameter	OD	+0.000 ... 0.006
Angle/chamfer	23°	±0,25°

Dimensions for ring-type joint gaskets type BX to ASME B16.20 (2017) for flanges as defined in B16.5 and B16.47, style A

Ring number	NPS [inch]	Class	Nominal size		Ring diameter OD		Ring width A		Ring height H		Hole diameter D	
			[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]
BX-150	1 11/16	10,000, 15,000	43	1 11/16	72.19	2.842	9.30	0.366	9.30	0.366	1.5	0.06
BX-151	1 13/16	10,000, 15,000, 20,000	46	1 13/16	76.40	3.008	9.63	0.379	9.63	0.379	1.5	0.06
BX-152	2 1/16	10,000, 15,000, 20,000	52	2 1/16	84.68	3.334	10.24	0.403	10.24	0.403	1.5	0.06
BX-153	2 9/16	10,000, 15,000, 20,000	65	2 9/16	100.94	3.974	11.38	0.448	11.38	0.448	1.5	0.06
BX-154	3 1/16	10,000, 15,000, 20,000	78	3 1/16	116.84	4.600	12.40	0.488	12.40	0.488	1.5	0.06
BX-155	4 1/16	10,000, 15,000, 20,000	103	4 1/16	147.96	5.825	14.22	0.560	14.22	0.560	1.5	0.06
BX-156	7 1/16	10,000, 15,000, 20,000	179	7 1/16	237.92	9.367	18.62	0.733	18.62	0.733	3.0	0.12
BX-157	9	10,000, 15,000	229	9	294.46	11.593	20.98	0.826	20.98	0.826	3.0	0.12
BX-158	11	10,000, 15,000	279	11	352.04	13.860	23.14	0.911	23.14	0.911	3.0	0.12
BX-159	13 5/8	10,000	346	13 5/8	426.72	16.800	25.70	1.012	25.70	1.012	3.0	0.12
BX-160	13 5/8	5,000	346	13 5/8	402.59	15.850	13.74	0.541	23.83	0.938	3.0	0.12
BX-161	16 3/4		422	16 5/8	491.41	19.347	16.21	0.638	28.07	1.105	3.0	0.12
BX-162	16 3/4	5,000, 10,000	422	16 5/8	475.49	18.720	14.22	0.560	14.22	0.560	1.5	0.06
BX-163	18 3/4	5,000	476	18 3/4	556.16	21.896	17.37	0.684	30.10	1.185	3.0	0.12
BX-164	18 3/4	10,000	476	18 3/4	570.56	22.463	24.59	0.968	30.10	1.185	3.0	0.12
BX-165	21 1/4	5,000	540	21 1/4	624.71	24.595	18.49	0.728	32.03	1.261	3.0	0.12
BX-166	21 1/4	10,000	540	21 1/4	640.03	25.198	26.14	1.029	32.03	1.261	3.0	0.12
BX-167	26 3/4	2,000	680	26 3/4	759.36	29.896	13.11	0.516	35.86	1.412	1.5	0.06
BX-168	26 3/4	3,000	680	26 3/4	765.25	30.128	16.05	0.632	35.86	1.412	1.5	0.06
BX-169	5 1/8	10,000	130	5 1/8	173.51	6.831	12.93	0.509	15.85	0.624	1.5	0.06
BX-170	9		168	6 5/8	218.03	8.584	14.22	0.560	14.22	0.560	1.5	0.06
BX-171	11		218	8 9/16	267.44	10.529	14.22	0.560	14.22	0.560	1.5	0.06
BX-172	13 5/8		283	11 5/32	333.07	13.113	14.22	0.560	14.22	0.560	1.5	0.06
BX-303	30	2,000, 3,000	762	30	852.75	33.573	16.97	0.668	37.95	1.494	1.5	0.06

## Assembly of static seals



### Step 1:

#### Clean and inspect the seal

- Remove all foreign materials from the seal surface, connecting elements (bolts or pins), nuts and washers. Apply any specified dust control methods.
- Inspect the connecting elements (bolts or pins), nuts and washers for defects such as cracks or flaws.
- Inspect the flange surface for irregularities, deep machining grooves or similar.
- Replace any faulty components (Obtain a second opinion if you are unsure).

### Step 2:

#### Align the flanges

- Align the flange surfaces and bolt holes. Do not use excessive force.
- Report any possible alignment errors to a specialist.

### Step 3:

#### Install the seal

- Do not use potting compounds when installing the seal and do not use any substances on the seal or seal surface that have not been approved by the manufacturer.
- Make sure that the material and size of the seal corresponds to the specification.
- Inspect the seal for defects.
- Carefully introduce the seal between the flanges.
- Make sure that the seal lies centrally between the flanges.
- Move the flanges together and make sure that the seal is not damaged or jammed.

#### Step 4: Lubricate the load-bearing surfaces

- Always use lubricants that are specified or approved by the seal manufacturer.
- Apply the lubricant evenly and generously to all threads, nuts, washers and load-bearing surfaces.
- Make sure that the lubricant does not contaminate the flange or sealing surface.

#### Step 5: Insert and tighten the bolts

- Always use suitable tools such as a calibrated torque wrench or adjusted clamping device.
- The seal manufacturer or your engineering department can advise you of the appropriate tightening torques.
- Always tighten the nuts using a diagonal sequence.
- Follow the steps below:
  1. Start by tightening all the nuts by hand.  
(You may need to use a wrench for larger bolts).
  2. Tighten each nut using around 30% of the full torque.
  3. Tighten each nut using around 60 % of the full torque.
  4. Fully tighten every nut using a diagonal sequence.  
(Large flanges may need an additional round of tightening).
  5. Finally, apply at least one full application of torque in the clockwise direction until all the torques are the same.  
(Large flanges may need an additional round of tightening).

#### Step 6: Retightening

- The seal manufacturer or your engineering department can provide instructions or recommendations with respect to retightening the bolts.
- Unless otherwise specified by the seal manufacturer, do not tighten elastomer-based and asbestos-free seals once they have been exposed to high temperatures.
- Retighten any fixings that have been exposed to temperature cycling.
- All tightening operations should be carried out at the temperature to which the fixings are exposed and under atmospheric pressure.



Section overview



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## Operating range for EagleBurgmann graphite rings and maintenance solutions

	Page	Range of applications		Temperature stability			
				Temperature stability $T_{min}$ [°C]	Temperature stability $T_{max}$ [°C]	Limit temperature in inert gas atmosphere [°C]	Temperature limit for steam operation [°C]
Graphite rings, static							
Statotherm profile rings R901/B	94	500	-200	500	-	550	
Statotherm V cover seals V881	96	800	-200	500	-	550	
Statotherm V cover seals V901	97	500	-200	500	-	550	
Graphite rings, dynamic							
Rotatherm 0901/B	98	800	-200	500	3,000	550	
Rotatherm S881/B	98	1,000	-200	500	3,000	550	
Maintenance solutions							
Manhole gasket HP 6365/HP	100	40	-	250	-	-	
Statotherm V-Flex 6850/V	102	500	-200	500	-	550	

### Important note

All technical specifications are based on extensive testing and our many years of experience. There are so many possible applications, however, so they can only serve as guide values. The table lists all the important operating ranges for EagleBurgmann graphite rings and maintenance solutions in the various possible applications.

Please note that the extreme values for the individual operating parameters cannot be applied at the same time due to the resulting interactions. The operating ranges of individual products will also depend on the associated pressure, external forces and influences, the temperature and the medium to be sealed.





## Media overview

Media	Media group	Media	Media group	Media	Media group
<b>A</b>		Calcium hydroxide (milk of lime)	11, 12	Ethylene	8
Acetaldehyde	15, 16	Calcium hypochlorite (bleaching lye)	9, 11	Ethylene chloride	6, 15
Acetic acid	9, 10	Calgon R® (sodium hydroxide phosphate silicate)	11	Ethylene glycol	16
Acetic acid anhydride	10	Calgon S (urea nitrate)	11, 12	Ethylene oxide	8
Acetone	8, 15	Calgon® (sodium hexametaphosphate)	11	<b>F</b>	
Acetylene	8, 15	Caprolactam	11, 16	Faeces (feces)	1.1
Acrylonitrile	16	Carbolic acid (phenol)	9, 10	Fat and fatty alcohols	13, 15
Adipic acid	9, 10	Carbon dioxide (gas)	6	Fatty acids	9, 10
Alcohol (ethanol)	15	Carbon dioxide (liquid)	6	Fatty alcohol sulfonate	1.1
Aluminum acetate	9, 11	Carbon disulfide	5	Ferricyanide	9, 11
Aluminum chloride	9, 11	Carbon monoxide (gas)	6	Fir needle oil	13
Aluminum sulfate	9, 11	Carbon tetrachloride	8, 15	Fish liver oils	13
Ammonia (gaseous)	11, 12	Caustic lime (calcium hydroxide)	12	Fish slurry	1.1
Ammonia (liquid)	11, 12	Caustic potash (potassium hydroxide)	11, 12	Fixing bath, acidic	9
Ammonium chloride	9, 11	Caustic soda (sodium hydroxide)	12	Formaldehyde (formalin)	15, 16
Ammonium hydroxide	11, 12	Caustic soda ≤30 % (all conc.)	11, 12	Formic acid	9, 10
Ammonium sulfate	9, 11	Chloracetic acid (mono, di)	9	Freon®	8, 15
Aniline	16	Chlorinated biphenyl	15	Frigene®	8, 15
Anthracene oil	13	Chlorinated paraffin	15, 17.1	Fruit juices	2
Anti-freeze additive (glycols)	15	Chlorine gas	6, 10	Fruit pulp	2
Apple must	2	Chlorine water (water saturated with chlorine)	10	<b>G</b>	
Arsenic acid	9, 10	Chlorobenzene	8, 15	Gallic acid	9, 10
Asphalt	17.1	Chloroform	15	Gas scrubber water	1.1, 9
ASTM Oil standard no. 1, 2, 3 and 4	13	Chlorosulfuric acid (chlorosulfonic acid)	10	Gelatin	2
<b>B</b>		Chromic acid	10	Glacial acetic acid	10
Barium chloride	9, 11	Chromium oxide salts	9, 11	Glauber's salt (Sodium sulfate)	9, 11
Barium hydroxide	11, 12	Citrus juices	2, 9	Glucose	2
Battery acid	10	Coconut fat	13	Glue	17.1
Beer	2	Coke oven gas	5	Glycerine (glycerol)	15
Beer mash from pumps	2	Copper acetate solution	9, 11	Glycol acetic acid ester	8, 15
Beer mash from wort boiler	2	Copper(I) chloride solution	9, 11	Glycol monoacetate	8, 15
Benzene	15	Copper(II) sulfate solution (vitriol of copper)	9, 11	Groundnut oil	13
Benzenesulfonic acid	10	Cresol	16	<b>H</b>	
Benzoic acid	9, 10	Crude oil	13	Heating oil	13
Benzyl alcohol	15	Cyclohexane	8, 15	Heavy water	1.1
Bitumen (asphalt)	17.1	Cyclohexanol	15	Heptane	8, 15
Blast furnace gas	6	Cyclohexanone	15	Hexafluorosilicic acid	10
Bleaching lye	11	<b>D</b>		Hexane	8, 15
Blood	2	Denatured alcohol	15	Honey	2
Boiler feed water	3	Dibutyl phthalate (DBP)	16	Hydraulic fluid (crude oil-based)	13
Bonder lye	9, 10, 11, 12	Diesel oil	13	Hydraulic fluid (phosphate ester-based)	13
Bone fat (dissolved in tri or petrol)	15	Diethanolamine (DEA)	11, 16	Hydrazine	15
Borax solution	11	Diethyl ether	8, 15	Hydrochloric acid	9, 10
Boric acid	9	Diethylene glycol	8, 15	Hydrocyanic acid	9, 10
Brackish water	1.1	Dimethyl ether	8, 15	Hydrofluoric acid	10
Brake fluid (ATE blue)	13	Dioxane	16	Hydrogen bromide	6, 9, 10
Bromine, aqueous	9, 10	Diphenyl oxide	15, 16	Hydrogen chloride	6, 10
Bunker and heating oil	13	Diphyl heat transfer fluid	14	Hydrogen chloride (hydrochloric acid gas)	6, 9, 10
Butadiene	16, 17.1	Distilled water	2	Hydrogen sulfide	6, 9, 10
Butane	8, 15	Dodecyl benzene	15	<b>I</b>	
Butanediol	15	Dowtherm® A	14	Iron phosphate solution	9, 11
Butanol (butyl alcohol)	15	Dye liquor	17.1	Iron(III) chloride solution	9, 10
Butanone (Methyl-ethyl-ketone)	15	Dyes	18	Isobutyl alcohol	8, 15
Butyl acetate	15	<b>E</b>		Isobutyl ketone	8, 15
Butyl alcohol (butanol)	15	Edible oil	2, 13	Isooctane	8, 15
Butylene	8, 15	Ethane	15	Isopropyl acetate	8, 15
Butyric acid	2, 9, 10	Ethanol (ethyl alcohol)	15	Isopropyl alcohol	8, 15
<b>C</b>		Ether (diethyl ether)	8, 15	Isopropyl ether	8, 15
Calcium acetate	9, 11	Ethyl acetate	8, 15		
Calcium bisulfite lye (sulfite lye)	9, 11				
Calcium chloride	9, 11				

Media	Media group
<b>J</b>	
Jam and marmalade	2
Jet fuel (kerosene JP 4, JP 5)	15
<b>K</b>	
Kerosene	15
<b>L</b>	
Lacquers	18
Lead acetate (lead sugar)	11
Lead sludge	17.2
Lemonades	2
Lignite tar oil	13, 17.1
Liqueurs	2
Liquid manure (slurry)	1.1
Liver oil (fish)	2
<b>M</b>	
Magnesium bisulfite	9, 11
Magnesium hydroxide	11, 12
Maleic acid anhydride	10
Manganese nitrate	9, 11
Mash: hop mash	2
Mazut (heavy heating oil)	13
Meat juices and stocks	2
Mercaptan	16
Mercury(II) nitrate	9, 11
Methane	8
Methanol (methyl alcohol)	15
Methyl chloride	8, 15
Methyl ethyl ketone (MEK)	8, 15
Methylene chloride (dichloromethane)	8, 15
Milk	2
Milk of lime (calcium hydroxide)	1, 12
Mineral oil	13
Mobiltherm® 600	14
Molasses	2, 17.1
<b>N</b>	
N-methyl-2-pyrrolidone (NMP)	15
Naphtha	15
Naphthenic acid	9, 10
Natural gas	5
Nitric acid	
- < 10 % 85 °C	9, 10
- > 10 % 35 °C	10
Nonylphenol	15
<b>O</b>	
Oils	
- animal oils	13
- lubricating oils	13
- plant oils	13
Olive oil	2, 13
Oxalic acid	9, 10
Oxygen (gas, liquid)	7.2
<b>P</b>	
P3° lye	10, 11, 12
Paper pulp	
- fine, tissue paper	17.2
- Photographic paper	9, 11, 17.2
- Plastic	9, 11, 17.2
- Wrapping paper	9, 11, 17.2

Media	Media group
Pentane	8, 15
Perchloric acid	9, 10
Petrol	15
Petroleum ether (gasoline)	8, 15
Phenol (carboic acid)	9, 10
Phenyl ether	8, 15
Phenylhydrazine	8, 15
Phosphoric acid	9, 10
Phosphorus trichloride	9, 10
Phthalic acid (heating)	9, 10
Phthalic anhydride	10
Potassium carbonate	11, 12
Potassium chloride	9, 11
Potassium cyanide (cyanide of potassium)	9, 11
Potassium hypochlorite	9, 11
Potassium nitrate	9, 11
Potassium silicate	9, 11
Potassium sulfate	9, 11
Propane	15
Propanol (propyl alcohol)	8, 15
Propanone (acetone)	8, 15
Propyl acetate (acetic acid ester)	8, 15
Pyridine	15, 16
Pyrrolidone	11, 12
<b>Q</b>	
Quark	2
Quenching oil	13
<b>R</b>	
Rapeseed oil	13
Raw juice (sugar solution)	2
<b>S</b>	
Salicylic acid	9, 10
Saltpetre	9, 11
Sea water	1.2
Silicon tetrachloride (tetrachlorosilane)	9, 10
Silicone greases	13
Silicone oils	13
Silver salts	9
Skin cream	2, 13
Soap solution	1.1
Sodium arsenate	9, 11
Sodium carbonate	1, 12
Sodium chloride (saline)	9, 11
Sodium hydroxide (caustic soda)	11, 12
Sodium hypochlorite	9, 11
Sodium nitrate	9, 11
Sodium phosphate	9, 11
Sodium silicate (water glass)	9, 11
Sodium sulfate (Glauber's salt)	9, 11
Sodium sulfide	9, 11
Sodium sulfite	9, 11
Sodium thiosulfate (antichlor)	9, 11
Starch solutions	17.1
Steam	4.1, 4.2, 4.3
Stearic acid (fatty acid)	9, 10
Styrene (phenyl ethylene)	15
Sulfite lye	9, 11
Sulfuric acid	
- 70-90 % 150 °C	10
- 90-95 % 70 °C	10
Sulfuric acid, fuming (oleum)	10
Sulfurous acid	9, 10

Media	Media group
<b>T</b>	
Table salt (sodium chloride)	9, 11
Table vinegar	9
Tallow	13
Tannic acid	9, 10
Tar	17.1
Test gasoline	15
Tetrachloroethylene	8, 15
Tetrahydrofurane	15
Thick juice (60% sugar solution)	2
Thin juice (sugar solution)	2, 17.1
Toluene	15
Trichloroethane	15
Trichloroethylene (tri)	15
Triethanolamine	11, 16
Trisodium phosphate	9, 11
Turbine oils	18
Turpentine	15
<b>U</b>	
Urea	11, 16
<b>V</b>	
Vegetable paste	2
Vinegar (table vinegar)	9
Vinyl chloride	8
<b>W</b>	
Waste water	1.1
Water from pressed fish	1.1
Water glass (Sodium silicate)	9, 11
Water	
a) Drinking	2
b) Distilled	3
c) Not treated	1.1
d) Boiler feed (hot water, condensate)	3
e) Reactor, radioactive	1.1
f) Heavy	1.1
g) Brackish, sea	1.2
h) Dirty	1.1
Whale oil, train oil	13
Wine	2
Wine spirits	2, 15
Wood pulp	11; 17.2
<b>X</b>	
Xylene	8; 15
<b>Y</b>	
Yeast paste	2
<b>Z</b>	
Zinc chloride	9; 11

## Graphite rings and maintenance solutions

### Properties

We generally distinguish between graphite rings for static applications and graphite rings for dynamic applications. Static graphite rings include the EagleBurgmann Statotherm profile rings and cover seals. The Rotatherm profile rings are sealing solutions for dynamic applications.

### Advantages

- High temperature stability
- High pressure resistance
- Easy to assemble and disassemble
- Do not harden
- Long service life

### Types

Graphite ring from the Statotherm series are made from graphite with a purity of 98% or from nuclear grade graphite (purity > 99.85%) without binders or fillers. Statotherm profile rings and cover seals can be produced with a density between 1.3 g/cm<sup>3</sup> and 1.8 g/cm<sup>3</sup>. The Statotherm cover seals are also available with a cap to protect against oxidation and/or embedded stainless steel insert for use in high pressure areas.

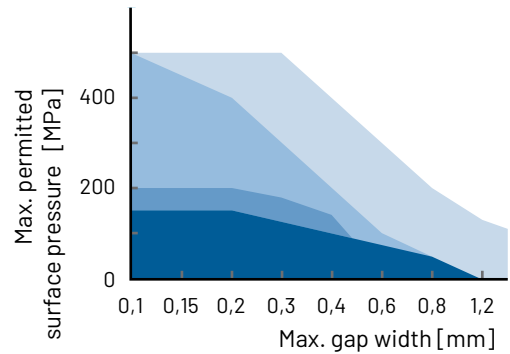
Rotatherm profile rings can be supplied as either industrial grade (purity 98%) or, with a graphite purity of 99.85%, as nuclear grade without binders or fillers. They are produced as standard with a density between 1.3 g/cm<sup>3</sup> and 1.8 g/cm<sup>3</sup>.

### Range of applications

Graphite rings are used in both static and dynamic applications. Rotatherm profile rings are preferred for sealing valves, and can be found in almost all operational and small-scale boiler facilities. Some versions can also be used as chamber sealing rings in high temperature and high pressure applications to avoid extrusion (even through large gaps).

Statotherm profile rings are used, in particular, in applications in the process, petrochemical and chemical industries, power station technology and building services that are subject to thermal cycling. Cover seals are recommended for higher pressures.

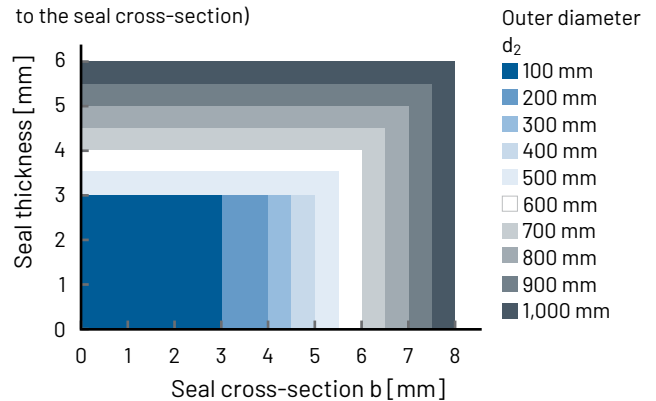
Relationship between surface pressure and gap width Sp in the operating state



- Precompressed graphite rings with stainless steel cap
- Precompressed graphite rings with stainless steel insert
- Precompressed graphite rings (density 1.7 g/cm<sup>3</sup>)
- Carbon-reinforced graphite compression packing

### Recommended profile dimensions

(maximum outer diameter in relation to the seal cross-section)



- 100 mm
- 200 mm
- 300 mm
- 400 mm
- 500 mm
- 600 mm
- 700 mm
- 800 mm
- 900 mm
- 1,000 mm

### Standard profiles



### Special profiles (examples)

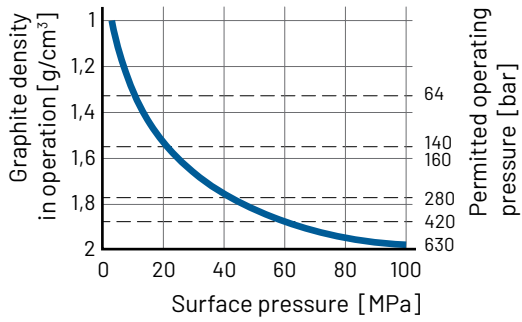


### Pressure rating and surface pressure for applications in the force shunt

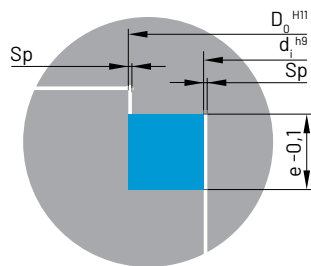
Pressure [bar]	< 160	< 250	< 400
Required deformability [%]	15	15	15
Required surface pressure [MPa]	25	55	70
Density [g/cm <sup>3</sup> ]	1.4	1.5	1.6

### Operating curve

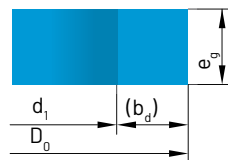
The sealing effect and required preloading are affected by the prevailing operating pressure. A minimum surface pressure is always required, however.



### Recommended groove tolerances



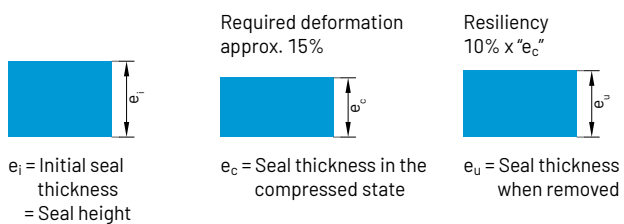
### Recommended ring tolerances

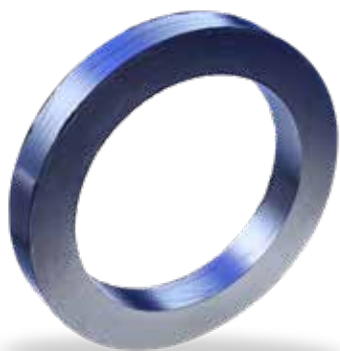


Tolerances for  $d_i$  and  $D_o$  are matched to the groove tolerances. Required surface roughness for the seal and groove surfaces:  $R_z = 10 \dots 40 \mu\text{m}$  (= ISO 1302)

Gap width $Sp$	ideal	$0.01 \times b_d$
Groove on components	max.	$0.03 \times b_d$

### Deformability and resiliency





**Advantages**

- High purity nuclear grade graphite
- Outstanding deformability
- Permanent resiliency
- Permanent elasticity
- Good cross-sectional tightness

**Statotherm R profile rings R901/B**

**Features**

Statotherm R profile rings R901/B are made from permanently elastic, expanded graphite (purity  $\geq 99.85\%$ , ash content  $\leq 0.15\%$ , chloride content  $\leq 20$  ppm) without binders or fillers.

Statotherm R profile rings R901/B are almost maintenance-free and are intended for exposure to extreme temperature cycling and/or high or low temperature ranges which cannot be withstood by elastomeric O-rings.

**Operating range**

Pressure:  $p = 500$  bar

Sliding velocity

- Pump applications:

$v_g = 2$  m/s

Temperature

- Continuous operation:

$t = -200$  °C ...  $+500$  °C

- Steam:  $t_{max} = +550$  °C

Recommended surface roughness:

$R_z = 10$  ...  $40$   $\mu$ m

Chemical resistance:

pH =  $0$  ...  $14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

**Recommended applications**

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Building services engineering

**Standards and releases**

- TA Luft
- BAM (upon request)

**Available dimensions**

- All dimensions (minimum cross-section  $3$  mm) and profiles up to max.  $\varnothing 1,000$  mm
- Precompressed rings, closed, split or with slanted cut
- Also available with protective cap (in 1.4541) on one side

**Note**

Statotherm profile rings must only be permitted to deform in the axial direction. The sealing groove must be designed to prevent tensile stresses caused by widening of the profile rings (which are damaged by radial deformation).

**Statotherm R profile ring R901/B variants**

Form as supplied	Graphite purity	Ash content	Sulfur	Density			
				1.3 g/cm <sup>3</sup>	1.4 g/cm <sup>3</sup>	1.6 g/cm <sup>3</sup>	1.8 g/cm <sup>3</sup>
Profile rings	$\geq 99.85\%$	$\leq 0.15\%$	$< 300$ ppm	R901/B5	R901/B6	R901/B7	R901/B8
			$\leq 200$ ppm	-	R904/B6	R904/B7	-
	$\geq 98\%$	$\leq 2.00\%$	$< 300$ ppm	R911/B5	R911/B6	R911/B7	R911/B8









## Advantages

- Especially suitable for sealing large gaps
- Easy to assemble and disassemble
- No damage to the sealing surfaces
- Long service life
- Do not harden
- Optimized sealing result
- Minimum wear of the contact surface

## Statotherm V cover seals V881

### Features

Statotherm V cover seals V881 (self-sealing) consist of pure graphite rings (purity > 99%) with an embedded stainless steel reinforcement.

They are used in particular in applications with large gaps and high pressures. For example, Statotherm V cover seals V881 are used successfully in power stations at high temperatures and with diameters of up to 1,000 mm.

### Operating range

Pressure:  $p = 800$  bar  
 Sliding velocity:  $v_g = 2$  m/s  
 Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C
- in a reducing or inert environment:  $t_{max} = +3,000$  °C

Recommended surface roughness:  
 $R_z = 10$  ...  $40$   $\mu$ m

### Chemical resistance:

pH = 0 ... 14  
 Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

- Industries
- Process industry
  - Petrochemical industry
  - Chemical industry
  - Power plant technology
  - Building services engineering

### Available dimensions

- Die-pressed rings, to drawing, measurements or other agreement
- Available in different densities and profiles

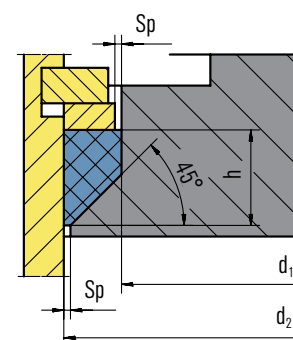
### Minimum surface pressure:

The seal and preloading are generally created by the working pressure, but there is a minimum surface pressure that must be achieved when the seal is installed.

### Design and ordering information

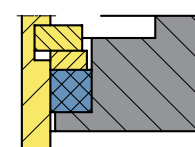
The design of the cover seal depends on the pressure and dimensions. Please specify the operating conditions and profile shape with any enquiries or orders (example: pressure in bar, diameter  $d_1$  and  $d_2$ , profile shape I, A or R).

### Dimensions and tolerances



#### Profile I: inner chamfer

Recommended tolerances for valve connecting parts:  
 $d_1 = h9$ ,  $d_2 = h11$



#### Profile R: rectangular shape

### Statotherm V cover seal V881 variants

Profile	Protective cap in 1.4541	Density		
		1.4 g/cm <sup>3</sup>	1.6 g/cm <sup>3</sup>	1.8 g/cm <sup>3</sup>
Rectangular profile	without cap	V881/R6	V881/R7	V881/R8
	with 1 cap	V881/R6K	V881/R7K	V881/R8K
Outer chamfer	without cap	V881/A6	V881/A7	V881/A8
	with 1 cap	V881/A6K	V881/A7K	V881/A8K
Inner chamfer	without cap	V881/I6	V881/I7	V881/I8
	with 1 cap	V881/I6K	V881/I7K	V881/I8K



### Advantages

- Easy to assemble and disassemble
- No damage to the sealing surfaces
- Long service life
- Do not harden
- Optimized sealing result
- Minimum wear of the contact surface

## Statotherm V cover seals V901

### Features

Statotherm V cover seals V901 (self-sealing) are precision-made seals made from permanently elastic, expanded graphite (purity  $\geq 99\%$ ) without binders or fillers. Cover seals are successfully used as self-sealing closures in high pressure valves, e.g. for power stations at high temperatures and up to 1,000 mm diameter.

### Operating range

Pressure:  $p = 500$  bar  
 Sliding velocity:  $v_g = 2$  m/s  
 Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C

Recommended surface roughness:  
 $R_z = 10$  ...  $40$   $\mu\text{m}$

Chemical resistance:  
 $\text{pH} = 0$  ...  $14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Building services engineering

### Standards and releases

- BAM (upon request)

### Available dimensions

- Die-pressed rings, to drawing, measurements or other agreement

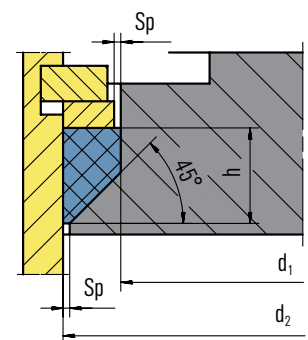
### Minimum surface pressure:

The seal and preloading are generally created by the working pressure, but there is a minimum surface pressure that must be achieved when the seal is installed.

### Design and ordering information

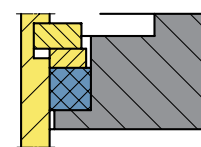
The design of the cover seal depends on the pressure and dimensions. Please specify the operating conditions and profile shape with any enquiries or orders (example: pressure in bar, diameter  $d_1$  and  $d_2$ , profile shape I, A or R).

### Dimensions and tolerances



#### Profile I: inner chamfer

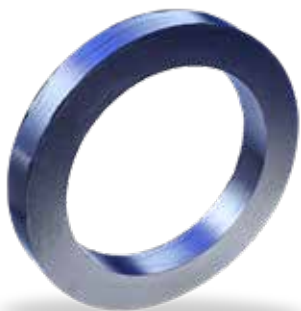
Recommended tolerances for valve connecting parts:  
 $d_1 = h9$ ,  $d_2 = h11$



#### Profile R: rectangular shape

### Statotherm V cover seal V901 variants

Profile	Protective cap in 1.4541	Density				Nuclear grade
		1.3 g/cm <sup>3</sup>	1.4 g/cm <sup>3</sup>	1.6 g/cm <sup>3</sup>	1.8 g/cm <sup>3</sup>	
Rectangular profile	without cap	V901/R5	V901/R6	V901/R7	V901/R8	V901/RN
	with 1 cap	V901/R5K	V901/R6K	V901/R7K	V901/R8K	V901/RNK
	with 2 caps	V901/R5KK	V901/R6KK	V901/R7KK	V901/R8KK	V901/RNKK
	with 2 caps	V901/R5WK	V901/R6WK	V901/R7WK	V901/R8WK	V901/RNWK
	with 2 caps	V901/B5DK	V901/B6DK	V901/B7DK	V901/B8DK	V901/BNDK
Outer chamfer	without cap	V901/A5	V901/A6	V901/A7	V901/A8	V901/AN
	with 1 cap	V901/A5K	V901/A6K	V901/A7K	V901/A8K	V901/ANK
	with 2 caps	V901/A5KK	V901/A6KK	V901/A7KK	V901/A8KK	V901/ANKK
Inner chamfer	without cap	V901/I5	V901/I6	V901/I7	V901/I8	V901/IN
	with 1 cap	V901/I5K	V901/I6K	V901/I7K	V901/I8K	V901/INK
	with 2 caps	V901/I5KK	V901/I6KK	V901/I7KK	V901/I8KK	V901/INKK



### Advantages

- High purity nuclear grade graphite
- Long service life
- Do not harden
- Very low surface friction

## Rotatherm profile rings 0901/B

### Features

Rotatherm 0901/B are pre-compressed rings made from permanently elastic expanded pure graphite ( $\geq 99.85\%$  graphite) without binders or fillers.

### Operating range

#### Valves

Pressure:  $p = 800$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Blowers

Pressure:  $p = 10$  bar

Sliding velocity:  $v_g = 10$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C
- Inert environment:  $t_{max} = +3,000$  °C

#### Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

Mechanical units

- Valves
- Blowers

### Standards and releases

- BAM (upon request)

### Available dimensions

- Available as full rings (initial installation) and split rings (replacement)
- Custom production to drawing, measurements or other agreement

### Note

Other densities available upon request.

Design and installation see page 99.



### Advantages

- Do not harden
- Long service life
- Uncomplicated installation and removal
- Low wear of the contact surface

## Rotatherm profile rings S881/B

### Features

Rotatherm S881/B are pre-compressed rings made from pure graphite ( $\geq 99.85\%$ ) with embedded stainless steel reinforcement optimally positioned to suit the cross-section. No metal-to-metal contact with spindle or housing. They are ideally used as chamber sealing rings in high temperature and high pressure valves to avoid extrusion (particularly through large gaps).

### Operating range

#### Valves

Pressure:  $p = 1,000$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C
- Inert environment:  $t_{max} = +3,000$  °C

#### Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

- Valves

### Available dimensions

- Precompressed rings with unique marking to indicate metal inserts
- Custom production to drawing, measurements or other agreement

### Installation note

The spindle and installation space must be clean and in perfect condition (as these are important if the seal is to work well for a long period). Adjust the valve spindle position so that it can be actuated in the packing ring tightening direction once the packing is partly sealed. Design and installation, see page 99.

### Recommended applications

Mechanical units

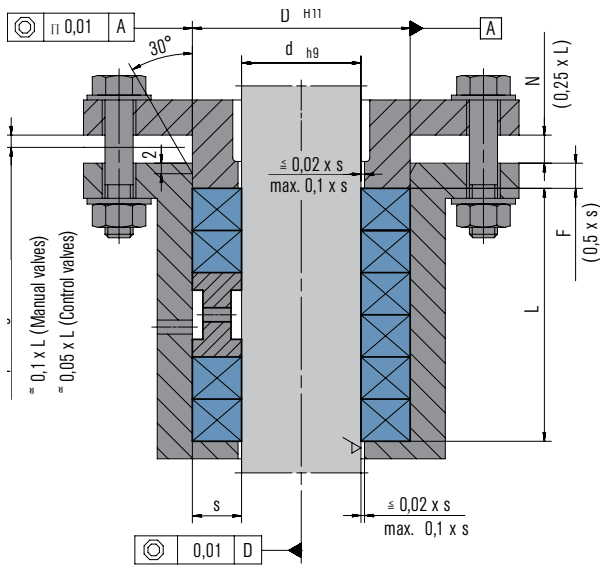
### Rotatherm profile ring 0901/B variants

Form as supplied	Graphite purity	Density			
		1.3 g/cm <sup>3</sup>	1.4 g/cm <sup>3</sup>	1.6 g/cm <sup>3</sup>	1.8 g/cm <sup>3</sup>
Profile rings	$\geq 99.85\%$	0901/B5	0901/B6	0901/B7	0901/B8
	$\geq 98\%$	0911/B5	0911/B6	0911/B7	0911/B8

### Rotatherm profile ring S881/B variants

Form as supplied	Density			
	1.3 g/cm <sup>3</sup>	1.4 g/cm <sup>3</sup>	1.6 g/cm <sup>3</sup>	1.8 g/cm <sup>3</sup>
Profile rings	0881/B5	0881/B6	0881/B7	0881/B8

## Rotatherm graphite rings – design and installation



### Gap width Sp calculation

$$Sp \leq 0,02 \times s, \text{ max. } 0,1 \times s$$

### Surface quality recommendation

$$R_z \leq 1,6 \mu\text{m for shafts and spindles in general}$$

$$R_z \leq 0,6 \mu\text{m for control valve spindles}$$

$$R_z \leq 6 \mu\text{m for stuffing box housing}$$

### Radial shaft deflection

To achieve low leakage rates in a vacuum:  $< 2 \% \times s$

With their homogeneous structure and high density, Rotatherm pure graphite sealing rings achieve a considerable reduction in the packing height. In existing equipment, the stuffing box space can be reduced as required by inserting a spacer at the bottom of the installation space.

In control valves and applications that require low and uniform friction forces, the radial sealing pressure on the spindle must not exceed a specific value.

Rotatherm rings are machined precisely to the dimensions of the installation space. The spindle and stuffing box space must be clean and in perfect condition (as these are important if the seal is to work well for a long period).

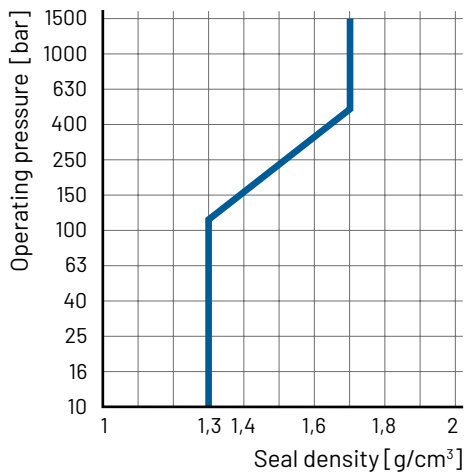
Place the Rotatherm rings in the installation space. If split rings are used, the butt ends must be fitted offset. Adjust the valve spindle position so that it can be moved towards the base of the stuffing box when the packing is partly compressed.

The packing set should be compressed to the required extent in two stages:

- Tighten the gland plate to 3/4 of the required compression distance, then move the spindle towards the base of the stuffing box.
- Complete the compression of the gland plate and packing set. The valve is now ready for operation.

### Note

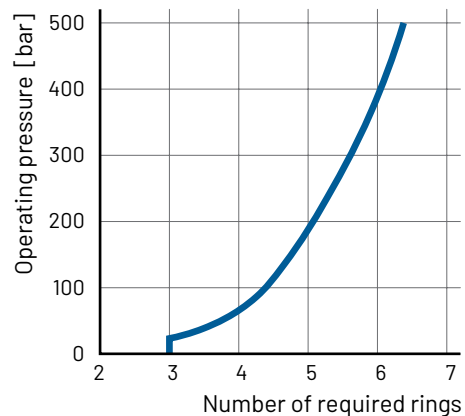
This procedure can also be used for pumps, valves and mixers with braided packings, non-woven packing sets or graphite rings. Determine the optimum packing cross-section as described on page 160.



### Recommended compressive load:

Manual valve: 0.1 x L

Control valve: 0.05 x L





**Advantages**

- Outstanding chemical resistance
- High density
- Safety-focused surface design
- Adapts perfectly to the cover plate
- Easy to install and remove

**Manhole gasket HP 6365/HP**

**Features**

The HP manhole gasket 6365/HP is a mesh-reinforced rubber seal made from a temperature, corrosion and chemical-resistant high-performance woven mesh with elastomeric coating that was specially developed to meet the stringent requirements of TRD 401 test class "D".

**Operating range**

Pressure:  $p = 40 \text{ bar}$

Temperature

- Continuous operation:  $t_{\text{max}} = +250 \text{ }^\circ\text{C}$

Recommended surface roughness:

$R_z = 10 \dots 40 \text{ } \mu\text{m}$

Chemical resistance: Boiler feed water / media resistance as per TRD 611.

**Recommended applications**

Industries

- Power plant technology
- Building services engineering

**Standards and releases**

- Component testing to TRD 401 – test class D
- TÜV

**Available dimensions**

- Standard dimensions: (Width x Length x Thickness)
  - 100 x 150 x 8 mm
  - 115 x 165 x 8 mm
  - 150 x 200 x 8 mm
  - 220 x 320 x 10 mm
  - 280 x 380 x 10 mm
  - 300 x 400 x 10 mm
  - 310 x 410 x 10 mm
  - 320 x 420 x 10 mm
  - 320 x 425 x 10 mm
  - 350 x 450 x 10 mm

**Sealing parameters**

Recommended heating gradient: max. 2 K/min

**Note**

The gasket is tightened once more after installation when the boiler is started again and is safe for operation once the installation is complete.

**HP manhole gasket 6365/HP variants**

**Form as supplied**

Manhole gasket

6365/HP

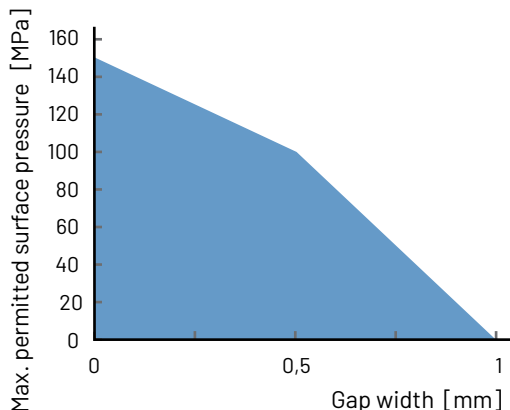


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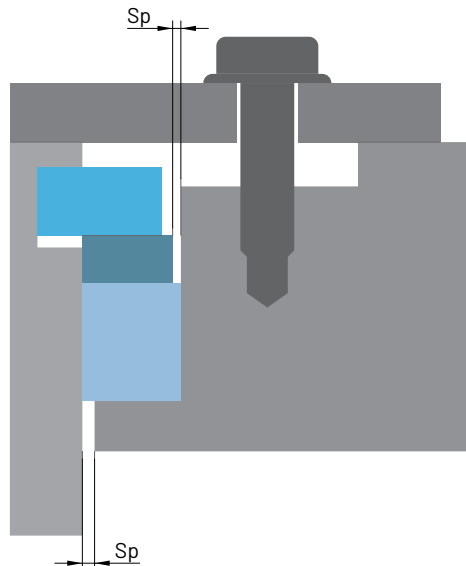


## Statotherm V-Flex 6850/V as a servicing replacement

Relationship between surface pressure and gap width  $S_p$  in the operating state



Gasket factor for test and operating state  $m = 1.4$



### Uncomplicated to install

- Open and lift up lantern ring, remove old gasket with the cover leaving no residue
- Thoroughly clean installation space / sealing point (free of dust and grease, and dry)
- Measure to length
- Cut gaskets to length with a slanted cut, insert or wrap and then fix in position. Offset butt joints. If two sealing rings are needed,
- After fitting / assembling, preshape the gasket using the tensioning bolts ( $\sigma_{vu} = 8 \dots 20 \text{ MPa}$ )
- The actual sealing force is generated via the operating pressure (self-sealing).

Please note that the gasket settles after the operating pressure is released which means that the tensioning bolts may loosen. They should then be hand-tightened.

### Media resistance

Medium	Concentration	Temperature
<b>Inorganic acids</b>		
Hydrochloric acid	all	Boiling point
Hydrofluoric acid	all	Boiling point
Phosphoric acid	all	Boiling point
Sulfuric acid	0 ... 70 %	Boiling point
Chromic acid	0 ... 10 %	200 °C
Nitric acid	0 ... 10 %	85 °C
	10 ... 20 %	60 °C
	over 20 %	40 °C
<b>Organic acids</b>		
Benzenesulfonic acid	60%	Boiling point
Acetic acid	all	Boiling point
Acetic acid anhydride	100%	Boiling point
Chloroacetic acid	all	Boiling point
Amino acid	all	Boiling point
<b>Alkalis</b>		
Caustic soda	all	Boiling point
Sodium hydroxide (solid)		Melting point
<b>Solvent</b>		
Benzene and homologues	0 ... 100 %	Boiling point
Alcohols	0 ... 100 %	Boiling point
Ether	0 ... 100 %	Boiling point
Esters	0 ... 100 %	Boiling point
Ketones	0 ... 100 %	Boiling point
Halogenized hydrocarbons	0 ... 100 %	Boiling point
Frigene	0 ... 100 %	Boiling point
Vinyl chloride	0 ... 100 %	Boiling point
Mineral oils	0 ... 100 %	Boiling point

Exception: With oxygenated acids and compounds with an oxidizing effect, the resistance is dependent on the concentration and temperature.



#### Advantages

- Extremely flexible and adaptable
- Suitable for a long service life
- Easy to install and remove
- Fills large gaps and compensates for damage

## Statotherm V-Flex 6850/V

#### Features

The Statotherm V-Flex 6850/V is a cover seal packing braided with a rectangular profile. It is made from permanently elastic, expanded pure graphite foil (> 96 %) with Inconel wire reinforcement to increase pressure resistance. It was specially developed as a servicing replacement for sealing covers in valves and blind flanges.

This is an outstandingly service-friendly gasket with universal media resistance. It is commonly used in power stations. It is installed from the roll and thus requires no special tools.

#### Operating range

Pressure:  $p = 500 \text{ bar}$

Temperature

- Continuous operation:  $t = -200 \text{ °C} \dots +500 \text{ °C}$
- Steam:  $t_{\text{max}} = +550 \text{ °C}$

Recommended surface roughness:

$R_z = 10 \dots 40 \text{ }\mu\text{m}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Not suitable for use in highly oxidizing media.

#### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Building services engineering

#### Available dimensions

- Sold by length in boxes
- Standard dimensions:
  - 5.0 x 12.0 mm
  - 7.5 x 15.0 mm
  - 10.0 x 15.0 mm
  - 15.0 x 30.0 mm
  - 20.0 x 30.0 mm
  - 25.0 x 35.0 mm
  - 27.5 x 50.0 mm
  - 30.0 x 45.0 mm

#### Sealing parameters

- Chloride content:  $\leq 100 \text{ ppm}$
- Average density:  $1.4 \text{ g/cm}^3$



#### Statotherm V-Flex 6850/V variants

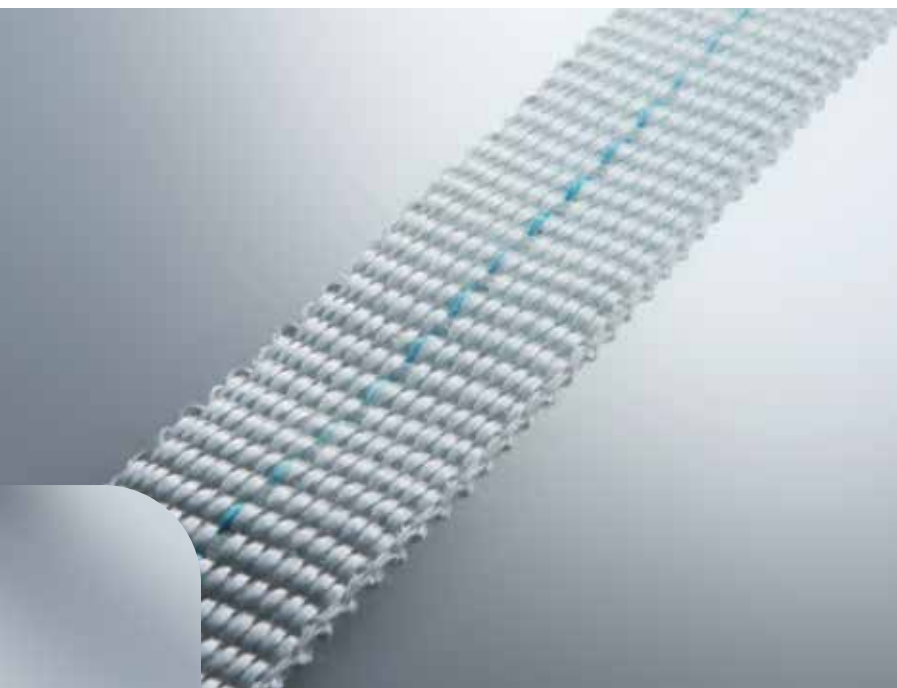
Form as supplied

Sold by length

6850/V



<b>Introduction</b>	
Operating range, temperature stability and chemical resistance	106
Media overview	108
Introduction	110
<b>PTFE tapes</b>	
Quick-Seal Universal F 9654/UF	114
Quick-Seal Multi 9654/MB	114
Elastic Tankpak 6756	115
<b>Graphite tapes</b>	
Statotherm Tape 6750/INC	116
Rotatherm Tape 0902/B	116
<b>Glass tapes</b>	
BuraGlas GS tape 9495	117



## Operating range for EagleBurgmann sealing cords and tapes

	Page	Range of applications		Temperature stability			
		Operating pressure [bar]		Temperature stability $T_{min}$ [°C]	Temperature stability $T_{max}$ [°C]	Transient peak temperature [°C]	Temperature limit for steam operation [°C]
PTFE tapes							
Quick-Seal Universal F 9654/UF	114	1)		-240	270	315	-
Quick-Seal Multi 9654/MB	114	1)		-240	270	315	-
Elastic Tankpak 6756	115	0.7		-50	100	-	-
Graphite tapes							
Statotherm Tape 6750/INC	116	25		-200	550	-	550
Rotatherm Tape 0902/B	116	1)		-200	500	-	550
Glass tapes							
BuraGlas GS tape 9495	117	1)		-	500	-	-

### Important note

All technical specifications are based on extensive testing and our many years of experience. There are so many possible applications, however, so they can only serve as guide values. The table lists all the important operating ranges for EagleBurgmann sealing cords and tapes in the various possible applications.

Please note that the extreme values for the individual operating parameters cannot be applied at the same time due to the resulting interactions. The operating ranges of individual products will also depend on the associated pressure, external forces and influences, the temperature and the medium to be sealed.

Chemical resistance

Permitted pH	Media group																							
	1.1	1.2	2	3	4.1	4.2	4.3	5	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17.1	17.2	18	
	Water, industrial water, waste water	Sea water	Drinking water, food, pharmaceutical products	Hot water, boiler feed water, condensate	Steam < 280 °C	Steam < 450 °C	Steam < 550 °C, steam < 700 °C <sup>1)</sup>	Neutral vapors, gases, air, nitrogen	Acidic gases	Hydrogen	Oxygen	Volatile hydrocarbons, solvent vapors	Dilute acids, inorganic and organic salt solutions	Concentrated acids, inorganic and organic	Dilute alkalis, salt solutions	Concentrated alkalis	Oils, greases, mineral oils, animal fats	Heat transfer oils	Solvents, aliphatic and aromatic hydrocarbons, aldehydes, alcohols, ketone esters, chlorinated hydrocarbons, coolants	Organic compounds, amines, nitrites	Sticky media, bitumen, adhesives	Abrasive media, lime, sand, solids	Dyes, paints, turbine oils	
pH 0 ... 14	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
pH 0 ... 14	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
pH 0 ... 14	●	●	●	●									●	●	●	●	●		●					
pH 0 ... 14	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
pH 0 ... 14	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
pH 6 ... 10	●	●	●	●				●	●			●					●				●	●	●	

Guarantees can only be offered in individual cases if the precise conditions of the application are known and they have been confirmed in a separate agreement. For critical operating conditions, we recommend a consultation with our specialist engineers.

<sup>1)</sup> In an inert atmosphere

## Media overview

Media	Media group	Media	Media group	Media	Media group
<b>A</b>		Calcium hydroxide (milk of lime)	11, 12	Ethylene	8
Acetaldehyde	15, 16	Calcium hypochlorite (bleaching lye)	9, 11	Ethylene chloride	6, 15
Acetic acid	9, 10	Calgon R <sup>®</sup> (sodium hydroxide phosphate silicate)	11	Ethylene glycol	16
Acetic acid anhydride	10	Calgon S (urea nitrate)	11, 12	Ethylene oxide	8
Acetone	8, 15	Calgon <sup>®</sup> (sodium hexametaphosphate)	11	<b>F</b>	
Acetylene	8, 15	Caprolactam	11, 16	Faeces (feces)	1.1
Acrylonitrile	16	Carbolic acid (phenol)	9, 10	Fat and fatty alcohols	13, 15
Adipic acid	9, 10	Carbon dioxide (gas)	6	Fatty acids	9, 10
Alcohol (ethanol)	15	Carbon dioxide (liquid)	6	Fatty alcohol sulfonate	1.1
Aluminum acetate	9, 11	Carbon disulfide	5	Ferricyanide	9, 11
Aluminum chloride	9, 11	Carbon monoxide (gas)	6	Fir needle oil	13
Aluminum sulfate	9, 11	Carbon tetrachloride	8, 15	Fish liver oils	13
Ammonia (gaseous)	11, 12	Caustic lime (calcium hydroxide)	12	Fish slurry	1.1
Ammonia (liquid)	11, 12	Caustic potash (potassium hydroxide)	11, 12	Fixing bath, acidic	9
Ammonium chloride	9, 11	Caustic soda (sodium hydroxide)	12	Formaldehyde (formalin)	15, 16
Ammonium hydroxide	11, 12	Caustic soda ≤30 % (all conc.)	11, 12	Formic acid	9, 10
Ammonium sulfate	9, 11	Chloracetic acid (mono, di)	9	Freon <sup>®</sup>	8, 15
Aniline	16	Chlorinated biphenyl	15	Frigene <sup>®</sup>	8, 15
Anthracene oil	13	Chlorinated paraffin	15, 17.1	Fruit juices	2
Anti-freeze additive (glycols)	15	Chlorine gas	6, 10	Fruit pulp	2
Apple must	2	Chlorine water (water saturated with chlorine)	10	<b>G</b>	
Arsenic acid	9, 10	Chlorobenzene	8, 15	Gallic acid	9, 10
Asphalt	17.1	Chloroform	15	Gas scrubber water	1.1, 9
ASTM Oil standard no. 1, 2, 3 and 4	13	Chlorosulfuric acid (chlorosulfonic acid)	10	Gelatin	2
<b>B</b>		Chromic acid	10	Glacial acetic acid	10
Barium chloride	9, 11	Chromium oxide salts	9, 11	Glauber's salt (Sodium sulfate)	9, 11
Barium hydroxide	11, 12	Citrus juices	2, 9	Glucose	2
Battery acid	10	Coconut fat	13	Glue	17.1
Beer	2	Coke oven gas	5	Glycerine (glycerol)	15
Beer mash from pumps	2	Copper acetate solution	9, 11	Glycol acetic acid ester	8, 15
Beer mash from wort boiler	2	Copper(I) chloride solution	9, 11	Glycol monoacetate	8, 15
Benzene	15	Copper(II) sulfate solution (vitriol of copper)	9, 11	Groundnut oil	13
Benzenesulfonic acid	10	Cresol	16	<b>H</b>	
Benzoic acid	9, 10	Crude oil	13	Heating oil	13
Benzyl alcohol	15	Cyclohexane	8, 15	Heavy water	1.1
Bitumen (asphalt)	17.1	Cyclohexanol	15	Heptane	8, 15
Blast furnace gas	6	Cyclohexanone	15	Hexafluorosilicic acid	10
Bleaching lye	11	<b>D</b>		Hexane	8, 15
Blood	2	Denatured alcohol	15	Honey	2
Boiler feed water	3	Dibutyl phthalate (DBP)	16	Hydraulic fluid (crude oil-based)	13
Bonder lye	9, 10, 11, 12	Diesel oil	13	Hydraulic fluid (phosphate ester-based)	13
Bone fat (dissolved in tri or petrol)	15	Diethanolamine (DEA)	11, 16	Hydrazine	15
Borax solution	11	Diethyl ether	8, 15	Hydrochloric acid	9, 10
Boric acid	9	Diethylene glycol	8, 15	Hydrocyanic acid	9, 10
Brackish water	1.1	Dimethyl ether	8, 15	Hydrofluoric acid	10
Brake fluid (ATE blue)	13	Dioxane	16	Hydrogen bromide	6, 9, 10
Bromine, aqueous	9, 10	Diphenyl oxide	15, 16	Hydrogen chloride	6, 10
Bunker and heating oil	13	Diphyl heat transfer fluid	14	Hydrogen chloride (hydrochloric acid gas)	6, 9, 10
Butadiene	16, 17.1	Distilled water	2	Hydrogen sulfide	6, 9, 10
Butane	8, 15	Dodecyl benzene	15	<b>I</b>	
Butanediol	15	Dowtherm <sup>®</sup> A	14	Iron phosphate solution	9, 11
Butanol (butyl alcohol)	15	Dye liquor	17.1	Iron(III) chloride solution	9, 10
Butanone (Methyl-ethyl-ketone)	15	Dyes	18	Isobutyl alcohol	8, 15
Butyl acetate	15	<b>E</b>		Isobutyl ketone	8, 15
Butyl alcohol (butanol)	15	Edible oil	2, 13	Isooctane	8, 15
Butylene	8, 15	Ethane	15	Isopropyl acetate	8, 15
Butyric acid	2, 9, 10	Ethanol (ethyl alcohol)	15	Isopropyl alcohol	8, 15
<b>C</b>		Ether (diethyl ether)	8, 15	Isopropyl ether	8, 15
Calcium acetate	9, 11	Ethyl acetate	8, 15		
Calcium bisulfite lye (sulfite lye)	9, 11				
Calcium chloride	9, 11				



Media	Media group
<b>J</b>	
Jam and marmalade	2
Jet fuel (kerosene JP 4, JP 5)	15
<b>K</b>	
Kerosene	15
<b>L</b>	
Lacquers	18
Lead acetate (lead sugar)	11
Lead sludge	17.2
Lemonades	2
Lignite tar oil	13, 17.1
Liqueurs	2
Liquid manure (slurry)	1.1
Liver oil (fish)	2
<b>M</b>	
Magnesium bisulfite	9, 11
Magnesium hydroxide	11, 12
Maleic acid anhydride	10
Manganese nitrate	9, 11
Mash: hop mash	2
Mazut (heavy heating oil)	13
Meat juices and stocks	2
Mercaptan	16
Mercury(II) nitrate	9, 11
Methane	8
Methanol (methyl alcohol)	15
Methyl chloride	8, 15
Methyl ethyl ketone (MEK)	8, 15
Methylene chloride (dichloromethane)	8, 15
Milk	2
Milk of lime (calcium hydroxide)	1, 12
Mineral oil	13
Mobiltherm® 600	14
Molasses	2, 17.1
<b>N</b>	
N-methyl-2-pyrrolidone (NMP)	15
Naphtha	15
Naphthenic acid	9, 10
Natural gas	5
Nitric acid	
- < 10 % 85 °C	9, 10
- > 10 % 35 °C	10
Nonylphenol	15
<b>O</b>	
Oils	
- animal oils	13
- lubricating oils	13
- plant oils	13
Olive oil	2, 13
Oxalic acid	9, 10
Oxygen (gas, liquid)	7.2
<b>P</b>	
P3° lye	10, 11, 12
Paper pulp	
- fine, tissue paper	17.2
- Photographic paper	9, 11, 17.2
- Plastic	9, 11, 17.2
- Wrapping paper	9, 11, 17.2

Media	Media group
Pentane	8, 15
Perchloric acid	9, 10
Petrol	15
Petroleum ether (gasoline)	8, 15
Phenol (carboic acid)	9, 10
Phenyl ether	8, 15
Phenylhydrazine	8, 15
Phosphoric acid	9, 10
Phosphorus trichloride	9, 10
Phthalic acid (heating)	9, 10
Phthalic anhydride	10
Potassium carbonate	11, 12
Potassium chloride	9, 11
Potassium cyanide (cyanide of potassium)	9, 11
Potassium hypochlorite	9, 11
Potassium nitrate	9, 11
Potassium silicate	9, 11
Potassium sulfate	9, 11
Propane	15
Propanol (propyl alcohol)	8, 15
Propanone (acetone)	8, 15
Propyl acetate (acetic acid ester)	8, 15
Pyridine	15, 16
Pyrrolidone	11, 12
<b>Q</b>	
Quark	2
Quenching oil	13
<b>R</b>	
Rapeseed oil	13
Raw juice (sugar solution)	2
<b>S</b>	
Salicylic acid	9, 10
Saltpetre	9, 11
Sea water	1.2
Silicon tetrachloride (tetrachlorosilane)	9, 10
Silicone greases	13
Silicone oils	13
Silver salts	9
Skin cream	2, 13
Soap solution	1.1
Sodium arsenate	9, 11
Sodium carbonate	1, 12
Sodium chloride (saline)	9, 11
Sodium hydroxide (caustic soda)	11, 12
Sodium hypochlorite	9, 11
Sodium nitrate	9, 11
Sodium phosphate	9, 11
Sodium silicate (water glass)	9, 11
Sodium sulfate (Glauber's salt)	9, 11
Sodium sulfide	9, 11
Sodium sulfite	9, 11
Sodium thiosulfate (antichlor)	9, 11
Starch solutions	17.1
Steam	4.1, 4.2, 4.3
Stearic acid (fatty acid)	9, 10
Styrene (phenyl ethylene)	15
Sulfite lye	9, 11
Sulfuric acid	
- 70-90 % 150 °C	10
- 90-95 % 70 °C	10
Sulfuric acid, fuming (oleum)	10
Sulfurous acid	9, 10

Media	Media group
<b>T</b>	
Table salt (sodium chloride)	9, 11
Table vinegar	9
Tallow	13
Tannic acid	9, 10
Tar	17.1
Test gasoline	15
Tetrachloroethylene	8, 15
Tetrahydrofurane	15
Thick juice (60% sugar solution)	2
Thin juice (sugar solution)	2, 17.1
Toluene	15
Trichloroethane	15
Trichloroethylene (tri)	15
Triethanolamine	11, 16
Trisodium phosphate	9, 11
Turbine oils	18
Turpentine	15
<b>U</b>	
Urea	11, 16
<b>V</b>	
Vegetable paste	2
Vinegar (table vinegar)	9
Vinyl chloride	8
<b>W</b>	
Waste water	1.1
Water from pressed fish	1.1
Water glass (Sodium silicate)	9, 11
Water	
a) Drinking	2
b) Distilled	3
c) Not treated	1.1
d) Boiler feed (hot water, condensate)	3
e) Reactor, radioactive	1.1
f) Heavy	1.1
g) Brackish, sea	1.2
h) Dirty	1.1
Whale oil, train oil	13
Wine	2
Wine spirits	2, 15
Wood pulp	11; 17.2
<b>X</b>	
Xylene	8; 15
<b>Y</b>	
Yeast paste	2
<b>Z</b>	
Zinc chloride	9; 11

## Cords and tapes

### Properties

EagleBurgmann sealing tapes and cords are available in a wide range of materials, dimensions and grades, enabling them to be used in almost every industrial sector. All EagleBurgmann sealing tapes are adhesive-backed for ease of fitting on site.

### Advantages

- Adhesive backing for very simple fitting on site
- Universal – can be used in almost every industry
- Pure graphite tapes offer very good sliding properties
- Ideal for use in repair operations

### Types

EagleBurgmann sealing tapes and cords are generally made from PTFE, graphite or glass in different combinations. Virgin, monodirectional or multidirectional expanded PTFE is used to manufacture PTFE tapes. Graphite tapes are available in 98% graphite or nuclear grade (99.85% purity) according to the application.

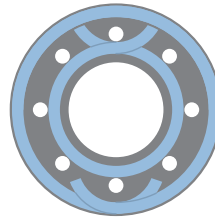
Sealing tapes are sold by length on rolls, with standard lengths ranging from 5 to 50 meters. The tape thickness and width must be matched to the width and composition of the sealing surface, design of the flanges and bolts and the prevailing operating conditions.

### Range of applications

EagleBurgmann sealing tapes are perfect for sealing a wide range of flanges in tanks, housings, pump and gearbox covers and devices. Graphite tapes are also excellent for sealing or packing valve spindles during repairs. They are used to quickly and easily create working packing rings inside the valve. Elastic Tankpak was specially developed for sealing shipping containers for chemicals or solvents.

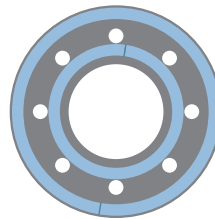
### Installation instructions for PTFE sealing tapes

- Clean sealing surfaces thoroughly and remove all dirt, corrosion residues, oil and other materials originating from the previous gasket. Then dry.
- Select a sealing tape of the right dimensions.
- Remove the backing strip.
- Starting from one bolt hole, apply the tape inside the pitch circle.
- Overlap the ends roughly 2 cm and cut to length.



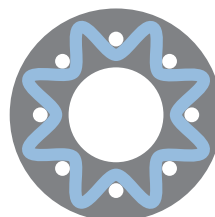
Tape applied with overlap

- For components that are sensitive to stress or if only low surface pressure can be applied, cut the tape with a slanted cut.
- To do this, cut the start and end of the sealing tape at an angle, ensuring that the cuts at start and end run in opposite directions.
- The length of overlap must be at least the same as the tape width.
- Remove the backing strip.
- Starting from one bolt hole, apply the sealing tape inside the pitch circle
- Join the ends.



Tape applied with slanted cut

- For thin flanges, it is a good idea to apply the tape in a wavy line to prevent the flange from bending.



Tape applied in a wavy line

### Recommended sizing for selecting the sealing tape

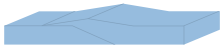
Sealing tape dimensions depend on factors such as the width and composition of the sealing surface, design of the flanges and bolts and the prevailing operating conditions. As a rule, the width of the seal should be roughly 1/4 to 1/3 of the sealing surface width.

Use thicker tapes if there are significant irregularities or damage in the surface to be sealed.

### Minimize downtimes due to installation and maintenance

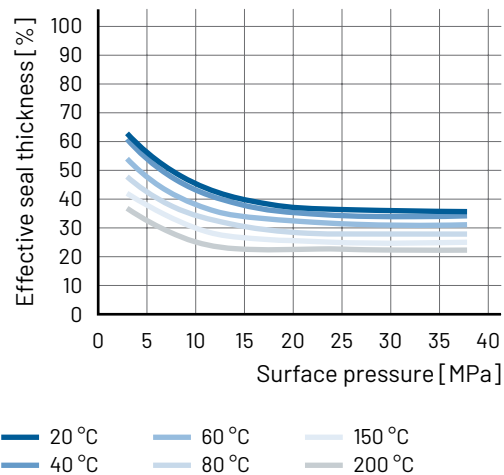


The self-adhesive backing makes the Quick-Seal tape easy to fit. Clean the sealing surfaces thoroughly and remove all dirt, corrosion residues, oil and other materials originating from the previous gasket. Cut the start of the sealing tape at an angle.



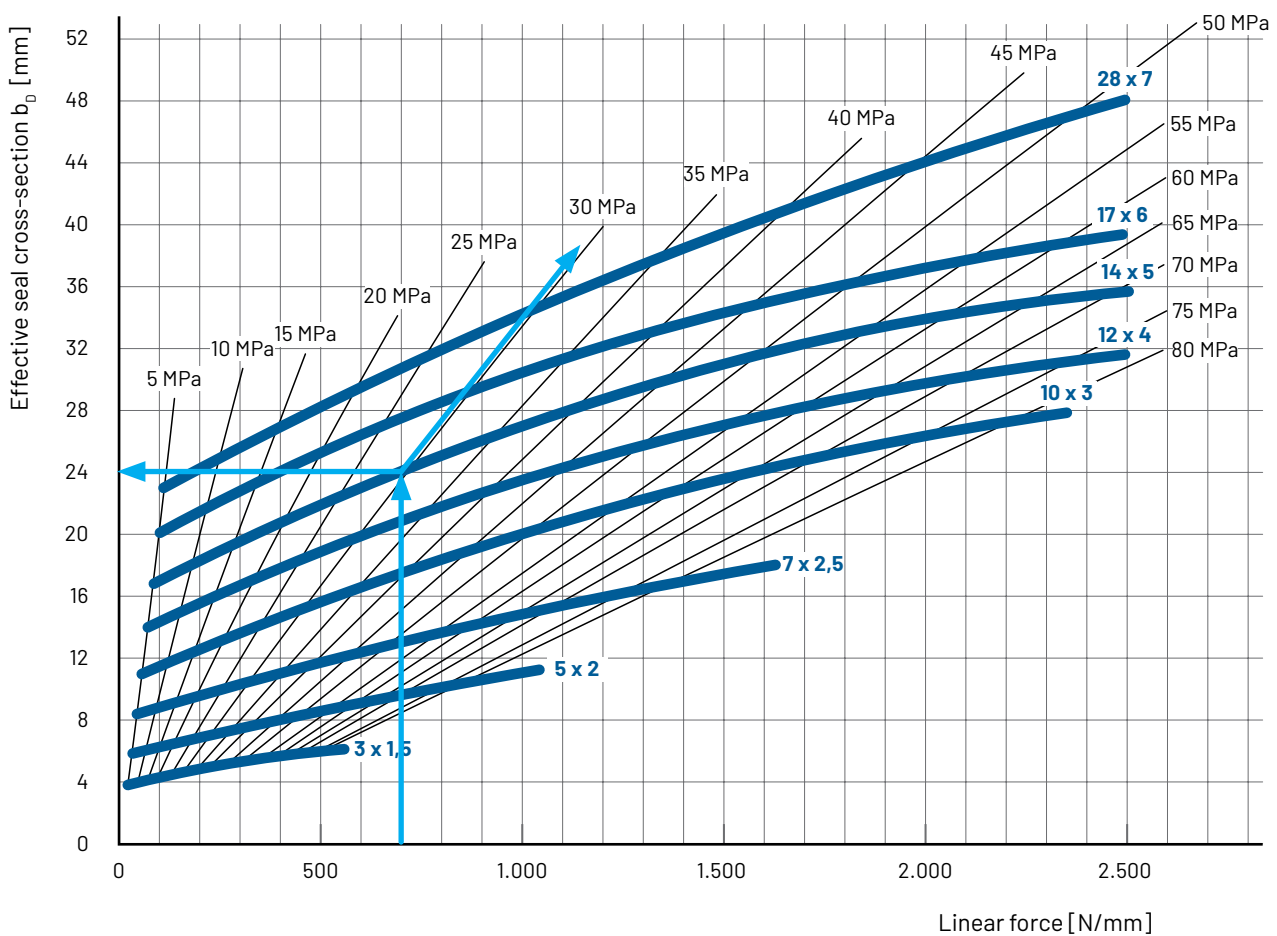
Remove the backing paper. Starting at a bolt hole, apply the tape in the middle of the sealing surface. Apply the tape concentrically to the pipe diameter. At the end, make another angled cut in the tape (in the opposite direction). The length of overlap must be at least equal to the tape width.

Quick-Seal Multi 9654/MB effective seal thickness



## Cords and tapes

Effective seal cross-section  $b_D$  and resulting surface pressure at 20 °C in relation to the linear force applied



**Example:**

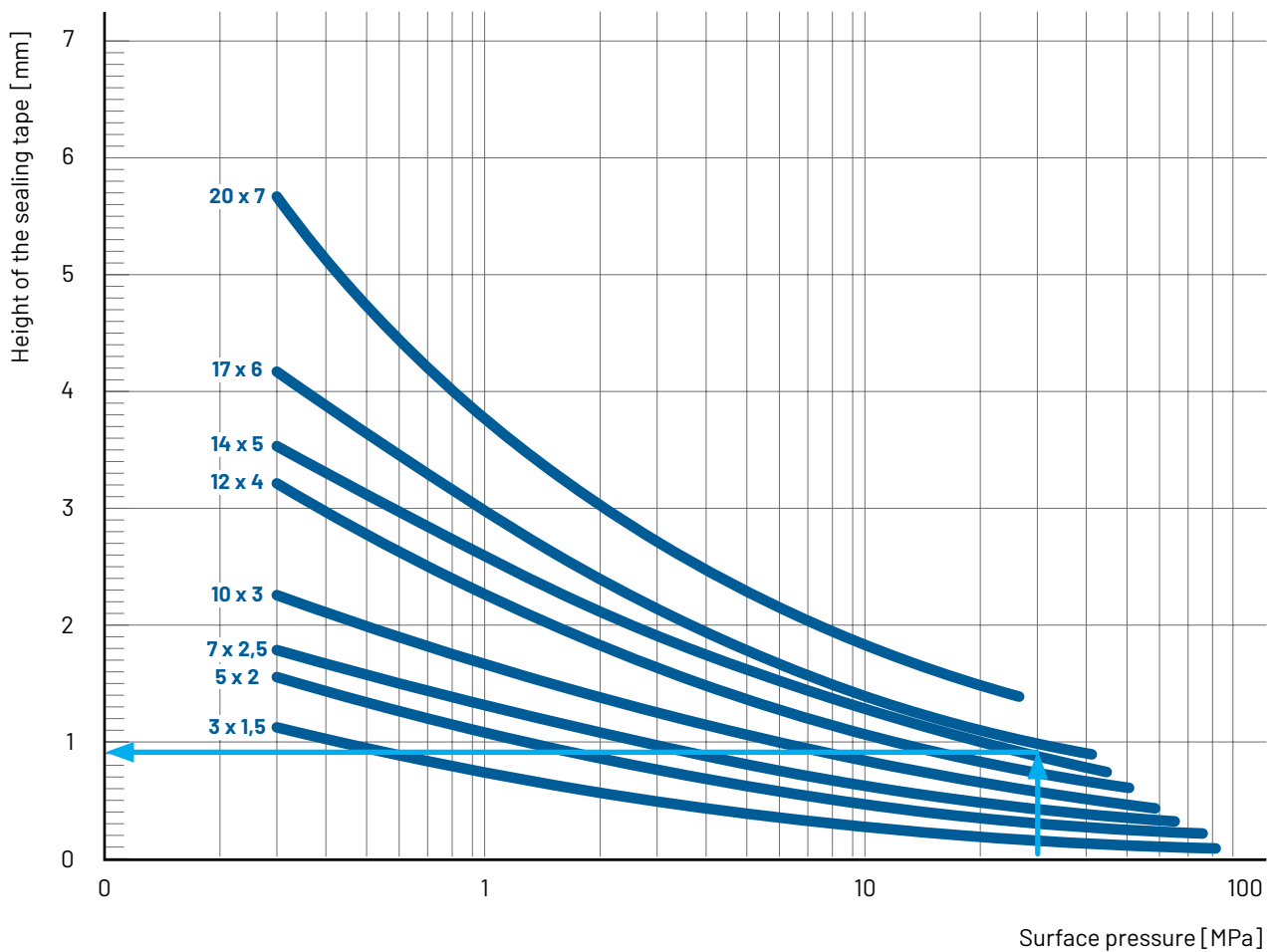
- Quick-Seal Universal F 14 x 5 mm sealing tape
- Linear force applied: 700 N/mm  
(entire bolt force, divided by the full length of the seal)

- Sealing tape dimensions
- Resulting surface pressure in relation to the linear force applied

**Result:**

The effective seal cross-section  $b_D$  when fitted is 24 mm.  
The resulting surface pressure is roughly 30 MPa.

## Change in seal thickness at 20 °C for Quick-Seal Universal F 9654/UF



### Example:

- Quick-Seal Universal F 14 x 5 mm sealing tape
- Surface pressure: 30 MPa

### Result

The effective seal thickness of the sealing tape is 0.9 mm.

These values are based on a surface roughness of  $R_z < 6.3 \mu\text{m}$ . For rougher standard surfaces it can be assumed that a larger seal cross-section will result in a greater surface pressure. When installed, this leads to a larger seal thickness which must be taken into account.

— Sealing tape dimensions



### Advantages

- Outstanding adaptability
- Easy handling
- Very good chemical resistance
- Does not age

## Quick-Seal Universal F 9654/UF

### Features

Quick-Seal Universal F 9654/UF is a self-adhesive sealing tape made from 100% virgin ePTFE (Teflon). The special manufacturing method creates a microporous, monoaxial fiber structure (ePTFE), that gives the seal its special properties.

### Operating range

**Pressure:** The pressure resistance depends exclusively on the installation and operating parameters (please read our installation and maintenance instructions).

### Temperature

- Continuous operation:  $t = -240\text{ °C} \dots +270\text{ °C}$
- transient peak temperature:  $t = +315\text{ °C}$

### Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

### Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to all media apart from dissolved and molten alkali metals and elementary fluorine at  $t > 150\text{ °C}$  and  $p > 40\text{ bar}$ .

### Recommended applications

#### Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Water and waste water technology
- Mining
- Building services engineering
- Food industry

### Available dimensions

- Sold by length on rolls in 5, 10, 25 and 50 m lengths
- Standard dimensions: (Width x Height)
  - 3 x 1.5 mm
  - 5 x 2 mm
  - 7 x 2.5 mm
  - 10 x 3 mm
  - 12 x 4 mm
  - 14 x 5 mm
  - 17 x 6 mm
  - 20 x 7 mm
  - 28 x 5 mm
  - 40 x 5 mm

### Note

With the self-adhesive backing, the sealing tape is quick and simple to install. The adhesive life depends on the storage and installation conditions.

### Quick-Seal Universal F 9654/UF variants

#### Form as supplied

Sold by length

9654/UF



### Advantages

- High dimensional stability
- Outstanding compressive strength
- Excellent adaptability
- Minimum cold flow properties
- Universal media resistance
- Easy handling

## Quick-Seal Multi 9654/MB

### Features

Quick-Seal Multi 9654/MB sealing tape consists of virgin multidirectional expanded PTFE. The modern production process creates a multidirectional fiber structure that gives the seal its special properties.

### Operating range

**Pressure:** The pressure resistance depends exclusively on the installation

and operating parameters (please read our installation and maintenance instructions).

### Temperature

- Continuous operation:  $t = -240\text{ °C} \dots +270\text{ °C}$
- transient peak temperature:  $t = +315\text{ °C}$

### Recommended surface roughness:

$R_z = 12.5 \dots 50\ \mu\text{m}$

### Chemical resistance:

$\text{pH} = 0 \dots 14$

Not suitable for use when melting alkali metals or in hydrogen fluoride and fluorine compounds at  $t > 150\text{ °C}$  and  $p > 40\text{ bar}$ .

### Recommended applications

#### Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Pulp and paper industry
- Food industry

### Standards and releases

- EC 1935/2004 (without adhesive)

### Available dimensions

- Sold by length on rolls in 10, 25 and 50 m lengths
- Standard dimensions: (Width x Height)
  - 10 x 3 mm, 10 x 6 mm
  - 15 x 3 mm, 15 x 6 mm
  - 20 x 3 mm, 20 x 6 mm
  - 25 x 3 mm, 25 x 6 mm
  - 30 x 3 mm, 30 x 6 mm
  - 35 x 3 mm, 35 x 6 mm
  - 50 x 6 mm, 50 x 9 mm
  - 65 x 6 mm, 65 x 9 mm

Additional sizes upon request

### Sealing parameters

#### AD Directive B7:

- $k_0 \times K_D = 25 \times b_D$
- $k_1 = 2,5 \times b_D$
- DIN 28090-2:
- $\epsilon_{KSW} = 39\%$

### Note

Easy to fit on site. Shape and length can be cut to size by hand. No waiting or curing times. The sealing tape does not age. The adhesive life depends on the storage and installation conditions. The tapes can also be doubled or spliced to take account of extreme flange conditions, distortion or irregularities.

### Quick-Seal Multi 9654/MB variants

#### Form as supplied

Sold by length

9654/MB



### Advantages

- Outstanding recovery curve
- Suitable for repeated opening and closing of container covers
- Universal chemical resistance
- Enormous inherent strength
- Optimized abrasion resistance
- Reusable

## Elastic Tankpak 6756

### Features

EagleBurgmann Elastic Tankpak 6756 is an excellent gasket for sealing transport containers for chemicals or solvents. The core is made from a hollow elastomeric material (EPDM) wrapped in PTFE foil, thus guaranteeing optimum chemical resistance for the entire seal. The polypropylene middle layer primarily acts as a cushion and buffer, and it is first wrapped with PTFE foil. The entire seal is then over-braided with PTFE yarn, fixing it firmly to the rest of the material composite.

### Operating range

Pressure:  $p = 0.7$  bar

Temperature

- Continuous operation:  
 $t = -50\text{ °C} \dots +100\text{ °C}$
- Continuous operation 6756/TH:  
 $t = -50\text{ °C} \dots +250\text{ °C}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to acids, alkalis, oils, organic solvents and liquid and powdered chemicals.

### Recommended applications

Industries

- Chemical industry
- Shipbuilding

### Standards and releases

- DNV, USCG (P02/1,2 Butylenoxid)
- Germanischer Lloyd

### Available dimensions

- 10 ... 60 mm
- Round or rectangular molded parts to suit the application

### Note

For rectangular cross-sections, the maximum width/height ratio should ideally not exceed 3:2. The surface pressure applied to the seal must be evenly distributed around the edge, and must be applied in small increments by attaching as many toggles or clamps as necessary.

The sealing surface on the edge of the container or coaming must be smooth and rounded to avoid damaging the seal. The packing may be safely stored in its original packaging for up to 3 years under cool, dry storage conditions.

### Elastic Tankpak 6756 variants

Form as supplied	Composite material	
Sold by length	EPDM core/propylene/PTFE	6756/TG
	Elastomer core/glass fiber/PTFE	6756/TH





### Advantages

- Does not age
- Easy handling
- Good resilience
- Outstanding chemical resistance
- High temperature stability

## Statotherm Tape 6750/INC

### Features

Statotherm tape 6750/INC is a braided tape made from graphite yarn reinforced with Inconel wires. It also has an adhesive backing.

### Operating range

Pressure

- with retention: p = 250 bar
- smooth raised face: p = 25 bar

Temperature

- Continuous operation: t = -200 °C ... +550 °C

Chemical resistance:

pH = 0 ... 14

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Power plant technology
- Water and waste water technology
- Mining
- Building services engineering
- Shipbuilding
- Metal production and processing

### Available dimensions

- Sold by length on 2 kg rolls
- Standard dimensions: (Width x Height)
  - 12.7 x 3.2 mm (1 kg rolls)
  - 25.4 x 6.4 mm
  - 31.8 x 6.4 mm
  - 38.1 x 6.4 mm

### Statotherm tape 6750/INC variants

Form as supplied	
Sold by length	6750/INC



### Advantages

- Do not harden
- Long service life
- Uncomplicated installation and removal

## Rotatherm Tape 0902/B

### Features

Rotatherm tape 0902 is nuclear grade pure graphite tape (purity ≥ 99.85 %). It is suitable for sealing or packing valve spindles during servicing. They are used to quickly and easily create working packing rings inside the valve.

### Operating range

Temperature

- Continuous operation: t = -200 °C ... +500 °C

Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

Industries

- Chemical industry
  - Petrochemical industry
  - Oil & gas industry
  - Process industry
  - Pharmaceutical industry
  - Power plant technology
  - Building services engineering
- Components
- Valves

### Standards and releases

- BAM (upon request)

### Available dimensions

- Sold by length on rolls in boxes in 12 and 15 m lengths
- Standard dimensions: (Width x Height)
  - 10 x 0.5 mm
  - 15 x 0.5 mm
  - 20 x 0.5 mm
  - 25 x 0.5 mm
  - 30 x 0.5 mm

### Rotatherm tape 0902/B variants

Form as supplied	Type	Tape width	for packing cross-section	
Sold by length	smooth	10 mm	up to 6 mm square	0902/10
		15 mm	up to 9 mm square	0902/15
		20 mm	up to 12 mm square	0902/20
		25 mm	from 15 mm square	0902/25
	knurled, self-adhesive			0903



## Advantages

- High temperature stability
- High flexibility

## BuraGlas GS tape 9495

### Features

BuraGlas GS tape 9495 is woven glass fiber sealant tape made of multiple glass layers. The individual layers are stitched and glued together. If needed the sealing tape can be impregnated with a high temperature-resistant graphite compound. All products from the BuraGlas range are manufactured from materials and fibers that meet the safety requirements of the World Health Organization (WHO).

### Operating range

Temperature

- Continuous operation:  
 $t_{\max} = +550\text{ °C}$
- transient peak temperature:  
 $t = +650\text{ °C}$

Chemical resistance:

pH = 6 ... 10

### Recommended applications

Industries

- Power plant technology
- Building services engineering
- Metal production and processing

Components

- Furnace doors
- Ducts
- Metal crucibles

### Available dimensions

- Sold by length on rolls in 25, 50 or 150 m lengths

- Standard dimensions

(Width x Height x Length):

- 15 x 2 mm x 150 m
- 20 x 2 mm x 150 m
- 30 x 2 mm x 50 m
- 40 x 2 mm x 50 m
- 50 x 2 mm x 50 m
- 60 x 2 mm x 50 m
- 80 x 2 mm x 50 m
- 100 x 2 mm x 50 m
- 10 x 3 mm x 150 m
- 15 x 3 mm x 150 m
- 20 x 3 mm x 150 m
- 30 x 3 mm x 50 m
- 40 x 3 mm x 50 m
- 50 x 3 mm x 50 m
- 80 x 3 mm x 50 m
- 100 x 3 mm x 50 m
- 20 x 4-5 mm x 20 m
- 30 x 4-5 mm x 20 m
- 40 x 4-5 mm x 20 m
- 50 x 4-5 mm x 20 m
- 100 x 4-5 mm x 20 m

### BuraGlas GS tape 9495 variants

Form as supplied

Sold by length

9495

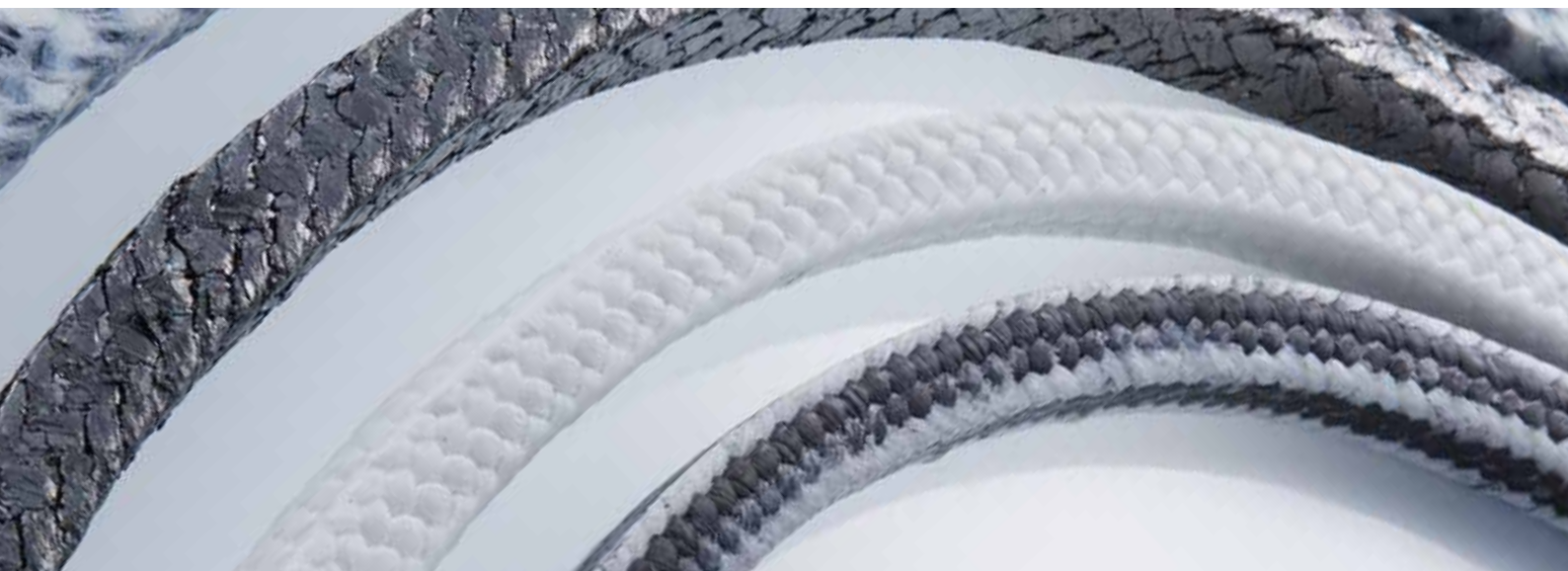
Section overview



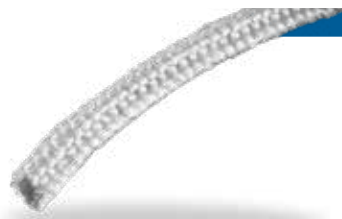
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You will find more compression packings on page 120



Section overview



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Densities and weights	164



# Operating range for EagleBurgmann pump packings

	Page	Universal applications		Special applications	FDA-certified	Range of applications											
						Pumps	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Valves	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Reciprocating piston pumps	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Fans, blowers (dry contacting)	Pressure p [bar]	Sliding velocity $v_g$ [m/s]
<b>Natural fibers</b>																	
Buratex B 4001	134	•	-	-		10	10	60	2	-	-	-	-	8	2		
Buratex R 4002	134	•	-	-		10	10	60	2	-	-	-	-	8	2		
Buratex W 4003	135	•	-	-		10	10	60	2	-	-	-	-	8	2		
Buraflo 5846	135	•	-	•		25	12	100	2	100	1.5	-	-	20	2		
<b>Aramid fibers</b>																	
Buramex SF 6335	136	-	•	•		25	25	100	2	50	2	-	-	25	2		
Araflon 6426	136	-	•	-		25	25	-	-	100	1.5	-	-	25	2		
Supraflon 6435	137	•	-	-		20	20	100	2	-	1.5	-	-	20	2		
<b>PTFE-based fibers</b>																	
Kombipack 6065	138	-	•	-		25	20	-	-	-	-	-	-	25	2		
Burasoft 6225/L	138	•	-	•		10	10	100	2	-	-	-	-	-	-		
Thermoflon 6230, SL 6230/SL	139	-	•	-		25	25	100	2	250	2	-	-	25	2		
<b>Special fibers</b>																	
Isartherm 6060	140	-	•	-		30	25	100	2	100	-	-	-	-	-		
Spezial-Kombi K1 6430/K1	140	-	•	-		-	-	-	-	500	3	-	-	50	2		
Spezial-Kombi K2 6430/K2	141	-	•	-		25	20	-	-	-	-	-	-	-	-		
Buraflex HT 2000/HT	141	-	•	-		60	40	80	5	-	-	-	-	40	10		

**Important note**

All technical specifications are based on extensive testing and our many years of experience. There are so many possible applications, however, so they can only serve as guide values. The table lists all the important operating ranges for EagleBurgmann compression packings in the various possible applications.

Please note that the extreme values for the individual operating parameters cannot be applied at the same time due to the resulting interactions. The operating ranges of individual products will also depend on the associated pressure, external forces and influences, the temperature and the medium to be sealed.



Temperature stability T <sub>min.</sub> [°C]	Temperature stability		Permitted pH	Chemical resistance																							
	Temperature stability T <sub>max.</sub> [°C]	Temperature limit for steam operation [°C]		Media group																							
				1.1	1.2	2	3	4.1	4.2	4.3	5	6	7.1	7.2	8	9	10	11	12	13	14	15	16	17.1	17.2	18	
				Water, industrial water, waste water	Sea water	Drinking water, food, pharmaceutical products	Hot water, boiler feed water, condensate	Steam < 280 °C	Steam < 450 °C	Steam < 550 °C, steam < 700 °C	Neutral vapors, gases, air, nitrogen	Acidic gases	Hydrogen	Oxygen	Volatile hydrocarbons, solvent vapors	Dilute acids, inorganic and organic salt solutions	Concentrated acids, inorganic and organic	Dilute alkalis, salt solutions	Concentrated alkalis	Oils, greases, mineral oils, animal fats	Heat transfer oils	Solvents, aliphatic and aromatic hydrocarbons, aldehydes, alcohols, ketone esters, chlorinated hydrocarbons, coolants	Organic compounds, amines, nitrites	Sticky media, bitumen, adhesives	Abrasive media, lime, sand, solids	Dyes, paints, turbine oils	
-20	100	-	pH 6 ... 8	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-20	100	-	pH 6 ... 8	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-20	100	-	pH 6 ... 8	•	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-50	140	-	pH 5 ... 11	•	•	•	-	-	-	-	-	-	-	-	-	-	-	•	-	•	-	-	-	-	•	-	-
-50	250	180	pH 1 ... 13	•	•	•	•	-	-	-	•	-	•	-	•	•	•	•	-	•	•	•	•	•	•	•	•
-100	250	180	pH 2 ... 12	•	•	•	•	-	-	-	•	-	•	-	•	•	•	•	-	•	•	•	•	•	•	•	-
-100	250	180	pH 1 ... 13	•	•	•	•	-	-	-	•	-	-	-	•	•	-	•	-	•	-	•	•	•	•	•	•
-100	280	-	pH 0 ... 14	•	•	•	•	-	-	-	•	•	-	-	•	•	•	-	•	•	•	•	•	-	-	•	-
-200	280	-	pH 0 ... 14	•	•	•	-	•	-	-	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	-	•
-200	280	-	pH 0 ... 14	•	•	•	•	•	-	-	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	-	-
-50	300	-	pH 1 ... 14	•	•	•	•	•	-	-	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	-	-
-100	250	180	pH 1 ... 13	•	•	•	•	-	-	-	-	-	•	-	-	•	-	•	-	-	-	-	-	•	•	•	-
-100	250	180	pH 1 ... 13	•	•	•	•	-	-	-	•	-	•	-	•	•	-	•	-	•	•	•	•	•	•	•	-
-100	280	180	pH 1 ... 14	•	•	•	•	•	-	-	•	•	•	-	•	•	-	•	-	•	•	•	•	•	-	-	-

Guarantees can only be offered in individual cases if the precise conditions of the application are known and they have been confirmed in a separate agreement. For critical operating conditions, we recommend a consultation with our specialist engineers.



# Operating range for EagleBurgmann valve packings and other compression packings

	Page	Range of applications																	
		Universal applications	Special applications	FDA-certified	Pumps	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Valves	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Reciprocating piston pumps	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Fans, blowers (dry contacting)	Pressure p [bar]	Sliding velocity $v_g$ [m/s]	Mixers, agitators, kneaders, filters (dry contacting)	Pressure p [bar]	Sliding velocity $v_g$ [m/s]
<b>PTFE fibers</b>																			
Chemstar L 6226/L	142	•	-	•	-	-	500	2	250	1.5	-	-	-	-	25	2	-	-	-
Chemstar NQ 6226/NQ	142	-	•	-	-	-	500	2	-	-	-	-	-	-	-	-	-	-	-
Thermoflon TR 6232	143	-	•	•	-	-	500	2	800	2	-	-	-	-	25	2	-	-	-
<b>Graphite fibers</b>																			
Isartherm A 6011/A	144	-	•	-	-	-	300	2	-	-	8	5	50	5	-	-	-	-	-
Isartherm-Flex 6050	144	•	•	-	-	15	15	350	2	-	-	-	-	-	-	-	-	-	-
Isartherm-Flex KIN 6050/KIN	145	•	-	-	-	-	500	2	-	-	8	2	50	2	-	-	-	-	-
Isartherm K-Flex 6051	145	-	•	-	25	25	450	2	-	-	-	-	-	-	-	-	-	-	-
<b>Low-emission sealing solutions for valves</b>																			
BuraTAL HT 9650/HT	148	-	•	-	-	-	300	2	-	-	-	-	-	-	-	-	-	-	-
BuraTAL-Flex 6070	148	-	•	-	-	-	450	2	-	-	-	-	-	-	-	-	-	-	-
BuraTAL 9650/T3, T4, T5	150	-	•	-	-	-	250	2	-	-	-	-	-	-	-	-	-	-	-
<b>Fire-safe packing sets</b>																			
Fire-safe packing set 9650/FS	152	-	•	-	-	-	260	2	-	-	-	-	-	-	-	-	-	-	-
<b>Soot blower packing sets</b>																			
Soot blower set 9650/SB1, SB2	153	-	•	-	-	-	100	2	-	-	-	-	-	-	-	-	-	-	-
<b>Glass packings</b>																			
BuraGlas 9480, 9472	154	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BuraGlas INC 7260/INC	155	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

**Important note**

All technical specifications are based on extensive testing and our many years of experience. There are so many possible applications, however, so they can only serve as guide values. The table lists all the important operating ranges for EagleBurgmann compression packings in the various possible applications.

Please note that the extreme values for the individual operating parameters cannot be applied at the same time due to the resulting interactions. The operating ranges of individual products will also depend on the associated pressure, external forces and influences, the temperature and the medium to be sealed.

Temperature stability			Permitted pH	Chemical resistance																							
Temperature stability T <sub>min.</sub> [°C]	Temperature stability T <sub>max.</sub> [°C]	Temperature limit for steam operation [°C]		Media group																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20								
-200	280	-	pH 0 ... 14	Water, industrial water, waste water	Sea water	Drinking water, food, pharmaceutical products	Hot water, boiler feed water, condensate	Steam < 280 °C	Steam < 450 °C	Steam < 550 °C, steam < 700 °C <sup>1)</sup>	Neutral vapors, gases, air, nitrogen	Acidic gases	Hydrogen	Oxygen	Volatile hydrocarbons, solvent vapors	Dilute acids, inorganic and organic salt solutions	Concentrated acids, inorganic and organic	Dilute alkalis, salt solutions	Concentrated alkalis	Oils, greases, mineral oils, animal fats	Heat transfer oils	Solvents, aliphatic and aromatic hydrocarbons, aldehydes, alcohols, ketone esters, chlorinated hydrocarbons, coolants	Organic compounds, amines, nitrites	Sticky media, bitumen, adhesives	Abrasive media, lime, sand, solids	Dyes, paints, turbine oils	
-200	280	-	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
-200	280	-	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
-40	450	-	pH 2 ... 12	•	•	•	•	•	•	•	•	•	•	-	•	-	-	•	•	•	•	•	•	•	-	-	•
-200	500	700	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
-200	500	550	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•
-200	450	550	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	•	•
-200	400	550	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	-	•	-	-	•	•	•	•	•	•	•	•	•	•
-200	450	650	pH 1 ... 14	•	•	•	•	•	•	•	•	•	•	-	•	-	-	•	•	•	•	•	•	•	•	•	•
-50	250	-	pH 1 ... 14	•	•	•	•	•	•	-	-	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
-	550	650	pH 0 ... 14	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
-	250	550	pH 2 ... 12	•	•	•	•	•	•	•	•	•	•	•	•	•	•	-	•	-	•	•	•	•	•	•	•
-	550	-	pH 5 ... 9	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	750	-	pH 5 ... 9	-	-	-	-	-	-	-	•	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Guarantees can only be offered in individual cases if the precise conditions of the application are known and they have been confirmed in a separate agreement. For critical operating conditions, we recommend a consultation with our specialist engineers.



<sup>1)</sup> In an inert atmosphere or with special chamber rings

## Media overview

Media	Media group	Media	Media group	Media	Media group
<b>A</b>		Calcium hydroxide (milk of lime)	11, 12	Ethylene	8
Acetaldehyde	15, 16	Calcium hypochlorite (bleaching lye)	9, 11	Ethylene chloride	6, 15
Acetic acid	9, 10	Calgon R <sup>®</sup> (sodium hydroxide phosphate silicate)	11	Ethylene glycol	16
Acetic acid anhydride	10	Calgon S (urea nitrate)	11, 12	Ethylene oxide	8
Acetone	8, 15	Calgon <sup>®</sup> (sodium hexametaphosphate)	11	<b>F</b>	
Acetylene	8, 15	Caprolactam	11, 16	Faeces (feces)	1.1
Acrylonitrile	16	Carbolic acid (phenol)	9, 10	Fat and fatty alcohols	13, 15
Adipic acid	9, 10	Carbon dioxide (gas)	6	Fatty acids	9, 10
Alcohol (ethanol)	15	Carbon dioxide (liquid)	6	Fatty alcohol sulfonate	1.1
Aluminum acetate	9, 11	Carbon disulfide	5	Ferricyanide	9, 11
Aluminum chloride	9, 11	Carbon monoxide (gas)	6	Fir needle oil	13
Aluminum sulfate	9, 11	Carbon tetrachloride	8, 15	Fish liver oils	13
Ammonia (gaseous)	11, 12	Caustic lime (calcium hydroxide)	12	Fish slurry	1.1
Ammonia (liquid)	11, 12	Caustic potash (potassium hydroxide)	11, 12	Fixing bath, acidic	9
Ammonium chloride	9, 11	Caustic soda (sodium hydroxide)	12	Formaldehyde (formalin)	15, 16
Ammonium hydroxide	11, 12	Caustic soda ≤30 % (all conc.)	11, 12	Formic acid	9, 10
Ammonium sulfate	9, 11	Chloracetic acid (mono, di)	9	Freon <sup>®</sup>	8, 15
Aniline	16	Chlorinated biphenyl	15	Frigene <sup>®</sup>	8, 15
Anthracene oil	13	Chlorinated paraffin	15, 17.1	Fruit juices	2
Anti-freeze additive (glycols)	15	Chlorine gas	6, 10	Fruit pulp	2
Apple must	2	Chlorine water (water saturated with chlorine)	10	<b>G</b>	
Arsenic acid	9, 10	Chlorobenzene	8, 15	Gallic acid	9, 10
Asphalt	17.1	Chloroform	15	Gas scrubber water	1.1, 9
ASTM Oil standard no. 1, 2, 3 and 4	13	Chlorosulfuric acid (chlorosulfonic acid)	10	Gelatin	2
<b>B</b>		Chromic acid	10	Glacial acetic acid	10
Barium chloride	9, 11	Chromium oxide salts	9, 11	Glauber's salt (Sodium sulfate)	9, 11
Barium hydroxide	11, 12	Citrus juices	2, 9	Glucose	2
Battery acid	10	Coconut fat	13	Glue	17.1
Beer	2	Coke oven gas	5	Glycerine (glycerol)	15
Beer mash from pumps	2	Copper acetate solution	9, 11	Glycol acetic acid ester	8, 15
Beer mash from wort boiler	2	Copper(I) chloride solution	9, 11	Glycol monoacetate	8, 15
Benzene	15	Copper(II) sulfate solution (vitriol of copper)	9, 11	Groundnut oil	13
Benzenesulfonic acid	10	Cresol	16	<b>H</b>	
Benzoic acid	9, 10	Crude oil	13	Heating oil	13
Benzyl alcohol	15	Cyclohexane	8, 15	Heavy water	1.1
Bitumen (asphalt)	17.1	Cyclohexanol	15	Heptane	8, 15
Blast furnace gas	6	Cyclohexanone	15	Hexafluorosilicic acid	10
Bleaching lye	11	<b>D</b>		Hexane	8, 15
Blood	2	Denatured alcohol	15	Honey	2
Boiler feed water	3	Dibutyl phthalate (DBP)	16	Hydraulic fluid (crude oil-based)	13
Bonder lye	9, 10, 11, 12	Diesel oil	13	Hydraulic fluid (phosphate ester-based)	13
Bone fat (dissolved in tri or petrol)	15	Diethanolamine (DEA)	11, 16	Hydrazine	15
Borax solution	11	Diethyl ether	8, 15	Hydrochloric acid	9, 10
Boric acid	9	Diethylene glycol	8, 15	Hydrocyanic acid	9, 10
Brackish water	1.1	Dimethyl ether	8, 15	Hydrofluoric acid	10
Brake fluid (ATE blue)	13	Dioxane	16	Hydrogen bromide	6, 9, 10
Bromine, aqueous	9, 10	Diphenyl oxide	15, 16	Hydrogen chloride	6, 10
Bunker and heating oil	13	Diphyl heat transfer fluid	14	Hydrogen chloride (hydrochloric acid gas)	6, 9, 10
Butadiene	16, 17.1	Distilled water	2	Hydrogen sulfide	6, 9, 10
Butane	8, 15	Dodecyl benzene	15	<b>I</b>	
Butanediol	15	Dowtherm <sup>®</sup> A	14	Iron phosphate solution	9, 11
Butanol (butyl alcohol)	15	Dye liquor	17.1	Iron(III) chloride solution	9, 10
Butanone (Methyl-ethyl-ketone)	15	Dyes	18	Isobutyl alcohol	8, 15
Butyl acetate	15	<b>E</b>		Isobutyl ketone	8, 15
Butyl alcohol (butanol)	15	Edible oil	2, 13	Isooctane	8, 15
Butylene	8, 15	Ethane	15	Isopropyl acetate	8, 15
Butyric acid	2, 9, 10	Ethanol (ethyl alcohol)	15	Isopropyl alcohol	8, 15
<b>C</b>		Ether (diethyl ether)	8, 15	Isopropyl ether	8, 15
Calcium acetate	9, 11	Ethyl acetate	8, 15		
Calcium bisulfite lye (sulfite lye)	9, 11				
Calcium chloride	9, 11				

Media	Media group
<b>J</b>	
Jam and marmalade	2
Jet fuel (kerosene JP 4, JP 5)	15
<b>K</b>	
Kerosene	15
<b>L</b>	
Lacquers	18
Lead acetate (lead sugar)	11
Lead sludge	17.2
Lemonades	2
Lignite tar oil	13, 17.1
Liqueurs	2
Liquid manure (slurry)	1.1
Liver oil (fish)	2
<b>M</b>	
Magnesium bisulfite	9, 11
Magnesium hydroxide	11, 12
Maleic acid anhydride	10
Manganese nitrate	9, 11
Mash: hop mash	2
Mazut (heavy heating oil)	13
Meat juices and stocks	2
Mercaptan	16
Mercury(II) nitrate	9, 11
Methane	8
Methanol (methyl alcohol)	15
Methyl chloride	8, 15
Methyl ethyl ketone (MEK)	8, 15
Methylene chloride (dichloromethane)	8, 15
Milk	2
Milk of lime (calcium hydroxide)	1, 12
Mineral oil	13
Mobiltherm® 600	14
Molasses	2, 17.1
<b>N</b>	
N-methyl-2-pyrrolidone (NMP)	15
Naphtha	15
Naphthenic acid	9, 10
Natural gas	5
Nitric acid	
- < 10 % 85 °C	9, 10
- > 10 % 35 °C	10
Nonylphenol	15
<b>O</b>	
Oils	
- animal oils	13
- lubricating oils	13
- plant oils	13
Olive oil	2, 13
Oxalic acid	9, 10
Oxygen (gas, liquid)	7.2
<b>P</b>	
P3° lye	10, 11, 12
Paper pulp	
- fine, tissue paper	17.2
- Photographic paper	9, 11, 17.2
- Plastic	9, 11, 17.2
- Wrapping paper	9, 11, 17.2

Media	Media group
Pentane	8, 15
Perchloric acid	9, 10
Petrol	15
Petroleum ether (gasoline)	8, 15
Phenol (carboic acid)	9, 10
Phenyl ether	8, 15
Phenylhydrazine	8, 15
Phosphoric acid	9, 10
Phosphorus trichloride	9, 10
Phthalic acid (heating)	9, 10
Phthalic anhydride	10
Potassium carbonate	11, 12
Potassium chloride	9, 11
Potassium cyanide (cyanide of potassium)	9, 11
Potassium hypochlorite	9, 11
Potassium nitrate	9, 11
Potassium silicate	9, 11
Potassium sulfate	9, 11
Propane	15
Propanol (propyl alcohol)	8, 15
Propanone (acetone)	8, 15
Propyl acetate (acetic acid ester)	8, 15
Pyridine	15, 16
Pyrrolidone	11, 12
<b>Q</b>	
Quark	2
Quenching oil	13
<b>R</b>	
Rapeseed oil	13
Raw juice (sugar solution)	2
<b>S</b>	
Salicylic acid	9, 10
Saltpetre	9, 11
Sea water	1.2
Silicon tetrachloride (tetrachlorosilane)	9, 10
Silicone greases	13
Silicone oils	13
Silver salts	9
Skin cream	2, 13
Soap solution	1.1
Sodium arsenate	9, 11
Sodium carbonate	1, 12
Sodium chloride (saline)	9, 11
Sodium hydroxide (caustic soda)	11, 12
Sodium hypochlorite	9, 11
Sodium nitrate	9, 11
Sodium phosphate	9, 11
Sodium silicate (water glass)	9, 11
Sodium sulfate (Glauber's salt)	9, 11
Sodium sulfide	9, 11
Sodium sulfite	9, 11
Sodium thiosulfate (antichlor)	9, 11
Starch solutions	17.1
Steam	4.1, 4.2, 4.3
Stearic acid (fatty acid)	9, 10
Styrene (phenyl ethylene)	15
Sulfite lye	9, 11
Sulfuric acid	
- 70-90 % 150 °C	10
- 90-95 % 70 °C	10
Sulfuric acid, fuming (oleum)	10
Sulfurous acid	9, 10

Media	Media group
<b>T</b>	
Table salt (sodium chloride)	9, 11
Table vinegar	9
Tallow	13
Tannic acid	9, 10
Tar	17.1
Test gasoline	15
Tetrachloroethylene	8, 15
Tetrahydrofurane	15
Thick juice (60% sugar solution)	2
Thin juice (sugar solution)	2, 17.1
Toluene	15
Trichloroethane	15
Trichloroethylene (tri)	15
Triethanolamine	11, 16
Trisodium phosphate	9, 11
Turbine oils	18
Turpentine	15
<b>U</b>	
Urea	11, 16
<b>V</b>	
Vegetable paste	2
Vinegar (table vinegar)	9
Vinyl chloride	8
<b>W</b>	
Waste water	1.1
Water from pressed fish	1.1
Water glass (Sodium silicate)	9, 11
Water	
a) Drinking	2
b) Distilled	3
c) Not treated	1.1
d) Boiler feed (hot water, condensate)	3
e) Reactor, radioactive	1.1
f) Heavy	1.1
g) Brackish, sea	1.2
h) Dirty	1.1
Whale oil, train oil	13
Wine	2
Wine spirits	2, 15
Wood pulp	11; 17.2
<b>X</b>	
Xylene	8; 15
<b>Y</b>	
Yeast paste	2
<b>Z</b>	
Zinc chloride	9; 11

## Packing selection

The range of compression packing materials and types is both comprehensive and complex given the number of products currently available.

Here are some of the important factors that you will need to take into account in order to select the best packing for your application.

You will always need to balance the following requirements when you choose the material:

- Media properties (e.g. abrasiveness, viscosity)
- Temperature
- Pressure
- Chemical resistance (e.g. pH)
- Type of machine, i.e. mechanical stresses (e.g. sliding velocity)

Compression packings must be able to withstand all the operating conditions for the application – pressure, temperature change, pressure surges, chemical resistance, mechanical stresses, safety requirements, etc.

The reliability is of immense significance since the cost of the compression packing is relatively low compared to the potential costs associated with a failed seal. And these costs are not always simply the direct replacement costs; they may include consequential costs due to lost production and injury to personnel.

The quality of the material used to manufacture the compression packings directly affects their performance and reliability.

Compression packings generally consist of a backing material (yarn or non-woven) which is impregnated with various preparations as required. The most commonly used backing materials are cotton, hemp, ramie, aramid, PTFE, graphite and carbon fibers, and glass. Fats and oil, graphite, rubber, PTFE and combinations of the individual materials are normally used as impregnating agents. The packing can also be manufactured with lubricants, fillers or binders to suit the application.

The structure of a compression packing also differs in terms of the braiding and material structure. It is the braiding of the packing that gives it different individual properties.

### Benefits of compression packings

#### Robust and flexible

- Relatively non-sensitive in operation, even with contaminated media

#### Safe

- Low risk of sudden failure
- Wear can be detected at an early stage due to the increased leakage

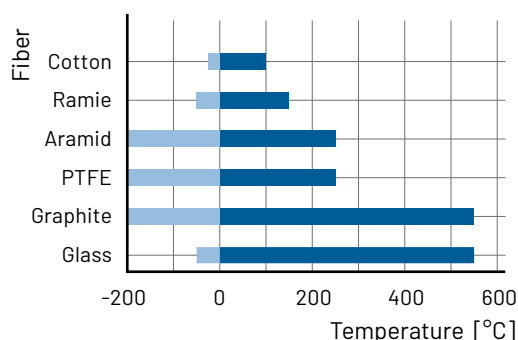
#### Fast and easy to install, remove and maintain

- Straightforward packing changes without having to disassemble the pump
- Can be done by in-house (trained) personnel

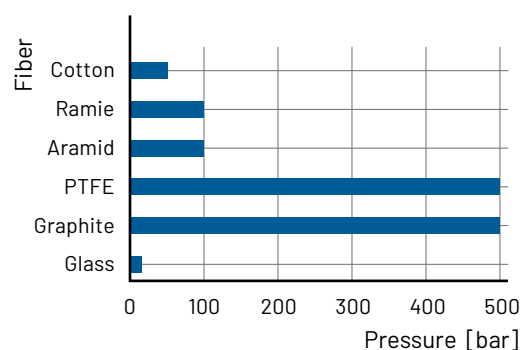
#### Also cost-effective in terms of purchase and maintenance

- Fast and straightforward maintenance by in-house (trained) personnel ensures short plant downtimes
- Low purchase costs (particularly for large shaft diameters)


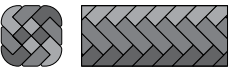



Operating temperature limits



Operating pressure limits



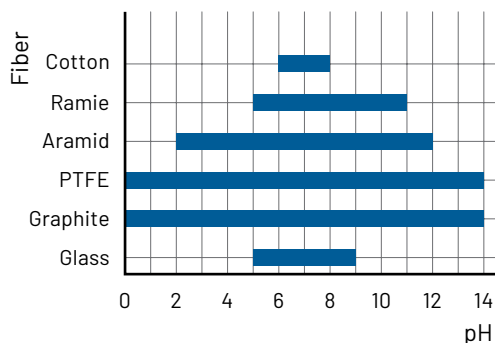
## Braiding of the packing

Braiding		Properties
	2-fold diagonal	rough surface, good elasticity
	3-fold diagonal	good cross-sectional stability, tightly braided structure
	4-fold diagonal	highly wear-resistant, smooth surface, very tightly braided structure
	diagonal braiding profile	effect optimized by improved force distribution and compression of the packing
	concentric braiding around core	fine, dense surface, low resistance to mechanical wear, cost-effective

## Recommended storage conditions

- Well packaged in dry storage areas
- Relative humidity: < 65%
- Room temperature < 25 °C
- Protected against contamination and foreign bodies, mechanical damage, and the effects of direct sunlight, temperature and radiation
- Use of the FIFO (first in, first out) storage principle is recommended

## Chemical resistance



## Box contents

up to 6.35 mm	1 kg
7 - 10 mm:	2 kg
11 - 13 mm:	3 kg
14 - 24 mm:	5 kg
from 25 mm:	10 kg

Sold by length, blank cuts, precompressed rings with straight or slanted cut

## Please note:

The recommended storage period can be greatly reduced if the room temperature remains more than 10 °C over the recommended value of 25 °C for a long period.

This particularly applies to seals made from dry, synthetic materials (plastics not including PTFE).

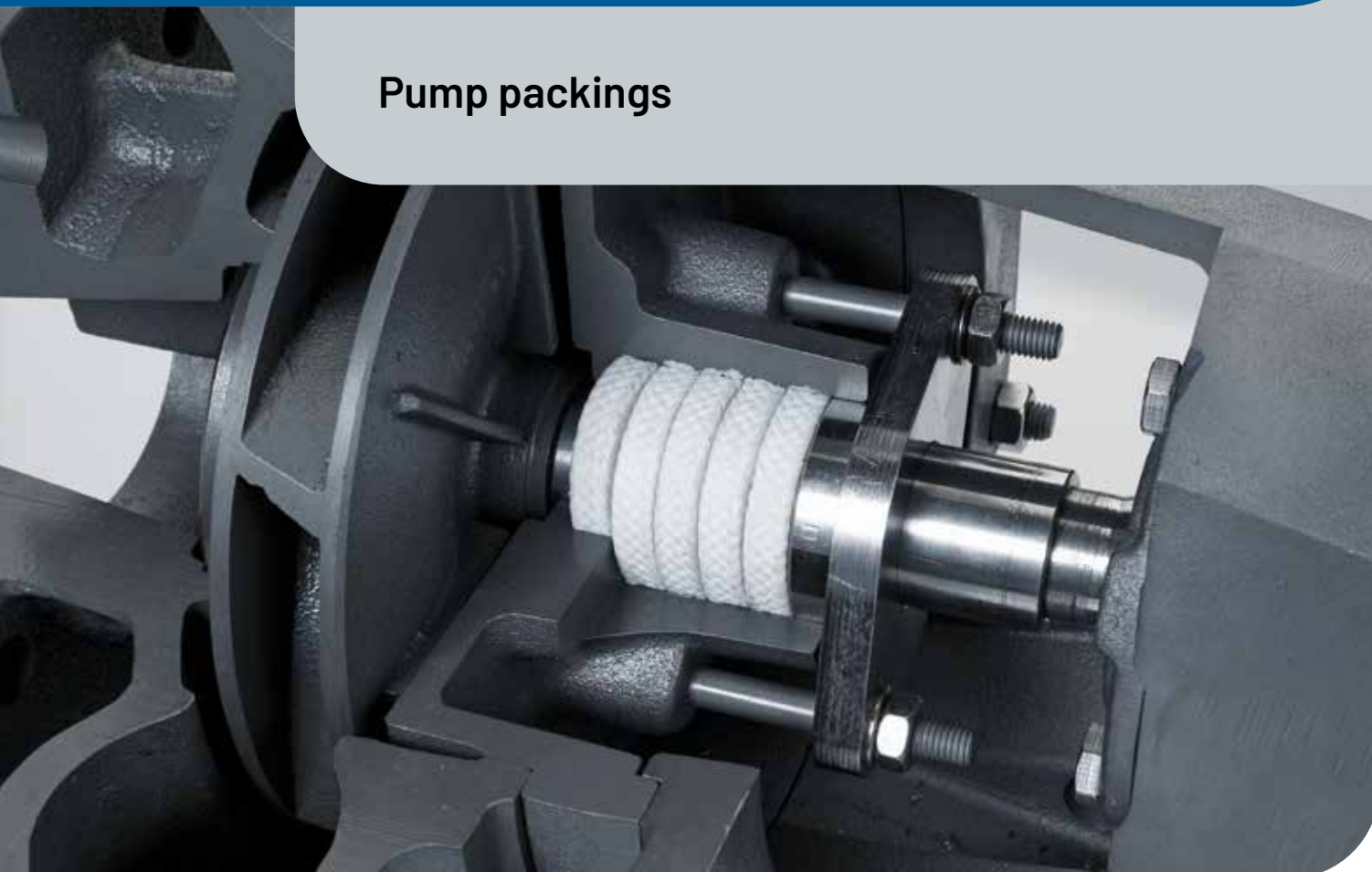
## Recommended storage period:

The stated times are approximate guide values:

Grease and oil-impregnated seals	2 - 3 years
Rubber-impregnated seals and seals with inorganic filler materials and synthetic elastomers	2 - 3 years
Seals made from dry, synthetic materials (plastics not including PTFE)	2 - 3 years
PTFE-impregnated seals and seals made from mineral and natural fibers	3 - 5 years
Dry PTFE silk packings and PTFE-impregnated packings	Practically unlimited
Seals made from pure graphite	Practically unlimited



### Pump packings



Pump packings contain a lubricant that makes the compression packing permanently elastic and moldable, and provide a film of lubricant to make starting easier. They are used, in particular, to seal slow to fast-turning shafts, for example in mixers, kneaders and refiners. The backing material for pump packings can be made from natural fibers, aramid fibers, PTFE-based fibers or specially-developed fibers.

#### Natural fibers

Buratex and Buraflon packings are made from cotton or silicone oil-free ramie fibers with different impregnating agents. It is these agents that give the packing its individual properties and possible applications. Natural fiber packings are generally used in water, waste water and sea water applications and to seal oils and fats.

#### Advantages

- User-friendly to handle
- Cost-effective sealing solution
- Easy to cut to size
- Particularly tear-resistant
- High elasticity

#### Aramid fibers

Buramex, Araflon and Supraflon packings are made from different aramid fibers such as Nomex or Kevlar. They are generally preferred in applications with abrasive media such as lime, sugar, sand and sludge or sticky media such as bitumen or adhesive.

#### Advantages

- Wear-resistant
- Treats shafts gently
- Stable and durable
- High chemical and temperature stability
- Good sliding properties

#### PTFE-based fibers

Kombipack, Burasoft and Thermoflon are made from PTFE, sometimes in combination with other materials such as carbon. They are generally preferred in food applications and in chemical and pharmaceutical facilities.

#### Advantages

- Very high elasticity
- Very low friction forces
- High structural strength
- Very good emergency running properties

#### Combination fibers

Thermoflon, special combination and Buraflex packings are made from various combinations of materials that give each packing its special properties.

# Valve packings

In contrast to pump packings, valve packings contain no lubricant, so they are not porous at higher temperatures and can be used at higher pressures. Valve packings seal even with low surface pressure and are very resistant to extrusion. They are used, for example, in valves, flaps, slide valves, or on slowly turning shafts.

## PTFE fibers

Chemstar and Thermoflon packings are made from 100% pure PTFE or graphite-incorporated PTFE without fillers or lubricants. They are commonly used in the chemical and food industries. The nuclear grade Chemstar packing can also be used as a backup component for nuclear valves.

## Graphite fibers

Isartherm packings are made from graphite; some variants are supplied with a special impregnating agent or carbon fiber edge reinforcement. Graphite packings are generally used in applications with high temperature and in high pressure and hot steam areas.

## Low-emission sealing solutions for valves

Using BuraTAL packing sets can limit the potential for product to be released into the atmosphere. At the same time, minimizing the spindle and shaft friction can reduce stoppages and downtimes. All BuraTAL packing sets have been demonstrated to fulfil the current emission regulations (e.g. TA Luft, ISO 15848, API 622) and guarantee that the process equipment complies with these regulations.

## Fire-safe and soot blower packing sets

Fire-safe and soot blower packing sets were designed for use in particularly challenging applications, and ensure a reliable seal even in the harshest conditions.

## Injectable packings

Burajet injectable packings offer very good running characteristics and excellent adaptability, even in asymmetric installation spaces. They help to optimize the reduction of leakage and friction forces. By reducing downtimes, Burajet proves very economical to use. It is also unnecessary to remove or rework scored shafts. Conversion to the fiber compound packing is problem-free and requires little technical equipment. No further downtimes are needed when repacking as the compound can be reinjected during operation.

## Glass fibers

BuraGlas glass packings have been used successfully for many years in applications such as furnace door seals, duct seals and metal crucible seals.

All products from the BuraGlas range are manufactured from materials and fibers that meet the safety requirements of the World Health Organization (WHO).

## Environmental protection and WHO requirements

Employee safety is of immense importance for day-to-day work in industry. In recent years, this has led to the introduction of worldwide regulations concerning and banning the use of certain materials. There has been a worldwide debate on the possible carcinogenic effects of certain fiber materials, e.g. artificial mineral fibers ("ceramic fibers").

Both the chemical composition and the physical size of the fibers play a role in endangering the health of the people who come into contact with the fibers when they are processed.

The carcinogenic nature of organic and inorganic, natural and synthetic fibers is based on their size ratio and their biological resistance.

The critical size range for such fibers is as follows:

- Length  $l > 5 \mu\text{m}$  and diameter  $d < 3 \mu\text{m}$
- Size ratio  $l : d = \text{greater than } 3 : 1$

Such dangerous fibers are classified in EU Directives 97/69/EC and 67/548/EEC, and in TRGS 905.

They are sometimes described as WHO fibers.



## Diagonal braiding packings

Almost all EagleBurgmann compression packings can also be supplied with the special diagonal braiding. Diagonally braided packings offer maximum tightness with minimal friction and low wear.

Benefits of diagonally braided packings

- Lower compression forces required for a good seal
- Reduced friction at the shaft, and thus lower energy absorption
- Uniform force distribution over the entire packing for maximum sealing against the stuffing box wall and outstanding control of lubricant leakage along the shaft surface.

If the diagonally braided packing is fitted on a shaft, the trapezoidal cross-section of the braiding ensures a practically stress-free seal arrangement.

The packing rings are symmetrical when installed. The parallel sealing surfaces prevent them tilting. The uniform distribution of the packing material under operating conditions allows selective control of the shaft leakage. This prevents co-rotation of the packing rings and any peripheral leakage.

### Advantages

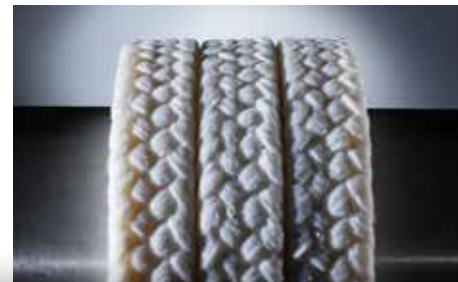
- Optimal pressing of the packing against the shaft
- Low wear on the shaft, shaft collar and packing
- Cost savings due to longer service life and improved system availability
- Minimal leakage
- Less heat build-up on the contact surface
- Lower power consumption
- Optimum distribution of the forces in the packing
- The gland plate does not tilt
- Can be manufactured from almost all grades of yarn
- Easy to install

In contrast to conventional braiding, the diagonal braiding profile offers optimum stress distribution and an outstanding precision fit if the packing ring is fitted on the shaft or shaft sleeve.

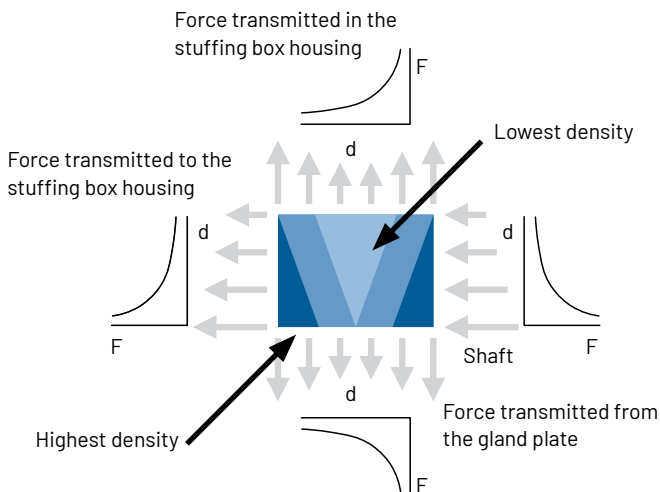
Standard braiding



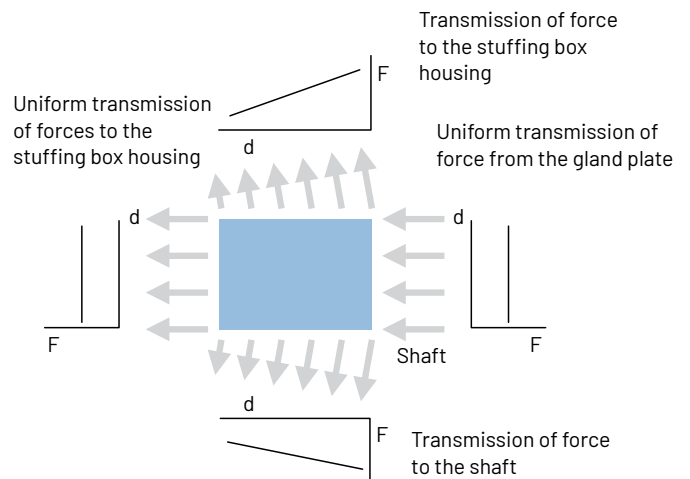
diagonal braiding profile



Force diagram for conventional braiding

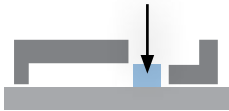


Force diagram for a diagonally braided packing



### Conventionally braided packing

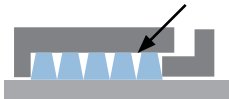
Before installation, the packing has a square cross-section.



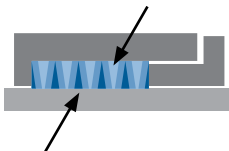
Once the packing has been placed around the shaft, the cross-section deforms and becomes trapezoidal since the material is compressed at the inner diameter and stretched at the outer diameter.



This creates voids at the outer diameter and regions of lower density at the stuffing box wall when the gland plate bolts are tightened.



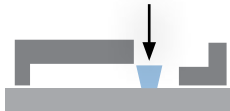
The lower density causes uneven sealing forces in the packing cross-section and can lead to increased leakage along the outer wall of the stuffing box.



If the pressure at the shaft does not allow controlled leakage, the packing will burn.

### Braided packing with diagonal profile

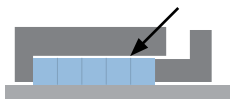
Before installation, the packing has a trapezoidal cross-section.



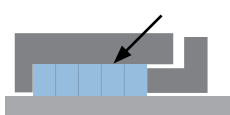
Once the packing has been placed around the shaft, the cross-section deforms and becomes square since the material is compressed at the inner diameter and stretched at the outer diameter.



No voids are created as a result. The outer diameter and material density are constant across the cross-section.



When the packing is compressed by the gland plate, uniform forces are created in the packing or on the sliding faces.





### Advantages

- User-friendly to handle
- Easy to cut to size
- Rot-resistant
- Permanently soft and flexible

## Buratex B 4001

### Features

Buratex B 4001 is a flexible cotton packing impregnated with black grease and graphite to improve the thermal conductivity. When it is manufactured, particularly tear-resistant cotton threads are pre-impregnated and twisted. At the next diagonal braiding step, the packing undergoes an additional intensive impregnating and graphiting stage.

### Operating range

#### Pumps

Pressure:  $p = 10$  bar

Sliding velocity:  $v_g = 10$  m/s

#### Valves

Pressure:  $p = 60$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 8$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  
 $t = -20$  °C ...  $+100$  °C

### Chemical resistance:

pH = 6 ... 8

Resistant to water and waste water

### Recommended applications

Mechanical units

- Pumps

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
8 mm  
10 mm  
12 mm  
14 mm  
16 mm  
18 mm  
20 mm
- Additional dimensions available upon request

### Installation note

In pump applications, ideally fitted with a straight cut.



### Advantages

- Easy to handle
- Special red impregnating agent is unmistakable
- Rot-resistant
- Permanently soft and flexible

## Buratex R 4002

### Features

Buratex B 4002 is a flexible cotton packing impregnated with a special sea water-resistant impregnating agent, which makes it THE packing for marine applications.

When it is manufactured, particularly tear-resistant cotton threads are pre-impregnated and twisted. At the next diagonal braiding step, the packing is further treated with a sea water-resistant and red-dyed impregnating agent.

### Operating range

#### Pumps

Pressure:  $p = 10$  bar

Sliding velocity:  $v_g = 10$  m/s

#### Valves

Pressure:  $p = 60$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 8$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  
 $t = -20$  °C ...  $+100$  °C

### Chemical resistance:

pH = 6 ... 8

Resistant to water, waste water and sea water.

### Recommended applications

Mechanical units

- Pumps
- Components
- Stern tubes
- Rudder posts

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
14 mm
- Additional dimensions available upon request

### Installation note

In pump applications, ideally fitted with a straight cut.

### Buratex B 4001 variants

Form as supplied

Sold by length

Standard braiding

4001

### Buratex R 4002 variants

Form as supplied

Sold by length

Standard braiding

4002



#### Advantages

- Easy to handle
- Rot-resistant
- Permanently soft and flexible
- No risk of discoloring the medium

## Buratex W 4003

#### Features

Buratex B 4003 is a flexible cotton packing impregnated with a special light-colored grease impregnating agent. It is preferred for pure, liquid media and clean applications. When it is manufactured, particularly tear-resistant cotton threads are pre-impregnated and twisted. At the next diagonal braiding step, the packing undergoes an additional intensive impregnating stage.

#### Operating range

##### Pumps

Pressure:  $p = 10$  bar

Sliding velocity:  $v_g = 10$  m/s

##### Valves

Pressure:  $p = 60$  bar

Sliding velocity:  $v_g = 2$  m/s

##### Mixers, agitators, kneaders, filters

Pressure:  $p = 8$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -20$  °C ...  $+100$  °C

#### Chemical resistance:

pH = 6 ... 8

Resistant to water and waste water, particularly resistant to oils and greases.

#### Recommended applications

Mechanical units

- Pumps

#### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
8 mm  
10 mm  
12 mm  
14 mm  
16 mm  
18 mm  
20 mm  
22 mm  
25 mm
- Additional dimensions available upon request

#### Installation note

In pump applications, ideally fitted with a straight cut. The light-colored impregnation avoids any risk of discoloring the medium.



#### Advantages

- Easy to maintain
- Easy to adjust
- Flexible
- Gentle on shaft surfaces
- Wear-resistant
- Particularly resistant to abrasive media
- Particularly rot-resistant

## Buraflon 5846

#### Features

Buraflon 5846 is a diagonally braided, silicone oil-free ramie fiber packing with a light-colored special PTFE impregnating agent based on paraffin wax and oil. This special combination will prevent product contamination. The packing is preferred for use in marine applications, the brewing and drinks industry and the pharmaceutical industry. It is a flexible, maintenance-friendly and easy to adjust packing that is gentle on shaft surfaces.

#### Operating range

##### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 12$  m/s

##### Valves

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 2$  m/s

##### Reciprocating piston pumps

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 1.5$  m/s

##### Mixers, agitators, kneaders, filters

Pressure:  $p = 20$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -50$  °C ...  $+140$  °C

#### Chemical resistance:

pH = 5 ... 11

Resistant to water, waste water, sea water and drinking water, and to certain oils and fats. Not suitable for use in concentrated alkalis and acids.

#### Recommended applications

Mechanical units

- Pumps
  - Reciprocating piston pumps
  - Refiners
- Components
- Filters

#### Standards and releases

- FDA

#### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions: 5 mm  
15 mm  
6 mm    16 mm  
8 mm    18 mm  
9.5 mm    19 mm  
10 mm    20 mm  
12 mm    22 mm  
12.7 mm    25 mm  
14 mm
- Additional dimensions available upon request

### Buratex W 4003 variants

Form as supplied	Standard braiding
Sold by length	4003

### Buraflon 5846 variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	5846	5846/AK





## Advantages

- Wear-resistant
- Resistant to abrasive media
- High cross-sectional stability and structural strength
- Good sliding properties
- Treats shafts gently

## Buramex SF 6335

### Features

Buramex SF 6335 is a Nomex packing (100% white, elastic synthetic fibers) based on aramid with silicone oil-free lubricant. When it is manufactured, the synthetic fibers are compactly and diagonally braided. The packing is preferred for use in the cellulose, paper, food and sugar industries, in breweries, in waste water technology or when treating water in power stations, for cooling water, abrasive river water and in turbine oil circuits.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 25$  m/s

#### Valves

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 50$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -50$  °C ...  $+250$  °C
- Steam:  $t_{max} = +180$  °C

### Chemical resistance:

pH = 1 ... 13

Resistant to drinking water and food, sticky media such as bitumen and adhesives, abrasive media such as lime, sand, sugar and salt, and dyes, paints and turbine oils.

### Recommended applications

#### Mechanical units

- Pumps
- Mixer
- Refiners
- Conchers

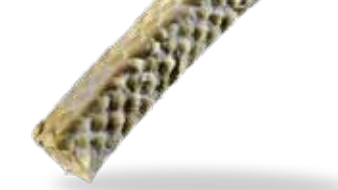
### Standards and releases

- FDA

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:
 

5 mm	15 mm
6 mm	16 mm
8 mm	18 mm
10 mm	19 mm
12 mm	20 mm
14 mm	25 mm
- Additional dimensions available upon request



## Advantages

- High resistance to abrasive media
- Long service life
- High purity
- Extremely stable and durable

## Araflon 6426

### Features

Araflon 6426 is a packing made from high quality, smooth, synthetic and partly pre-impregnated continuous aramid fibers (Kevlar) with multiple applications of PTFE impregnating agent and lubricant additive. The aramid fibers are diagonally braided. This is a high quality and high strength packing. It is used, in particular, in the chemical, petrochemical, waste water and paper industries.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 25$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 1.5$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -100$  °C ...  $+250$  °C
- Steam:  $t_{max} = +180$  °C

#### Chemical resistance:

pH = 2 ... 12

Recommended for abrasive media, e.g. lime, sand, solids and sticky media, bitumen and adhesive.

### Recommended applications

#### Mechanical units

- Pumps
- Mixer
- Pulpers

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:
 

6 mm
8 mm
10 mm
12 mm
12.7 mm
14 mm
16 mm
18 mm
20 mm
- Additional dimensions available upon request

### Buramex SF 6335 variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	6335	6335/AK

### Araflon 6426 variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	6426	6426/AK





### Advantages

- High resistance to abrasive media
- Extraordinary cross-sectional tightness
- Good sliding properties
- Highly wear-resistant
- Treats shafts gently

## Supraflon 6435

### Features

Supraflon 6435 is a packing made from aramid staple fibers with silicone oil-free universal lubricant and PTFE impregnating agent. The aramid fibers are diagonally braided. It is used, in particular, in the paper and chemical industries, and in power stations.

### Operating range

#### Pumps

Pressure:  $p = 20$  bar

Sliding velocity:  $v_g = 20$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 1.5$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 20$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -100$  °C ...  $+250$  °C
- Steam:  $t_{max} = +180$  °C

#### Chemical resistance:

pH = 1 ... 13

Recommended for abrasive media, e.g. lime, sand, solids and sticky media, bitumen and adhesive.

### Recommended applications

Mechanical units

- Pumps
- Valves
- Mixer
- Pulpers

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
6 mm  
8 mm  
10 mm  
12 mm  
14 mm  
16 mm
- Additional dimensions available upon request

### Installation note

Because the aramid fibers are highly stable, we recommend a surface hardness of 40 ... 60 HRC to avoid wear on the running surfaces of shafts and sleeves.



### Supraflon 6435 variants

Form as supplied

Sold by length

Standard braiding

6435



### Advantages

- Very low friction coefficients
- Very high elasticity
- Best sliding properties
- Low leakage rates
- Long service life
- Good heat dissipation
- Can be used at high temperatures without cold flow

## Kombipack 6065

### Features

Kombipack 6065 is a packing made from an especially elastic combination of high quality carbon and PTFE yarns, diagonally braided with a special PTFE compound and impregnated with running-in lubricant. The packing is especially able to absorb shaft misalignment and radial stresses, for example in the chemical, paper and food industries.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 20$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -100$  °C ...  $+280$  °C

#### Chemical resistance:

pH = 0 ... 14  
Resistant alkalis, solvents, alcohols, ester ketones, oils, acids, hot water, brine, and ammonia

### Recommended applications

Mechanical units

- Pumps
- Agitators
- Mixer

### Standards and releases

- FDA

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- All dimensions are individually produced to order.



### Advantages

- Excellent emergency running properties
- High structural strength
- High cross-sectional stability

## Burasoft 6225/L

### Features

Burasoft 6225/L is a diagonally braided silicone oil-free PTFE packing with lubricant. The packing can be used universally in the chemical, pharmaceutical and food industries.

### Operating range

#### Pumps

Pressure:  $p = 10$  bar  
Sliding velocity:  $v_g = 10$  m/s

#### Valves

Pressure:  $p = 100$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -200$  °C ...  $+280$  °C

#### Chemical resistance:

pH = 0 ... 14  
Universal chemical resistance.  
Not suitable for use in abrasive media or in applications using hot water, hot steam or oxygen.

### Recommended applications

Mechanical units

- Pumps
- Components
- Valves

### Standards and releases

- FDA

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
6 mm  
8 mm  
10 mm  
12 mm  
14 mm  
16 mm
- Additional dimensions available upon request

### Kombipack 6065 variants

Form as supplied	Standard braiding
Sold by length	6065

### Burasoft 6225/L variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	6225/L	6225/LAK



### Advantages

- Treats shafts gently
- High cross-sectional stability
- Highly flexible
- Outstanding functional efficiency
- Very good emergency running properties
- Very high thermal conductivity
- No embrittlement
- Does not age
- Long service life

## Thermoflon 6230

### Features

Thermoflon 6230 is a diagonally braided packing made from 100% genuine GFO (graphite-incorporated PTFE yarn). With its universal structure, the packing is used in almost every branch of industry.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 20$  m/s

#### Valves

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 250$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  $t = -200$  °C ...  $+280$  °C
- Hot water: without cooling ...  $+140$  °C

### Chemical resistance:

pH = 0 ... 14

Not suitable for use in oxidizing media such as oleum (fuming nitric acid), gaseous fluorine and molten alkali metals.

### Recommended applications

Mechanical units

- Pumps
- Agitators
- Mixer
- Kneaders

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
4 mm    14 mm  
5 mm    15 mm  
6 mm    16 mm  
10 mm   18 mm  
12 mm   19 mm  
12.7 mm 20 mm
- Additional dimensions available upon request

### Installation note

For sealing hot water pumps, the required leakage must always emerge in liquid form in order to lubricate the packing. The compression packing will have to be cooled via a lantern ring or a jacket, gland or shaft cooling system if the heat radiation via the stuffing box housing is not sufficient.



### Advantages

- Treats shafts gently
- Extremely low friction coefficients
- No stick-slip effect
- Highly flexible
- High volumetric stability
- Outstanding functional efficiency
- Very high thermal conductivity
- No embrittlement
- Does not age

## Thermoflon SL 6230/SL

### Features

Thermoflon SL 6230/SL is a diagonally braided packing made from graphite-incorporated PTFE yarn with additional lubricant. With its universal structure, the packing is used in almost every branch of industry.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 20$  m/s

#### Valves

Pressure:  $p = 100$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 250$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  $t = -200$  °C ...  $+280$  °C
- Hot water: without cooling ...  $+140$  °C

### Chemical resistance:

pH = 0 ... 14

Not suitable for use in hot steam or abrasive media.

### Recommended applications

Mechanical units

- Pumps
- Agitators
- Mixer
- Kneaders

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions: 4 mm  
10 mm   18 mm  
5 mm    12 mm   19 mm  
6 mm    12.7 mm 20 mm  
6.35 mm 14 mm   22 mm  
8 mm    15 mm   25 mm  
9.5 mm   16 mm
- Additional dimensions available upon request

### Installation note

For sealing hot water pumps, the required leakage must always emerge in liquid form in order to lubricate the packing. The compression packing will have to be cooled via a lantern ring or a jacket, gland or shaft cooling system if the heat radiation via the stuffing box housing is not sufficient.

### Thermoflon 6230 variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	6230	6230/AK

### Thermoflon SL 6230/SL variants

Form as supplied	Standard braiding	with diagonal braiding profile
Sold by length	6230/SL	6230/SLAK



### Advantages

- High functionality
- High stability

## Isartherm 6060

### Features

Isartherm 6060 is a diagonally braided carbon yarn packing with a PTFE/graphite impregnating agent combined with a silicone oil-free running-in lubricant. It is manufactured from pre-impregnated high performance yarns with the addition of a special lubricant. Isartherm is a special packing for the paper industry and for applications where there are high requirements in terms of functionality and stability.

### Operating range

#### Pumps

Pressure:  $p = 30$  bar

Sliding velocity:  $v_g = 25$  m/s

#### Temperature

- Continuous operation:  
 $t = -50$  °C ...  $+300$  °C

#### Chemical resistance:

pH = 1 ... 14

Universal chemical resistance.

Not suitable for use in oxidizing media such as oleum (fuming nitric acid), gaseous fluorine and molten alkali metals.

### Recommended applications

Mechanical units

- Pulpers
  - Refiners
  - Paper mills
  - Centrifugal pumps
  - Agitators
  - Mixer
  - Kneaders
  - Autoclaves
- Components
- Valves

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
5 mm    15 mm  
6 mm    16 mm  
8 mm    18 mm  
10 mm   20 mm  
12 mm   22 mm  
12.7 mm 25 mm  
14 mm
- Additional dimensions available upon request



### Advantages

- Good heat conductivity
- Good sliding properties
- Significantly reduced extrusion
- Long service life

## Spezial-Kombi K1 6430/K1

### Features

Spezial-Kombi K1 6430/K1 is a diagonally braided packing made from graphite-incorporated PTFE combined with reinforcing corners of aramid yarn to prevent gap extrusion in high pressure and temperature ranges.

The Spezial-Kombi K1 is a special packing for applications at high pressures with oscillating movements at the same time.

### Operating range

#### Reciprocating piston pumps

Pressure:  $p = 500$  bar

Sliding velocity:  $v_g = 3$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 50$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -100$  °C ...  $+250$  °C
- Steam:  $t_{max} = +180$  °C

Chemical resistance:

pH = 1 ... 13

Suitable for water, waste water, sea water and abrasive and sticky media. Not suitable for concentrated acids and alkalis.

### Recommended applications

Mechanical units

- Reciprocating piston pumps

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Individual dimensions available upon request

### Isartherm 6060 variants

Form as supplied	Standard braiding
Sold by length	6060

### Spezial-Kombi K1 6430/K1 variants

Form as supplied	Type	Standard braiding
Sold by length	Standard	6430/K1
	silicone oil-free	6430/K1S



### Advantages

- Good sliding properties
- Good heat conductivity
- High strength

## Spezial-Kombi K2 6430/K2

### Features

Spezial-Kombi K2 6430/K2 is a diagonally braided packing made from graphite-incorporated PTFE combined with a running surface reinforcement of endless aramid fibers (Kevlar).

The Spezial-Kombi K2 is a special packing for applications with high pressures and sliding velocities.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 20$  m/s

#### Temperature

- Continuous operation:  $t = -100$  °C ... +250 °C
- Steam:  $t_{max} = +180$  °C

#### Chemical resistance:

pH = 1 ... 13

Suitable for abrasive and sticky media.

### Recommended applications

Mechanical units

- Pumps

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions: 8 mm  
10 mm  
12 mm  
14 mm  
16 mm  
20 mm
- Additional dimensions available upon request



### Advantages

- High strength for low torques
- High cross-sectional stability
- Good heat conductivity
- Improved structural strength
- Protects against extrusion
- Abrasion resistance

## Buraflex HT 2000/HT

### Features

Buraflex HT 2000/HT is a packing made from expanded graphite combined with Nomex yarn corners.

The Buraflex HT is a special packing for applications with high temperatures and peripheral speeds.

### Operating range

#### Pumps

Pressure:  $p = 60$  bar

Sliding velocity:  $v_g = 40$  m/s

#### Valves

Pressure:  $p = 80$  bar

Sliding velocity:  $v_g = 5$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 40$  bar

Sliding velocity:  $v_g = 10$  m/s

#### Temperature

- Continuous operation:  $t = -100$  °C ... +250 °C
- Steam:  $t_{max} = +180$  °C

#### Chemical resistance:

pH = 1 ... 13

Suitable for water, waste water, sea water, hot water, boiler feed water, condensate, water vapour, neutral vapors, gases, air, nitrogen.

Particularly suitable for hot water and steam up to 180 °C.

### Recommended applications

Mechanical units

- Centrifugal pumps
  - Compressors
  - Blowers
  - Ventilators
- Components
- Control valves

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions: 6 mm  
14 mm  
8 mm    16 mm  
9.5 mm    18 mm  
10 mm    20 mm  
12 mm    22 mm  
12.7 mm
- Additional dimensions available upon request

### Installation note

Buraflex HT is extremely gentle on shaft surfaces and does not harden. The maximum excess length for blank cuts is 3 %.

### Spezial-Kombi K2 6430/K2 variants

#### Form as supplied

Sold by length

#### Standard braiding

6430/K2

### Buraflex HT 2000/HT variants

#### Form as supplied

Sold by length

#### Standard braiding

2000/HT



## Advantages

- Good pressure resistance
- Low extrusion
- High structural strength
- High cross-sectional stability



## Chemstar L 6226/L

### Features

Chemstar L 6226/L is a diagonally braided 100% PTFE packing, impregnated with a PTFE dispersion. It is manufactured with sintered, high tensile PTFE multifilament yarns with intensive PTFE impregnation. The packing is commonly used in the chemical and food industries.

### Operating range

#### Valves

Pressure:  $p = 500$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 250$  bar

Sliding velocity:  $v_g = 1.5$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+280$  °C

#### Chemical resistance:

$pH = 0$  ...  $14$

Universal chemical resistance.

Not suitable for use in highly oxidizing media such as oleum (fuming nitric acid), gaseous fluorine and molten alkali metals.

### Recommended applications

#### Industries

- Food industry
- Chemical industry

#### Mechanical units

- Mixer
  - Kneaders
  - Agitators
- Components
- Valves

### Standards and releases

- FDA
- BAM (upon request)
- EPA provisions, article 3, 1935/2004

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Standard dimensions:
 

4 mm	14 mm
5 mm	15 mm
6 mm	16 mm
8 mm	18 mm
10 mm	19 mm
11 mm	20 mm
12 mm	
- Additional dimensions available upon request



## Advantages

- High structural strength
- High cross-sectional stability
- Suitable for nuclear applications



## Chemstar NQ 6226/NQ

### Features

Chemstar NQ 6226/NQ is a diagonally braided 100% PTFE silk packing, impregnated with a pure PTFE dispersion. According to the Siemens specification for nuclear power stations, the low-chloride PTFE packing is of nuclear grade and suitable as a reserve component in nuclear valves.

### Operating range

#### Valves

Pressure:  $p = 500$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+280$  °C
- transient peak temperature:  $t = +300$  °C

#### Chemical resistance:

$pH = 0$  ...  $14$

Universal chemical resistance

Not suitable

for use in abrasive media or in hot water and hot steam applications.

### Recommended applications

#### Industries

- Nuclear power stations

#### Components

- Valves

### Standards and releases

- FDA
- BAM (upon request)
- EPA provisions, article 3, 1935/2004

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Individual dimensions available upon request

### Installation note

For gaps  $> 0.03$  x packing cross-section between the gland and shaft or shaft and stuffing box bore, we recommend the use of a header ring with Thermoflon TR 6232/TR.

### Service

We can also provide quality monitoring including time certification according to agreed specifications upon request.

### Chemstar L 6226/L variants

Form as supplied	Type	Standard braiding
Sold by length	without added lubricant	6226/L
	with added lubricant	6226/2

### Chemstar NQ 6226/NQ variants

Form as supplied	Standard braiding
Sold by length	6226/NQ





### Advantages

- High thermal conductivity
- No embrittlement
- Does not age
- Good volumetric stability
- Good structural strength
- Outstanding cross-sectional stability
- Gentle on spindle surfaces

## Thermoflon TR 6232

### Features

Thermoflon TR 6232 is a PTFE packing made from high purity graphite-incorporated PTFE without the addition of lubricants or fillers. It is ideal as a header ring to prevent gap extrusion. The special yarn structure also makes it suitable for temperature cycling applications.

### Operating range

#### Valves

Pressure:  $p = 500$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Reciprocating piston pumps

Pressure:  $p = 800$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -200$  °C ...  $+280$  °C

#### Chemical resistance:

pH = 0 ... 14

Universal chemical resistance. Also suitable for food applications.

Not suitable for use in hot steam or abrasive media.

### Recommended applications

#### Industries

- Food industry
- Chemical industry

#### Mechanical units

- Reciprocating piston pumps
  - Mixer
  - Agitators
  - Kneaders
- #### Components
- High pressure valves

### Standards and releases

- FDA
- BAM (upon request)
- EPA provisions, article 3, 1935/2004

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Standard dimensions:
  - 10 mm
  - 12 mm
  - 14 mm
  - 16 mm
- Additional dimensions available upon request



### Thermoflon TR 6232 variants

Form as supplied

Sold by length

Standard braiding

6232





## Advantages

- High cross-sectional stability
- High structural strength
- Wear-resistant
- Gentle on spindle surfaces

## Isartherm A 6011/A

### Features

Isartherm A 6011/A is a diagonally braided graphite fiber packing with a heat-resistant and innovative special impregnating agent. The packing is ideal for use in the high pressure and hot steam range, particularly for valves in power station technology, refineries and the petrochemical industry. It is also well established in practice as a header ring or where the gap geometry is unknown or the sealing surfaces are not optimal.

### Operating range

#### Valves

Pressure:  $p = 300$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Blowers

Pressure:  $p = 8$  bar  
Sliding velocity:  $v_g = 5$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 50$  bar  
Sliding velocity:  $v_g = 5$  m/s

#### Temperature

- Continuous operation:  $t = -40$  °C ...  $+450$  °C
- Steam:  $t_{max} = +550$  °C

#### Chemical resistance:

pH = 2 ... 12  
Particularly suitable for hot water and hot steam applications. Not suitable for concentrated acids and alkalis.

### Recommended applications

#### Industries

- Power plant technology
- Refinery
- Petrochemical industry

#### Mechanical units

- Blowers
  - Mixer
  - Agitators
- Components
- Valves
  - Valves

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Standard dimensions:
 

5 mm	9 mm	12.7 mm
6 mm	10 mm	14 mm
8 mm	12 mm	16 mm
- Additional dimensions available upon request

### Installation note

Isartherm cannot be used as a cover seal or self-sealing gasket. For such applications we recommend the Statotherm pure graphite or V-Flex cover seals which have proven their worth over a long period.



## Advantages

- Wear-resistant
- Gentle on spindle surfaces
- Treats shafts gently

## Isartherm-Flex 6050

### Features

Isartherm-Flex 6050 is a diagonally braided packing made from permanently elastic, expanded pure graphite foils. It is used, in particular, in high pressure and high temperature applications. It is a standard packing that can be used in almost all areas of industry.

### Operating range

#### Pumps

Pressure:  $p = 15$  bar  
Sliding velocity:  $v_g = 15$  m/s

#### Valves

Pressure:  $p = 350$  bar  
(up to 500 bar upon request)  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +700$  °C

#### Chemical resistance:

pH = 0 ... 14  
Resistant to waste water, sea water, hot water, boiler feed water, condensate, steam, neutral vapors, air, nitrogen, acidic gases, hydrogen, volatile hydrocarbons, oils, mineral oils, fats, heat transfer oils and volatile solvents.

### Recommended applications

#### Mechanical units

- Pumps
- Components
- Valves

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Standard dimensions:
 

4 mm	10 mm
5 mm	12 mm
6 mm	14 mm
7 mm	15 mm
8 mm	16 mm
9 mm	
- Additional dimensions available upon request

### Installation note

If there are large gaps in the compression packing geometry, we recommend using the Isartherm Flex 6050/KIN as the header ring to avoid gap extrusion.

### Isartherm A 6011/A variants

Form as supplied	Type	Standard braiding
Sold by length	Standard carbon fiber	6011/A
	High temperature carbon fiber	6011/B

### Isartherm-Flex 6050 variants

Form as supplied	Standard braiding
Sold by length	6050



### Advantages

- Wear-resistant
- Gentle on spindle surfaces
- Treats shafts gently
- Highly extrusion resistant

## Isartherm-Flex 6050/KIN

### Features

Isartherm-Flex 6050 is a diagonally braided packing made from permanently elastic, expanded pure graphite foils. It is used, in particular, in high pressure and high temperature applications. It is a standard packing that can be used in almost all areas of industry. It is also ideal as a header ring to prevent gap extrusion. Reinforced with Inconel fibers, impregnated with corrosion inhibitor.

### Operating range

#### Valves

Pressure:  $p = 500$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Blowers

Pressure:  $p = 8$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Mixers, agitators, kneaders, filters

Pressure:  $p = 50$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+500$  °C
- Steam:  $t_{max} = +550$  °C

Chemical resistance:  
pH = 0 ... 14

Resistant to water, waste water, sea water, hot water, boiler feed water, condensate, steam, neutral vapors, air, nitrogen, acidic gases, hydrogen, volatile hydrocarbons, oils, mineral oils, fats, heat transfer oils and volatile solvents. Not suitable for use in highly oxidizing, sticky or abrasive media.

### Recommended applications

Mechanical units

- Blowers
  - Mixer
- Components
- Valves

### Standards and releases

- Yarmouth Research  
API 589 - Fire-safe

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Standard dimensions:  
4 mm    8 mm    14 mm  
5 mm    9 mm    15 mm  
6 mm    10 mm    16 mm  
7 mm    12 mm
- Additional dimensions available upon request



### Advantages

- Treats shafts gently
- Extrusion resistant
- Temperature stable

## Isartherm K-Flex 6051

### Features

Isartherm K-Flex 6051 is a braided packing made from expanded graphite, reinforced with textile fibers and with carbon fiber reinforcing corners. It is often used in high pressure and high temperature applications, particularly in power stations and chemical facilities.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 25$  m/s

#### Valves

Pressure:  $p = 450$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+450$  °C
- Steam:  $t_{max} = +550$  °C

Chemical resistance:  
pH = 0 ... 14

Resistant to hot water, steam, gases, oils, acids and alkalis. Not suitable for use in highly oxidizing media in high concentrations.

### Recommended applications

Mechanical units

- Pumps
- Components
- Valves

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Individual dimensions available upon request

### Installation note

Suitable as end rings in conjunction with braided packings made from expanded pure graphite foils, for example.

### Isartherm-Flex 6050/KIN variants

Form as supplied	Standard braiding
Sold by length	6050/KIN

### Isartherm K-Flex 6051 variants

Form as supplied	Standard braiding
Sold by length	6051

## Low-emission sealing solutions for valves

The ideal conditions for optimizing your production equipment from the sealing viewpoint can be achieved by installing high quality products to control fugitive emissions, by setting up appropriate monitoring systems, and by providing comprehensive training.

Plant operators now have to work extremely hard to meet the more stringent environmental protection regulations worldwide. Compliance with these regulations can directly impact both the production process and the overall plant profitability.

The challenges facing the process industry go far beyond the usual production and business issues.

All around the world demands are increasing for industry to not only limit but actually reduce its long-term impact environmental impact.

These demands have now been translated into a whole series of environmental protection laws that are having a considerable effect on influence. In Europe, implementation of the IPPC Directive and introduction of the ISO 15848 standard for valve leakage values mean that all process systems now have to comply with extremely stringent emission limits. Similar standards such as API 622 and the TA Luft Directive in Germany have also increased the demand for sealing systems with low leakage values for valves and equipment connections.

Plant operators have to comply with these new regulations and provide evidence on a regular basis that their systems are compliant at all times. Process plants must be using the best possible methods and significant penalties can be imposed for non-compliance.

As one of the world's leading seal suppliers, EagleBurgmann offers a range of products and services that fulfil these new regulations without overwhelming the maintenance budget.

### **Better performance**

State-of-the-art sealing technology can limit the potential release of product into the atmosphere. More reliable sealing systems might appear more expensive, but when the quality is right and proper maintenance is performed there are many benefits, including longer replacement intervals. With the BuraTAL range for valves and flanges, EagleBurgmann offers products that meet the most stringent regulations for fugitive emissions.

### **Increased efficiency**

The reliable BuraTAL seal sets reduce stoppages and downtimes. They minimize friction on spindles and shafts. This in turn extends the service life and reduces wear on the valve actuators.

### **Reduced emissions**

All BuraTAL packing sets have been proven to fulfil the current emission regulations (e.g. TA Luft, ISO 15848, API 622) and guarantee that the process equipment complies with these regulations.



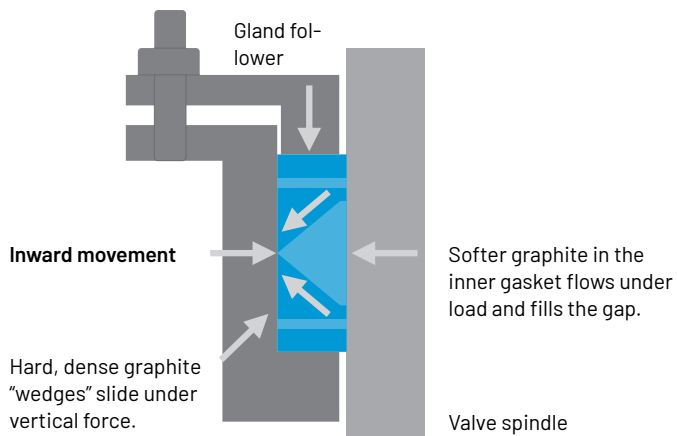
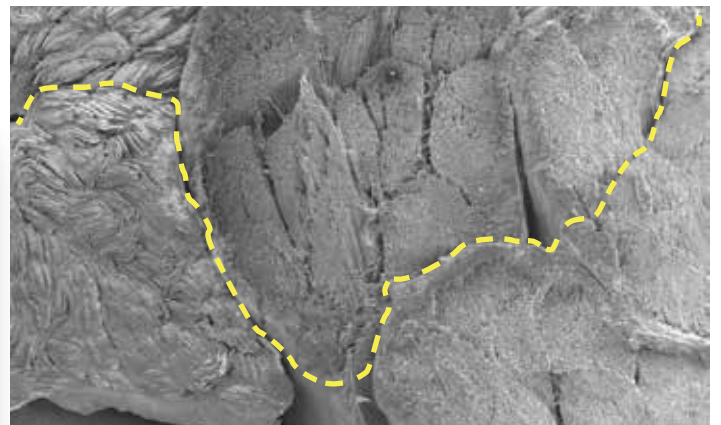
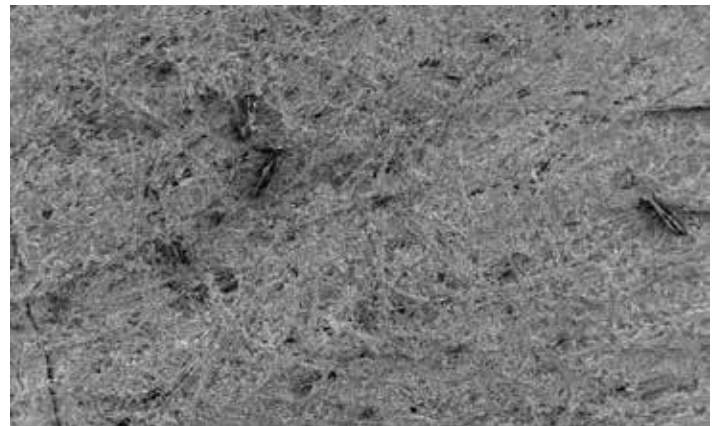


BuraTAL T is a special range of packing sets using patented fleece technology. The packing sets offer excellent dimensional stability and cross-sectional tightness; they are also flexible, low-friction and durable.

They are used with great success in process and control valves.

**Non-woven fiber matrix**

- No leakage paths
- Interlocking multidirectional fibers prevent cold flow of the PTFE impregnation



**Conventionally braided PTFE packing**

- Visible leakage paths between the fibers
- PTFE is prone to cold flow, leading to gap extrusion and inadequate elasticity.





## Advantages

- Low spindle torques
- Minimal leakage rates

## BuraTAL HT 9650/HT

### Features

BuraTAL HT is a completely new design of packing set consisting of the following components:

- Braided end rings of expanded pure graphite with carbon fiber-reinforced corners
- High-density expanded pure graphite sealing discs as a diffusion barrier
- Specially impregnated adapter rings made from high-density, expanded pure graphite
- Lower-density sealing ring made from expanded pure graphite with a smooth, friction-reducing coating.

### Operating range

#### Valves

Pressure:  $p = 300$  bar

Pressure  $p$  as per TA Luft: 80 bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+400$  °C
- Steam:  $t_{max} = +550$  °C

Chemical resistance:

pH = 0 ... 14

Resistant to most chemicals (solvents, hydrocarbons, acids, alkalis), steam, alcohols, oils, water etc.

### Recommended applications

Industries

- Process industry
- Petrochemical industry
- Chemical industry
- Mineral oil industry (refineries)

Components

- Valves

### Standards and releases

- TA Luft
- Leakage test to API 622
- Fire safe to API 589

### Available dimensions

- Custom-made packing sets
- Individual dimensions available upon request

### Installation note

Valve sealing kit - for high pressures and temperatures, particularly in TA Luft applications, for standardization without live-loading.



## Advantages

- Minimal leakage rates
- Diameter-independent TA Luft packing solution
- Ideal for use as a replacement packing
- Maximum possible gap bridging

## BuraTAL-Flex 6070

### Features

BuraTAL-Flex 6070 is a graphite-based, multi-layered high performance packing. It is manufactured from high-purity expanded graphite yarn (> 99 %) combined with a newly-developed high temperature impregnation. For long-term stable use in the high temperature range, the packing is additionally finished with a corrosion inhibitor.

The multi-layer structure combines the benefits of maximum possible gap bridging due to the inner Inconel wire reinforcement with protection of the high-quality spindle surfaces in the valves. The packing can be installed without special end rings.

### Operating range

#### Valves

Pressure:  $p = 450$  bar

Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  $t = -200$  °C ...  $+450$  °C
- Steam:  $t_{max} = +650$  °C

Chemical resistance:

pH = 1 ... 14

Resistant to hot water, steam, gases, oils, acids and alkalis. Not suitable for use in highly oxidizing acids such as sulfuric and nitric acid in higher concentrations.

### Recommended applications

Components

- Valves

### Standards and releases

- ISO 15848
- Fire safe to API 589
- Leakage test to API 622
- Leakage test to Chevron Texaco test standard

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Individual dimensions available upon request

### BuraTAL HT 9650/HT variants

Form as supplied	Type
Packing set	without live-loading system 9650/HT with live-loading system 9650/HTB

### BuraTAL-Flex 6070 variants

Form as supplied	Standard braiding
Sold by length	6070

**Note**

As well as meeting the European emissions directives, the BuraTAL-Flex 6070 has been certified to the API 622 directive and to the stricter requirements of Chevron Texaco (5,000 spindle strokes with 10 temperature cycles). Usage in areas conforming to Fire Safe API 589 was demonstrated by a test at the Yarmouth Institute. These properties make the BuraTAL-Flex 6070 the ideal solution for end users and valve service companies.





### Advantages

- Dimensionally stable
- High gas tightness
- Minimal friction coefficients

## BuraTAL T3 9650/T3

### Features

The BuraTAL T3 9650/T3 an innovative new packing set made from high quality, impregnated non-wovens.

It consists of the following components:

- Carbon fiber non-woven end rings with a special PTFE/graphite compound.
- Aramid non-woven sealing rings in the middle impregnated with PTFE to ensure very high cross-sectional stability.

The packing set is especially suitable where high gas sealing performance with low friction is required.

### Operating range

#### Valves

Pressure: p = 250 bar

Pressure p to TA Luft

- without live-loading system: 30 bar
- with live-loading system: 63 bar

Sliding velocity:  $v_g = 2 \text{ m/s}$

Temperature

- Continuous operation:  $t = -50 \text{ °C} \dots +250 \text{ °C}$

Chemical resistance:

pH = 1 ... 13

Resistant to almost all media. Not suitable for use in highly oxidizing media such as hot sulfuric and nitric acid.

### Recommended applications

Industries

- Chemical industry
- Process industry

Components

- Valves

### Standards and releases

- TA Luft

### Available dimensions

- Customized packing sets made from endless or split precompressed rings
- Made to order



### Advantages

- Dimensionally stable
- High gas tightness
- Minimal friction coefficients
- Prevents contamination of the media

## BuraTAL T4 9650/T4

### Features

The BuraTAL T4 9650/T4 an innovative new packing set made from high quality, impregnated non-wovens.

It consists of the following components:

- Two carbon fiber non-woven rings impregnated with a special PTFE/graphite compound on the atmospheric side.
- Three aramid non-woven sealing rings on the product side impregnated with PTFE to ensure very high cross-sectional stability.

The packing set is especially suitable in applications that demand elimination of contamination by the media and where high gas sealing performance with low friction is required.

### Operating range

#### Valves

Pressure: p = 250 bar

Pressure p to TA Luft

- without live-loading system: 30 bar
- with live-loading system: 63 bar

Sliding velocity:  $v_g = 2 \text{ m/s}$

Temperature

- Continuous operation:  $t = -50 \text{ °C} \dots +250 \text{ °C}$

Chemical resistance:

pH = 1 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

Industries

- Chemical industry
- Process industry

Components

- Valves

### Standards and releases

- TA Luft

### Available dimensions

- Customized packing sets made from endless or split precompressed rings
- Made to order

### BuraTAL T3 9650/T3 variants

Form as supplied	Type	
Packing set	without live-loading system	9650/T3
	with live-loading system	9650/T3B

### BuraTAL T4 9650/T4 variants

Form as supplied	Type	
Packing set	without live-loading system	9650/T4
	with live-loading system	9650/T4B





### Advantages

- High gas tightness
- Minimal friction coefficients
- Meets the most stringent cleanliness standards

## BuraTAL T5 9650/T5

### Features

The BuraTAL T5 9650/T5 an innovative new, pure white packing set made from high quality, impregnated non-wovens. It consists of aramid non-woven sealing rings impregnated with PTFE to ensure very high cross-sectional stability. The packing set is especially suitable in applications that demand the highest level of cleanliness, particularly those where high gas sealing performance with low friction is required.

### Operating range

#### Valves

Pressure:  $p = 250$  bar

Pressure  $p$  to TA Luft

- with live-loading system: 30 bar

Sliding velocity:  $v_g = 2$  m/s

Temperature

- Continuous operation:  $t = -200$  °C ...  $+250$  °C

Chemical resistance:

pH = 1 ... 14

Universal chemical resistance.

Not suitable for use in highly oxidizing media such as oleum (fuming nitric acid), gaseous fluorine and molten alkali metals.

### Recommended applications

Components

- Valves

### Available dimensions

- Customized packing sets made from endless or split precompressed rings
- Made to order



### BuraTAL T5 9650/T5 variants

Form as supplied	Type	
Packing set	without live-loading system	9650/T5
	with live-loading system	9650/T5B



## Advantages

- Particularly suitable for harsh conditions
- High temperature stability

## Fire-safe packing set 9650/FS

### Features

The fire-safe packing set 9650/FS is an extremely high performance set made from graphite products and stainless steel in different combinations. It is particularly for suitable for harsh conditions.

It consists of the following components:

- R901/B7K (with stainless steel cap)
- 6050/KIN (packing)
- 9591 (gasket 2 mm)
- 6050/KIN (packing)
- 9591 (gasket 2 mm)
- 6050/KIN (packing)
- 9591 (gasket 2 mm)
- 6050/KIN (packing)
- R901/B7K (with stainless steel cap)

### Operating range

#### Valves

Pressure:  $p = \text{max. } 260 \text{ bar}$   
Sliding velocity:  $v_g = 2 \text{ m/s}$

#### Temperature

- Continuous operation, constant:  $t_{\text{max}} = +550 \text{ }^\circ\text{C}$
- Steam, constant:  $t_{\text{max}} = +550 \text{ }^\circ\text{C}$
- transient peak temperature:  $t = 600 \text{ }^\circ\text{C}$

Chemical resistance:

$\text{pH} = 0 \dots 14$

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

Components

- Valves

### Standards and releases

- ISO 10497
- BS 6755 Pt. 2: 1987

### Available dimensions

- Custom-made packing sets
- Made to order



## Fire safe packing set 9650/FS variants

Form as supplied

Packing set

9650/FS



## Advantages

- High adaptability to the seal environment

## Soot blower set 1 9650/SB1

### Features

Soot blower set 1 9650/SB1 consists of a combination of Isartherm A 6011/A packing rings and Rotatherm 0901/B7 precompressed pure graphite rings.

### Operating range

#### Valves

Pressure:  $p = 100$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Steam:  $t_{max} = +550$  °C

#### Chemical resistance:

pH = 2 ... 12  
Particularly suitable for hot water and steam applications. Not suitable for use in concentrated acids and alkalis.

### Recommended applications

Mechanical units

- Soot blowers

### Available dimensions

- Custom-made packing sets
- Made to order

### Note

EagleBurgmann soot blower packing sets reliably seal the lance, even while it is moving into or out of the exhaust gas flow. It reliably contains both the hot exhaust gases and the ash particles. The soot blower packing set is made up of specially preshaped and alternately arranged types of material, ensuring leakage control despite high temperature differences. It also reduces deflection of the lance, i.e. the packing set acts as a bearing to a certain extent. Deposits on the lance are also largely stripped off during the movement, maintaining long-term serviceability.



## Advantages

- High adaptability to the seal environment
- Extremely resistant to abrasive particles

## Soot blower set 2 9650/SB2

### Features

Soot blower set 2 9650/SB2 consists of a combination of Araflon A 6426 packing rings and Rotatherm 0901/B7 precompressed pure graphite rings.

### Operating range

#### Valves

Pressure:  $p = 100$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Steam:  $t_{max} = +250$  °C

#### Chemical resistance:

pH = 2 ... 12  
Recommended for use in abrasive media.

### Recommended applications

Mechanical units

- Soot blowers

### Available dimensions

- Custom-made packing sets
- Made to order

## Soot blower set 1 9650/SB1 variants

Form as supplied

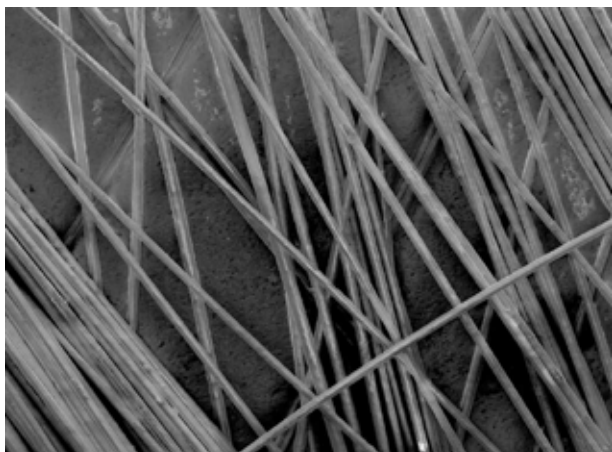
Packing set 9650/SB1

## Soot blower set 2 9650/SB2 variants

Form as supplied

Packing set 9650/SB2

## BuraGlas glass packings



### BuraGlas glass packings

EagleBurgmann glass packings have been used successfully for many years in applications such as furnace door seals, duct seals and metal crucible seals. All products from the BuraGlas range are manufactured from materials and fibers that meet the safety requirements of the World Health Organization (WHO).

### Environmental protection and WHO requirements

Employee safety is of immense importance for day-to-day work in industry. In recent years, this has led to the introduction of worldwide regulations concerning and banning the use of certain materials.

There has been a worldwide debate on the possible carcinogenic effects of certain fiber materials, e.g. artificial mineral fibers ("ceramic fibers").

Both the chemical composition and the physical size of the fibers play a role in endangering the health of the people who come into contact with the fibers when they are processed.

The carcinogenic nature of organic and inorganic, natural and synthetic fibers is based on their size ratio and their biological resistance. The critical size range for such fibers is as follows:

- Length  $l > 5 \mu\text{m}$  and
- diameter  $d < 3 \mu\text{m}$
- Size ratio  $l : d = \text{greater than } 3 : 1$

Such dangerous fibers are classified in the EU Directives 97/69/EC and 67/548/EEC and in TRGS 905. They are sometimes described as WHO fibers.



### Advantages

- High temperature stability
- Square braiding
- High flexibility

## BuraGlas 9480

### Features

BuraGlas 9480 is a square braided glass fiber packing made from texturized glass yarn. BuraGlas braided materials contain no combustible backings and so are non-flammable.

### Operating range

Pressure:  $p = 10 \text{ bar}$

Temperature

- Continuous operation:  $t = -100 \dots +550 \text{ }^\circ\text{C}$

Chemical resistance:

$\text{pH} = 5 \dots 9$

Resistant to water, steam, oil, neutral and dry gases.

### Recommended applications

Components

- Tanks
- Coal mills
- Heat exchanger
- Furnace doors

### Standards and releases

- Hydrolytic class 1 to DIN 12 111

### Available dimensions

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents
  - up to 6.35 mm: 1 kg
  - 7 - 10 mm: 2 kg
  - 11 - 13 mm: 3 kg
  - 14 - 24 mm: 5 kg
  - from 25 mm: 10 kg
- Individual dimensions available upon request

### BuraGlas 9480 variants

Form as supplied	without impregnation	with graphite impregnation
Sold by length	9480	9480/P



**Advantages**

- High temperature stability
- Round braiding
- High flexibility

**BuraGlas R 9472**

**Features**

BuraGlas R 9472 is a round braided glass fiber packing made from texturized glass yarn. BuraGlas braided materials contain no combustible backings and so are non-flammable.

**Operating range**

Pressure: p = 10 bar  
Temperature

- Continuous operation:  
t = -100 ... +550 °C

Chemical resistance:

pH = 5 ... 9

Resistant to water, steam, oil, neutral and dry gases.

**Recommended applications**

Components

- Tanks
- Coal mills
- Heat exchanger
- Furnace doors

**Available dimensions**

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Individual dimensions available upon request



**Advantages**

- Very high temperature stability

**BuraGlas INC 7260/INC**

**Features**

BuraGlas INC 7260/INC is a braided glass fiber packing with a core of HT glass fiber yarn with Inconel reinforcement and special impregnation. BuraGlas braided materials contain no combustible backings and so are non-flammable.

**Operating range**

Pressure: p = 10 bar  
Temperature

- Continuous operation:  
t = -100 ... +750 °C  
(even in contact with air)

Chemical resistance:

pH = 5 ... 9

Resistant to water, steam, oil, neutral and dry gases.

**Recommended applications**

Components

- Tanks
- Coal mills
- Heat exchanger
- Furnace doors

**Available dimensions**

- Sold by length, blank cuts, precompressed rings with straight or slanted cut
- Box contents  
up to 6.35 mm: 1 kg  
7 - 10 mm: 2 kg  
11 - 13 mm: 3 kg  
14 - 24 mm: 5 kg  
from 25 mm: 10 kg
- Individual dimensions available upon request

**BuraGlas R 9472 variants**

Form as supplied	without impregnation	with graphite impregnation
Sold by length	9472	9472/P

**BuraGlas INC 7260/INC variants**

Form as supplied	with Inconel reinforcement	without Inconel reinforcement
Sold by length	7260/INC	7260



## Advantages

- Specially developed for abrasive media
- Very good running properties
- Outstanding adaptability to the installation space
- Optimal friction force reduction
- Optimal leakage reduction

## Burajet SCA 8032/SCA

### Features

Burajet SCA 8032/SCA is a fiber injectable compound based on aramid/PTFE with a special lubricant. For some applications, it may be necessary to retain it between braided compression packings (e.g. Buramex SF 6335 or Arafion 6426).

### Operating range

#### Pumps

Pressure:  $p = 15$  bar

Sliding velocity:

- Braided end rings:

$v_g = 10$  m/s

- Lip seals:

$v_g = 4$  m/s

#### Valves

Pressure:  $p = 70$  bar

Sliding velocity:  $v_g = 2$  m/s

### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  
 $t = -10$  °C ...  $+260$  °C

Chemical resistance:

pH = 2 ... 12

Resistant to drinking water and food, sticky media such as bitumen and adhesives, abrasive media such as lime, sand, sugar and salt, and dyes, paints and turbine oils.

### Recommended applications

Mechanical units

- Pumps
  - Mixer
  - Kneaders
  - Agitators
  - Refiners
- Components
- Valves

### Available sizes

- 1kg container of loosely packed fiber injectable compound
- Also available with Buramex SF 6335 or Arafion 6426 braided end rings or FKM or HPU header rings



## Advantages

- Very good chemical resistance

## Burajet SCB 8032/SCB

### Features

Burajet SCB 8032/SCB is a fiber injectable packing based on PTFE fiber with a graphite-based heavy-duty lubricant. For some applications, it may be necessary to retain it between braided compression packings (e.g. Buraflex 2000/HT). To reduce product contamination and to compensate better for radial shaft movements, a special retention between HPU (hydrolysis-resistant polyurethane) or FKM (fluorocarbon rubber) lipped rings is used. The packing is used in almost all branches of industry.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar

Sliding velocity:

- Braided end rings:

$v_g = 10$  m/s

- Lip seals:

$v_g = 4$  m/s

#### Valves

Pressure:  $p = 75$  bar

Sliding velocity:  $v_g = 2$  m/s

### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar

Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  
 $t = -100$  °C ...  $+250$  °C

Chemical resistance:

pH = 0 ... 14

Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

Mechanical units

- Pumps
  - Mixer
  - Kneaders
  - Agitators
  - Refiners
- Components
- Valves

### Available sizes

- 1kg container of loosely packed fiber injectable compound
- Also available with Buraflex 2000/HT or Arafion 6426 braided end rings or FKM or HPU header rings



The product offers very good running characteristics and excellent adaptability, even in asymmetric installation spaces. It helps to optimize the reduction of leakages and

friction forces. By reducing downtimes, Burajet proves very economical to use. It is also unnecessary to remove or rework scored shafts.

## Burajet SCA 8032/SCA variants

### Form as supplied

Fiber injectable compound

8032/SCA

## Burajet SCB 8032/SCB variants

### Form as supplied

Fiber injectable compound

8032/SCB





### Advantages

- Specially developed for high temperatures
- Good heat conductivity
- Can cover over minor shaft defects

## Burajet SCH 8032/SCH

### Features

Burajet SCH 8032/SCH is a fiber injectable compound packing made from fiber-stabilized graphite. It is manufactured from natural graphite combined with binders which are applied to the graphite fibers using a special process. For some applications, it may be necessary to retain it between braided compression packings (e.g. Isartherm-Flex 6050 or Isartherm K-Flex 6051).

### Operating range

#### Valves

Pressure:  $p = 100$  bar  
Sliding velocity:  $v_g = 2$  m/s

#### Temperature

- Continuous operation:  
 $t = -30$  °C ...  $+450$  °C

### Chemical resistance:

pH = 0 ... 14  
Resistant to waste and exhaust gases

### Recommended applications

#### Components

- Shut-off flap spindles
- Waste gas shut-off valves

### Available sizes

- 1kg container of loosely packed fiber injectable compound
- Also available with Isartherm Flex 6051 or Isartherm Flex 6050 braided end rings



### Advantages

- Very good chemical resistance

## Burajet SCW 8032/SCW

### Features

Burajet SCW 8032/SCW is a fiber injectable packing based on PTFE fiber with a heavy-duty lubricant. For some applications, it may be necessary to retain it between braided compression packings (e.g. Burasoft L 6225/L or Buramex 6335). To reduce product contamination and to compensate better for radial shaft movements, a special retention between HPU (hydrolysis-resistant polyurethane) or FKM (fluorocarbon rubber) lipped rings is used.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar  
Sliding velocity  
• Braided end rings:  
 $v_g = 10$  m/s  
• Lip seals:  
 $v_g = 4$  m/s

#### Valves

Pressure:  $p = 75$  bar  
Sliding velocity:  $v_g = 2$  m/s  
**Mixers, agitators, kneaders, filters**  
Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 2$  m/s

### Temperature

- Continuous operation:  
 $t = -100$  °C ...  $+250$  °C

### Chemical resistance:

pH = 0 ... 14  
Resistant to almost all organic and inorganic acids, alkalis, oils and solvents.

### Recommended applications

#### Industries

- Paper and pulp industry
- Chemical industry

#### Mechanical units

- Pumps
- Mixer
- Kneaders

#### Agitators

#### Refiners

#### Components

- Valves

### Available sizes

- 1kg container of loosely packed fiber injectable compound
- Also available with Buramex SF 6335 or Burasoft 6225/L braided end rings or FKM or HPU header rings

Conversion to the fiber compound packing is problem-free and requires little technical equipment.

No further downtimes are needed when repacking as the compound can be reinjected during operation.

### Burajet SCH 8032/SCH variants

#### Form as supplied

Fiber injectable compound

8032/SCH

### Burajet SCW 8032/SCW variants

#### Form as supplied

Fiber injectable compound

8032/SCW



Burajet® is successfully used to reduce stoppages and downtimes and to cut operating costs in the pulp and paper industry.

A practical example:

All the refiners in a paper factory were retrofitted with Burajet. The lantern rings and flushing water supplies were removed from every refiner. The existing connection was converted to a Burajet injection port. It was not necessary to reconnect the flushing water since Burajet does not require flushing under normal operating temperatures.

By retrofitting Burajet, the operator is now saving over 20,000 USD per refiner per year on water. Process interruptions are also less frequent, which has further advantages as Burajet can continue to be injected while the machine is in operation.



## Advantages

- Easy to handle during installation.

## Burajet chamber rings 8032

### Features

Burajet retainer rings are molded HPU (hydrolysis-resistant polyurethane) or FKM (fluorocarbon rubber) rings with sealing lip which are produced to match the shaft and gland housing. They efficiently retain the Burajet injectable compound packings, thus reducing product contamination. The compensation for radial shaft movements is also better than with braided packings.

### Operating range

#### Pumps

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 4$  m/s

#### Valves

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 4$  m/s

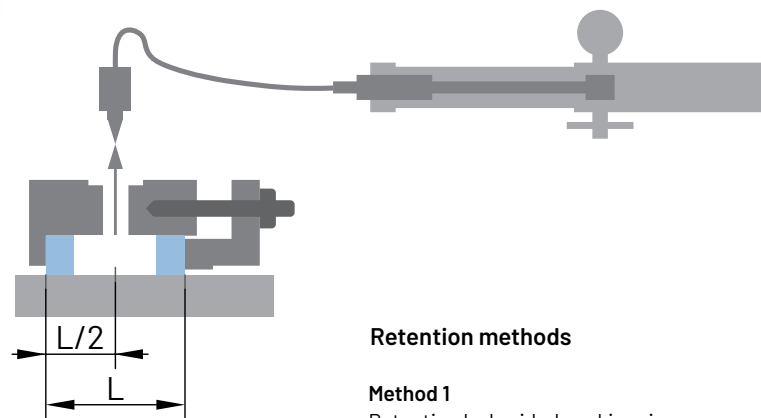
#### Mixers, agitators, kneaders, filters

Pressure:  $p = 25$  bar  
Sliding velocity:  $v_g = 4$  m/s

#### Temperature

- Continuous operation:  
 $t = -30$  °C ...  $+110$  °C

Chemical resistance:  
pH = 2 ... 12



### Retention methods

#### Method 1

Retention by braided packing rings

### Advantages

- Easy to handle
- Can be used multiple times on different machines
- Greater distance from the machine is possible



## Burajet injection device 8032/HHP

Resistant to almost all media. Not suitable for use in highly oxidizing media such as hot sulfuric or nitric acid.

### Recommended applications

Mechanical units

- Pumps
  - Mixer
  - Kneaders
  - Agitators
  - Refiners
- Components
- Valves

### Available dimensions

- Custom-made retainer rings
- Made to order
- 2 rings per set

### Installation note

Easy to handle during installation. To make it easier to fit into assembled systems, the profile ring can be cut through at one point and then glued back together using cyanoacrylate adhesive. The rings are manufactured to fit the shaft and gland housing diameters. An exact measurement is needed (accurate to 0.1 mm) in order to produce the lip seals with the correct dimensions.

### Features

The Burajet injection gun 8032/HHP is a hydraulic gun for fiber-injectable packings allowing easy injection of the compound into the stuffing box space. An injection gun can be used for multiple applications or machines.

It consists of the following components:

- Hydraulic cylinder with hand lever
- Nipple for lantern ring/flush water connection
- Stop valve
- Pressure hose with pressure gauge

### Conversion

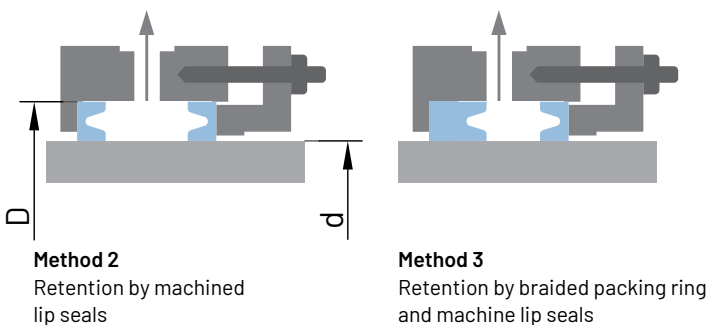
Conversion to the fiber compound packing is problem-free and requires little technical equipment. Use the packing extractor 9611 to remove the old packing. Then retain the injectable fiber packings between two braided packing rings.

### Installation note

The packing can be installed by hand while the equipment is stopped with the gland follower open. With the gland plate closed and while the equipment is stopped, the packing can be injected for the first time using the hydraulic injection gun 8032/HHP via the flush water/lantern ring connection. If there is no connection, it may be attached later.

### Operating range

For supplying and topping up Burajet fiber injectable compound



### Burajet retainer ring 8032 variants

Form as supplied	Material	
Retainer rings	Hydrolysis-resistant polyurethane	8032/AU
	Fluorocarbon rubber	8032/FKM

### Burajet injection gun 8032/HHP variants

Form as supplied	
Set	8032/HHP

## Cutting packing rings to size

The EagleBurgmann packing cutter 9612 guarantees precision-cut rings. If you do not have a cutter, follow these instructions: The cut length  $L$  of the ring is determined by the shaft diameter  $d$  and the packing width  $s$  according to the following formula:

$$L_M = (d + s) \cdot x \cdot \pi \text{ (mm)}$$

where  $x$  = allowance factor

$x = 1.07$  for shaft diameter  $\leq 60$  mm

$x = 1.05$  for shaft diameter  $> 60$  mm  $\leq 100$  mm

$x = 1.03$  for shaft diameter  $> 100$  mm

These are average values which can vary for different packing grades and applications. Using values significantly different from these recommendations in practice can lead to installation and functional problems, particularly with larger cross-sections and structurally strong packings. Please contact us to discuss such cases.

Example:

Shaft diameter  $d = 60$  (mm)

Stuffing box diameter  $D = 80$  (mm)

Packing thickness  $s$ :

$$s = \frac{D - d}{2} = \frac{80 - 60}{2} = 10 \text{ mm}$$

Cut length  $L_M$ :

$$\begin{aligned} L_M &= (d + s) \cdot 1,07 \cdot \pi \\ &= (60 + 10) \cdot 1,07 \cdot \pi \\ &\sim 235 \text{ mm} \end{aligned}$$

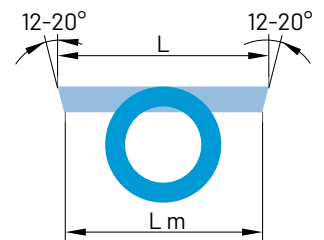
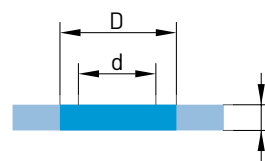
### Straight cut

For rotating shafts, we recommend cutting the packing straight and perpendicular to the shaft. This is especially true for pump applications.

To achieve parallel contact of the cut ends without any gap when the packing ring is closed, the allowance angle on both cut ends should equal approx.  $12^\circ \dots 20^\circ$ . If you apply the above formula, or if you use the packing cutter 9612, the cut ring will be slightly over-long. In conjunction with the straight cut this results in a slight tensioning of the ring against the stuffing box outer wall during installation which prevents co-rotation of the packing rings on the product size and leakage to the outside.

### Slanted cut for valves

A slanted cut is sensible in this case as it makes the valve packings, which are generally stiffer, easier to fit. There is no need for any supporting effect with valves, unlike pumps. The cut ends of dry packings fray easily, so you should secure the ends with adhesive tape prior to cutting. We also recommend a slanted cut for reciprocating piston pumps and slow-turning shafts, e.g. in agitators, mixers and kneaders.



# Packing installation – Preparation

## Removing the old packing

After depressurizing the equipment and removing the gland plate, use the packing extractor to remove the old packing rings and debris right down to the bottom of the stuffing box.

## Preparing the stuffing box

Thoroughly clean the stuffing box and the spindle or shaft surface. Replace any corroded spindles or worn shafts and protective sleeves. Check the shaft bearing and concentricity. Inspect the gap at the gland and bottom of the stuffing box. If the gap is too large, insert a washer or neck bush to prevent the packing material being extruded into the gap. An alternative is to use retainers with a suitable packing material. If the bottom of the stuffing box or the gland contact surface is conical we recommend machining it square. The wedge effect would otherwise increase the contact pressure, leading to excessive wear of the packing material and sliding surfaces.

## Selecting the grade and size of packing

Before installing the packing, check once again that you have chosen the right packing for the operating conditions. For valves, use exactly the right packing cross-sections, preferably in the form of precompressed rings. For pumps we recommend using a slightly under-sized packing cross-section (roughly  $0.1 < 0.6$  mm depending on the cross-section). This provides the necessary leakage gap between the shaft and the packing ring. The gap ensures the higher rate of start-up leakage needed for lubrication and to dissipate the heat of friction. This is especially important to note with PTFE and PTFE-impregnated packings (risk of burning). The use of over-size packings is not recommended because the packing cross section reverts to its original size when the cut packing is inserted into the installation space.

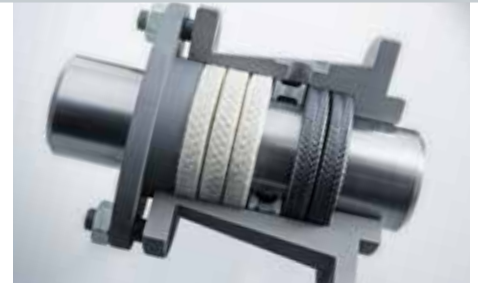


## Coating recommendations for shafts and their protective sleeves

Coating method	Coating material	HRc	HV	Coating properties
Plasma flame method	Aluminum oxide	60 ... 65	3,000	High wear resistance, electrical insulator, corrosion-resistant
	Chromium oxide	60 ... 65	2,500	Good chemical resistance, extremely resistant to wear, good resistance to abrasion and high temperatures
Thermal spray method	Nickel chromium – Boron silicon alloys	62 ... 65	–	Fusion-bonded, highly wear-resistant coatings, resistant to cavitation, erosion and corrosion

Hard chromium plating is not suitable due to the risk of flaking and sub-surface corrosion.

## Packing installation

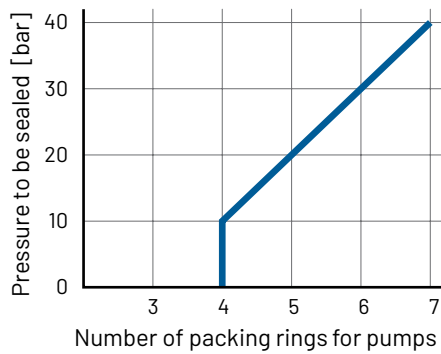


Carefully twist the precompressed rings open in the axial and radial directions just far enough to allow them to be slipped over the shaft. Bending the rings too much can damage the structure by kinking.

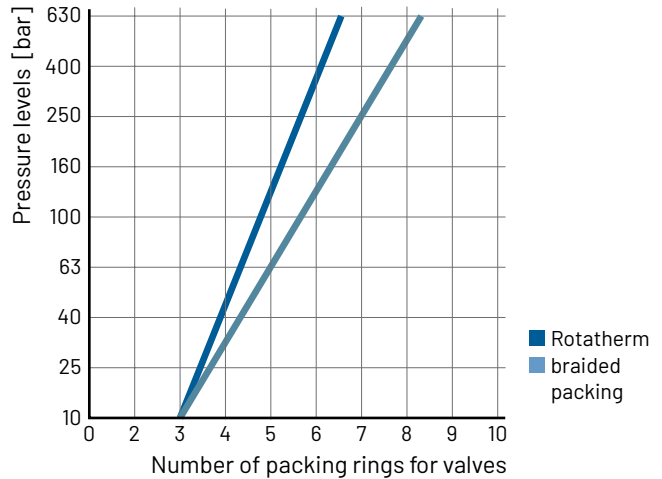
Using assembly shells or the gland, insert each ring separately into the stuffing box with the cut ends leading. Do not use sharp objects to do this as there is a risk of damaging the shaft or deforming the packing material.

Keep inserting rings until the gland projects (for guidance) into the stuffing box compartment by at least  $\frac{1}{4}$  (for valves) to roughly  $\frac{1}{2}$  (for pumps) of the packing width "s". Press the rings home with the gland and tighten the nuts hand-tight. If there is a lantern ring, check that it is correctly positioned in relation to the connection after the gland has been tightened.

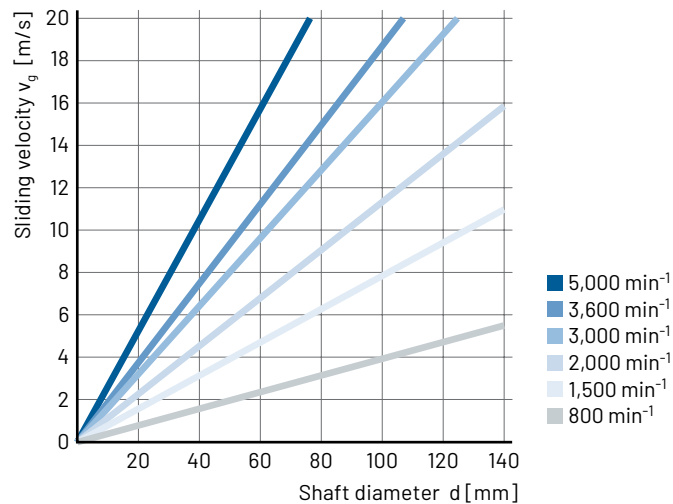
Number of packing rings



Number of packing rings

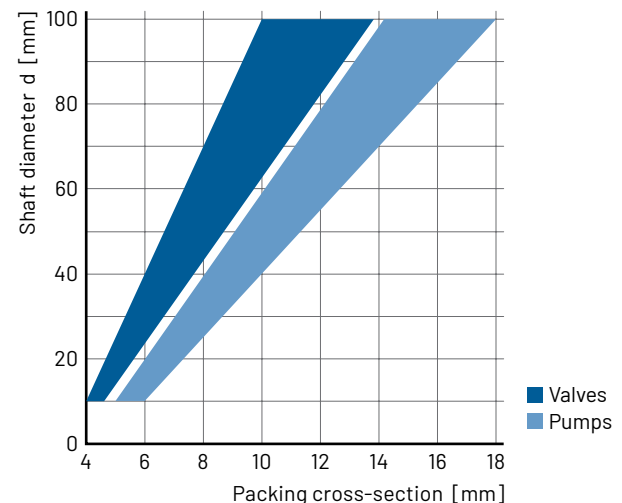


Sliding velocity  $v_g$



The sliding velocity can be derived from the diagram as a function of the shaft diameter and the shaft speed. Formula:  $v_g = \frac{d \cdot \pi \cdot n}{60,000}$  [m/s]

Packing cross-section



For pumps we recommend a packing cross-section in the range:  $s = 1.4 \dots 1.8 \cdot \sqrt{d}$ .

For valves in the range:  $s = 1.0 \dots 1.4 \cdot \sqrt{d}$ .



# Commissioning

## Centrifugal pumps

In centrifugal pumps, stuffing box packings have the function of limiting but not totally preventing the escape of medium. A lubricant is required in order to minimize shaft wear and to dissipate the heat produced by friction. For this reason the gland follower should be tightened only lightly by hand prior to commissioning. If the pressure is applied using a torque limiting wrench, we recommend an initial tension of 1.1 ... 1.6 times the operating pressure.

A high initial rate of leakage should be allowed, particularly with PTFE and PTFE-impregnated packings (50 < 200 drops per minute depending upon the medium and the sliding velocity). During the roughly 30-minute running-in phase, the minimum leakage rate must be set by gradually tightening the gland nuts in increments of roughly 1/6 turn. The stuffing box temperature should not rise abnormally (20 ... 60 °C above the medium temperature is permitted). If there is a sudden jump in temperature and a notable reduction in leakage, the gland must be slackened immediately and the running-in process repeated.

The leakage values that can be achieved will depend on factors such as the medium, pressure, temperature, leakage gap, sliding velocity, shaft run-out, and the packing material used.

If the operating conditions are known, we can calculate an approximation of the leakage with our computer program.

If increased peripheral leakage is noted (leakage around the outer wall of the stuffing box), the packing rings must be compressed hard and briefly with the pump at a standstill. Then release the gland and repeat the running-in operation.

## Valves

To achieve the desired leakage-free seal, the gland follower must be tightened in accordance with the following values according to the operating pressure  $p_1$  and the medium (liquid or gaseous) prior to pressurizing the system:

Liquid medium  
up to 40 bar:  $2 \times p_1$  (at least 5 MPa)  
> 40 bar:  $1.5 \times p_1$

Gaseous medium  
up to 40 bar:  $5 \times p_1$  (at least 10 MPa)  
> 40 ... 200 bar:  $2.5 \times p_1$   
> 200 bar:  $1.5 \times p_1$

Avoid tilting the gland. For uniform and controlled pre-tensioning of the packing by the gland follower, we recommend the use of a torque wrench or similar force measuring device.

Control valves require delicate adjustment of the zero leakage under operating conditions. We recommend actuating the spindle several times during the setting process to check the actuation force.

In addition to these general notes, separate instructions are available for specific packing materials and special applications.

The following formula can be applied for the friction forces and moments that are expected or actually occur:

$$F_R = p_B \cdot d \cdot \pi \cdot h \cdot \mu_k$$

$F_R$  Spindle friction force [N]  
 $p_B$  Axial gland pressure [MPa]  
 $d$  Spindle diameter [mm]  
 $h$  Height of seal set, uncompressed [mm]  
 $\mu_k$  Friction/force deflection factor

## Reciprocating piston pumps

The guidelines for valves are generally applicable for installation of the packing material and commissioning for piston pumps. Reliable sealing of piston pumps in the pressure range above 100 bar requires special packing combinations to be installed. Contact us for recommendations matched to your operating conditions.



## Densities and weights

### Length per kilogram [m/kg](tolerance: ±5%)

Packing Item no.	Density [g/cm <sup>3</sup> ]	Packing size [mm]								
		3	4	5	6	6.35	8	9	9.5	10
2000/HT	1.25	-	-	-	22.2	19.8	12.5	9.9	8.9	8.0
4001	1.20	92.6	52.1	33.3	23.2	20.7	13.0	10.3	9.2	8.3
4002	1.20	92.6	52.1	33.3	23.2	20.7	13.0	10.3	9.2	8.3
4003	1.20	92.6	52.1	33.3	23.2	20.7	13.0	10.3	9.2	8.3
5846	1.30	85.5	48.1	30.8	21.4	19.1	12.0	9.5	8.5	7.7
6011/A	1.15	96.6	54.4	34.8	24.2	21.6	13.6	10.5	9.6	8.7
6050	1.15	96.6	54.4	34.8	24.2	21.6	13.6	10.7	9.6	8.7
6050/KIN	1.20	92.6	52.1	33.3	23.2	21.6	13.0	10.7	9.6	8.3
6051	1.10	-	-	-	25.3	22.5	14.2	11.2	10.1	9.1
6060	1.45	76.6	43.1	27.5	19.1	17.1	10.8	8.5	7.6	6.9
6065	1.65	67.3	37.9	24.2	16.8	15.0	9.5	7.5	6.7	6.1
6070	1.70	65.4	36.8	23.5	16.3	14.6	9.2	7.3	6.5	5.9
6225/L	1.72	64.6	36.3	23.3	16.2	14.4	9.1	7.2	6.4	5.8
6226/L	1.75	63.5	35.7	22.9	15.9	14.2	8.9	7.1	6.3	5.7
6226/NQ	1.75	63.5	35.7	22.9	15.9	14.2	8.9	7.1	6.3	5.7
6230	1.58	70.3	39.6	25.3	17.6	15.7	9.9	7.8	7.0	6.3
6230/SL	1.62	68.6	38.6	24.7	17.2	15.3	9.7	7.6	6.8	6.2
6232	1.45	76.6	43.1	27.6	19.2	17.1	10.8	8.5	7.6	6.9
6335	1.35	82.3	46.3	29.6	20.6	18.4	11.6	9.6	8.2	7.4
6426	1.38	80.5	45.3	29.0	20.1	18.0	11.3	8.9	8.0	7.3
6430/K1	1.48	-	-	27.0	18.8	16.8	10.6	8.3	7.5	6.8
6430/K2	1.52	-	-	26.3	18.3	16.3	10.3	8.1	7.3	6.6
6435	1.32	84.2	47.4	30.3	21.0	18.8	11.8	9.4	8.4	7.6
7260/INC	1,5 <sup>1)</sup>	-	41.7	26.3	18.5	-	10.4	-	-	7.1
9472	1,24 <sup>2)</sup>	111.1	63.7	42.4	29.5	-	18.9	15.0	-	12.7
9480	1,14 <sup>1)</sup>	-	55.0	35.1	24.4	-	13.7	-	-	8.4

### Weight per meter [kg/m](tolerance: ±5%)

Packing Item no.	Density [g/cm <sup>3</sup> ]	Packing size [mm]								
		3	4	5	6	6.35	8	9	9.5	10
2000/HT	1.25	-	-	-	0.04500	0.05050	0.08000	0.10100	0.11230	0.12500
4001	1.20	0.01080	0.01920	0.03000	0.04320	0.04830	0.07680	0.09710	0.10870	0.12000
4002	1.20	0.01080	0.01920	0.03000	0.04320	0.04830	0.07680	0.09710	0.10870	0.12000
4003	1.20	0.01080	0.01920	0.03000	0.04320	0.04830	0.07680	0.09710	0.10870	0.12000
5846	1.30	0.01170	0.02080	0.03250	0.04680	0.05240	0.08320	0.10530	0.11760	0.13000
6011/A	1.15	0.01040	0.01840	0.02880	0.04140	0.04630	0.07360	0.09345	0.10410	0.11500
6050	1.15	0.01040	0.01840	0.02880	0.04140	0.04830	0.07360	0.09710	0.10870	0.11500
6050/KIN	1.20	0.01080	0.01920	0.03000	0.04320	0.04830	0.07680	0.09710	0.10870	0.12000
6051	1.10	-	-	-	0.03960	0.04440	0.07040	0.08929	0.09900	0.11000
6060	1.45	0.01310	0.02320	0.03640	0.05240	0.05850	0.09300	0.11760	0.13160	0.14600
6065	1.65	0.01490	0.02640	0.04130	0.05940	0.06670	0.10560	0.13330	0.14930	0.16500
6070	1.70	0.01530	0.02720	0.04260	0.06130	0.06850	0.10870	0.13700	0.15380	0.16950
6225/L	1.72	0.01550	0.02750	0.04300	0.06190	0.06940	0.11010	0.13880	0.15630	0.17200
6226/L	1.75	0.01580	0.02800	0.04380	0.06300	0.07040	0.11200	0.14080	0.15870	0.17500
6226/NQ	1.75	0.01580	0.02800	0.04380	0.06300	0.07040	0.11200	0.14080	0.15870	0.17500
6230	1.58	0.01420	0.02530	0.03950	0.05690	0.06370	0.10110	0.13330	0.14920	0.15800
6230/SL	1.62	0.01460	0.02590	0.04050	0.05830	0.06540	0.10370	0.13160	0.14710	0.16200
6232	1.45	0.01310	0.02320	0.03630	0.05220	0.05840	0.09280	0.11770	0.13160	0.14500
6335	1.35	0.01220	0.02160	0.03380	0.04860	0.05430	0.08640	0.10990	0.12190	0.13500
6426	1.38	0.01240	0.02210	0.03450	0.04970	0.05550	0.08830	0.11230	0.12500	0.13800
6430/K1	1.48	-	-	0.03700	0.05330	0.05950	0.09470	0.12050	0.13330	0.14800
6430/K2	1.52	-	-	0.03800	0.05470	0.06190	0.09730	0.12350	0.13700	0.15200
6435	1.32	0.01190	0.02110	0.03300	0.04750	0.05320	0.08450	0.10640	0.11900	0.13200
7260/INC	1,5 <sup>1)</sup>	-	0.02400	0.03800	0.05400	-	0.09600	-	-	0.14010
9472	1,24 <sup>2)</sup>	0.00900	0.01570	0.02360	0.03390	-	0.05280	0.06680	-	0.07860
9480	1,14 <sup>1)</sup>	-	0.01820	0.02850	0.04110	-	0.07300	-	-	0.11920

<sup>1)</sup> For dimension 4 mm x 4 mm

<sup>2)</sup> For diameter 4 mm



12	12.7	14	15	16	18	19	20	22	24	25
5.6	5.0	4.1	3.6	3.1	2.5	2.2	2.0	1.7	1.4	1.3
5.8	5.2	4.3	3.7	3.3	2.6	2.3	2.1	1.7	1.5	1.3
5.8	5.2	4.3	3.7	3.3	2.6	2.3	2.1	1.7	1.5	1.3
5.8	5.2	4.3	3.7	3.3	2.6	2.3	2.1	1.7	1.5	1.3
5.3	4.8	3.9	3.4	3.0	2.4	2.1	1.9	1.6	1.3	1.2
6.0	5.4	4.4	3.9	3.4	2.7	2.4	2.2	1.8	1.5	1.4
6.0	5.4	4.4	3.9	3.4	2.7	2.4	2.2	1.8	1.5	1.4
5.8	5.2	4.3	3.7	3.3	2.6	2.3	2.1	1.7	1.5	1.3
6.3	5.6	4.6	4.0	3.6	2.8	2.5	2.3	1.9	1.6	1.5
4.8	4.3	3.5	3.1	2.7	2.1	1.9	1.7	1.4	1.2	1.1
4.2	3.8	3.1	2.7	2.4	1.9	1.7	1.5	1.3	1.1	1.0
4.1	3.6	3.0	2.6	2.3	1.8	1.6	1.5	1.2	1.0	0.9
4.0	3.6	3.0	2.6	2.3	1.8	1.6	1.5	1.2	1.0	0.9
4.0	3.5	2.9	2.5	2.2	1.8	1.6	1.4	1.2	1.0	0.9
4.0	3.5	2.9	2.5	2.2	1.8	1.6	1.4	1.2	1.0	0.9
4.4	3.9	3.2	2.8	2.5	2.0	1.8	1.6	1.3	1.1	1.0
4.3	3.8	3.2	2.7	2.4	1.9	1.7	1.5	1.3	1.1	1.0
4.8	4.3	3.5	3.1	2.7	2.1	1.9	1.7	1.4	1.2	1.1
5.1	4.6	3.8	3.3	2.9	2.3	2.1	1.9	1.5	1.3	1.2
5.0	4.5	3.7	3.2	2.8	2.2	2.0	1.8	1.5	1.3	1.2
4.7	4.2	3.5	3.0	2.6	2.1	1.9	1.7	1.4	1.2	1.1
4.6	4.1	3.4	2.9	2.6	2.0	1.8	1.6	1.4	1.1	1.1
5.3	4.7	3.9	3.4	3.0	2.3	2.1	1.9	1.6	1.3	1.2
5.0	-	3.2	3.0	2.8	2.1	1.9	1.7	1.6	-	1.3
9.3	-	7.2	6.3	5.5	4.6	-	3.7	3.1	2.6	2.6
6.1	-	4.7	4.1	3.3	2.8	2.5	2.4	2.2	-	1.8

12	12.7	14	15	16	18	19	20	22	24	25
0.18000	0.20160	0.24500	0.28130	0.32000	0.40500	0.45130	0.50000	0.60500	0.72000	0.78130
0.17280	0.19350	0.23520	0.27000	0.30720	0.38880	0.43320	0.48000	0.58080	0.69120	0.75000
0.17280	0.19350	0.23520	0.27000	0.30720	0.38880	0.43320	0.48000	0.58080	0.69120	0.75000
0.17280	0.19350	0.23520	0.27000	0.30720	0.38880	0.43320	0.48000	0.58080	0.69120	0.75000
0.18720	0.20970	0.25480	0.29250	0.33280	0.42120	0.46930	0.52000	0.62920	0.74880	0.81250
0.16560	0.18550	0.22540	0.25880	0.29440	0.37260	0.41520	0.46000	0.55660	0.66240	0.71880
0.16560	0.18550	0.22540	0.25880	0.29440	0.37260	0.41520	0.46000	0.55660	0.66240	0.71880
0.17280	0.19350	0.23520	0.27000	0.30720	0.38880	0.43320	0.48000	0.58080	0.69120	0.75000
0.15840	0.17740	0.21560	0.24750	0.28160	0.35640	0.39710	0.44000	0.53240	0.63360	0.68750
0.20980	0.23440	0.28570	0.32680	0.37310	0.47170	0.52630	0.58140	0.70420	0.84750	0.90910
0.23760	0.26610	0.32340	0.37130	0.42240	0.53460	0.59570	0.66000	0.79860	0.95040	1.03130
0.24390	0.27780	0.33330	0.38460	0.43480	0.55560	0.62500	0.66670	0.83330	1.00000	1.11110
0.24770	0.27740	0.33710	0.38700	0.44030	0.55730	0.62090	0.68800	0.83250	0.99070	1.07500
0.25200	0.28230	0.34300	0.39380	0.44800	0.56700	0.63180	0.70000	0.84700	1.00800	1.09380
0.25200	0.28230	0.34300	0.39380	0.44800	0.56700	0.63180	0.70000	0.84700	1.00800	1.09380
0.22750	0.25480	0.30970	0.35550	0.40450	0.51190	0.57040	0.63200	0.76470	0.91010	0.98750
0.23330	0.26130	0.31750	0.36450	0.41470	0.52490	0.58480	0.64800	0.78410	0.93310	1.01250
0.20880	0.23390	0.28420	0.32630	0.37120	0.46980	0.52350	0.58000	0.70180	0.83520	0.90630
0.19440	0.21770	0.26460	0.30380	0.34560	0.43740	0.48740	0.54000	0.65340	0.77760	0.84380
0.19870	0.22260	0.27050	0.31050	0.35330	0.44710	0.49820	0.55200	0.66790	0.79490	0.86250
0.21310	0.23870	0.29010	0.33300	0.37890	0.47950	0.53430	0.59200	0.71630	0.85250	0.92500
0.21890	0.24520	0.29790	0.34200	0.38910	0.49250	0.54870	0.60800	0.73570	0.87550	0.95000
0.19010	0.21290	0.25870	0.29700	0.33790	0.42770	0.47650	0.52800	0.63890	0.76030	0.82500
0.20200	-	0.31450	0.33780	0.29590	0.47000	0.52360	0.58000	0.62890	-	0.75190
0.10740	-	0.13840	0.15900	0.18080	0.21880	-	0.27000	0.31920	0.38000	0.39240
0.16410	-	0.21360	0.24520	0.30460	0.35320	0.39360	0.41600	0.45480	-	0.55640

Section overview



Packing cartridge unit 9984  
Live-loading system

168  
170





## Advantages

- Split gland for easy and fast packing changes
- Particularly fast and easy to install

## Packing cartridge unit 9984

### Features

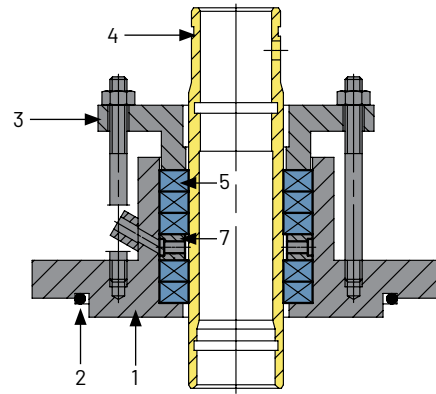
Packing cartridges combine a simple system structure with a robust construction. They are ideal for absorbing larger axial and radial shaft movements and can be suitable for dry contacting, depending on the conditions of use and packing quality. The choice of packing quality depends on the medium and the operating conditions. EagleBurgmann packing cartridges are used successfully in a range of different industries. The design is based on the operating ranges.

### Typical applications

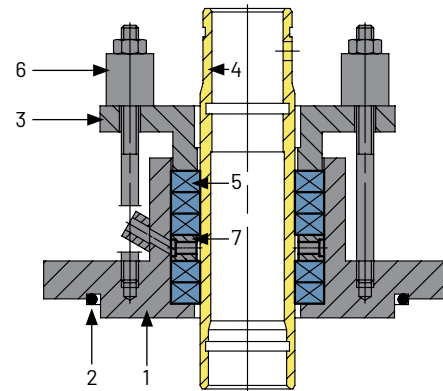
Packing cartridges are ideal for uses requiring a long service life and fast seal replacement, e.g. to reduce stoppages and downtimes.

### Available versions

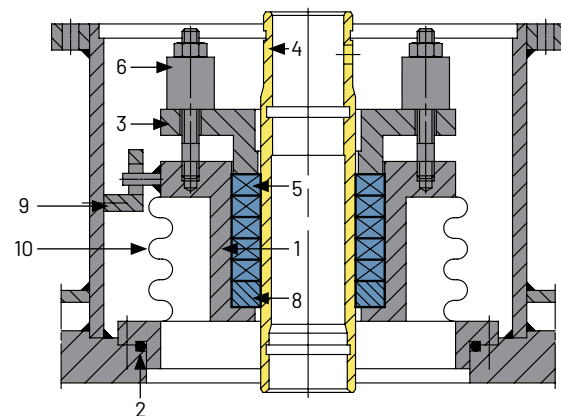
- Ready-to-fit cartridge unit, connection sizes to DIN EN/ASME standards (agitators)
- Live-loaded system (external disk spring arrangement) with defined surface pressure and visual control
- Available with integrated shaft bearings
- Lubrication or pressurized buffer gas via lantern ring possible. Shaft protection sleeve with chromium oxide coating or hardened to protect against abrasive particles in the medium
- Suitable for large radial shaft deflections if the packing set is arranged "floating"



- |                                     |                |
|-------------------------------------|----------------|
| 1 Stuffing box housing              | 4 Shaft sleeve |
| 2 O-ring or Statotherm profile ring | 5 Packing set  |
| 3 Gland follower                    | 7 Lantern ring |



- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1 Stuffing box housing              | 5 Packing set                     |
| 2 O-ring or Statotherm profile ring | 6 Guide sleeve for spring washers |
| 3 Gland follower                    | 7 Lantern ring                    |
| 4 Shaft sleeve                      |                                   |



- |                                     |                                   |
|-------------------------------------|-----------------------------------|
| 1 Stuffing box housing              | 6 Guide sleeve for spring washers |
| 2 O-ring or Statotherm profile ring | 8 Carbon ring                     |
| 3 Gland follower                    | 9 Anti-rotation device            |
| 4 Shaft sleeve                      | 10 Containment bellows            |
| 5 Packing set                       |                                   |

## Packing cartridge unit 9984 variants

Form as supplied

Set

9984

## References

A major chemical plant needed to improve the mean time between repair (MTBR) of a critical piston pump. The service life was doubled to 6 months by fitting a packing cartridge equipped with 2 independent live-loaded sealing sets. The packing set on the high pressure side was fitted with an additional diffusion barrier and there was also an intermediate lantern ring with water barrier before the low pressure packing set. The customer was able to reduce pump leakage to zero, extend the service life and reduce downtimes for pump servicing.

A refinery wanted to increase production but was prevented from doing so because the decoking process took too much time. The problem identified was the reliability of and servicing time required by the hydraulic high-pressure discharge pump/cutting head. These pumps were handling hot, liquid coke at 330 bar and 485 °C. The pumps were retro-fitted with EagleBurgmann packing cartridges and the service life jumped from 3 to 6 months up to 24 months. The refinery now achieves a much higher production throughput while protecting the environment (through reduced leakage) and shorter downtimes.







## Live-loading system

### Features

The EagleBurgmann live-loading system creates a defined, permanent initial tension on the sealing set, ensuring optimum sealing under the harshest operating conditions. The live-loading system is ideal for valves which are critical for plant operation or are in "difficult to get to" locations.

The system can be fitted to new valves or retro-fitted to existing valves or mixers.

EagleBurgmann live-loading system guarantees

- A constant self-adjusting sealing force on the packing set – ideal for applications with high thermal and/or pressure cycle rates.
- Leakage rates which are well below the levels demanded by standards such as TA Luft, API 622 and ISO 15848.
- Reduced maintenance requirements since regular manual adjustment of the packing set is not required.
- Extended packing set life

### Advantages

- Allows a defined and permanent initial tension to be applied to the seal set
- Guarantees optimum sealing, even under difficult operating conditions



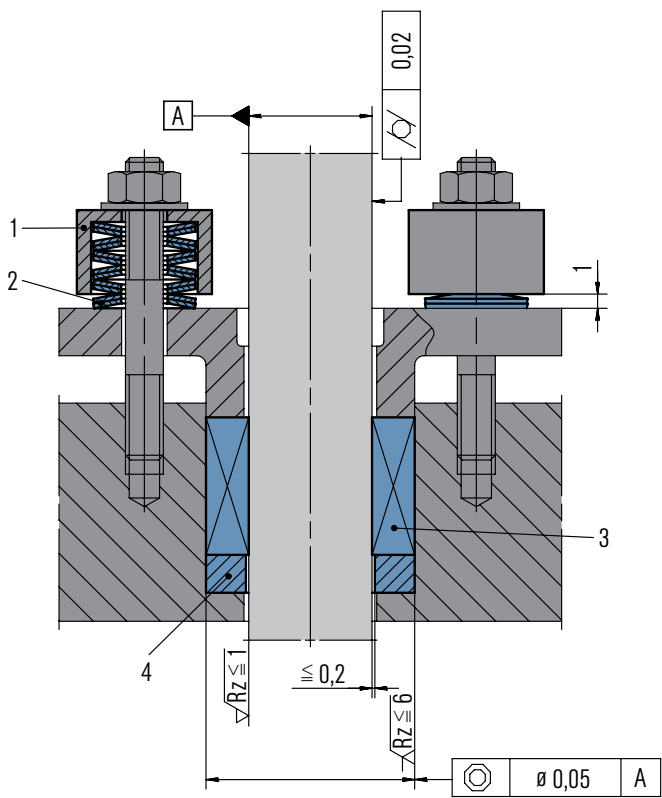
Live-loading systems can be quickly fitted to existing valves. The required spring loading etc. is calculated by our application engineers from your on-site measurements.

The gap between the spring stack cover and the gland follower is preset to 1 mm on initial installation. In normal operation the packing set wears. The gap is adjusted back to 1 mm when it reaches 3 mm.

### Live-loading system variants

Form as supplied	
Live-loading system	9650/BS
Live-loading system with washer	9650/BSS





- 1 Guide housing
- 2 Spring stack
- 3 Seal set
- 4 Spacer sleeve





Section overview



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Joudol lubricant and anti-seize agent SM 8152	175
Packing extractor 9611	176
Packing cutter 9612	176
Packing cutter 9616	177





### Advantages

- Convenient
- Easy to use
- Particularly suitable for preparing small quantities

## Gasket cutter 9614

### Features

The gasket cutter 9614 is a manually operated cutting tool for on-site installation where there is no power supply. For cutting circular sealing rings.

The gasket cutter consists of:

- Cutting plate
- Short and long cutting arm with scale and adjustable stop
- Operating handle with blade holder and hard metal blade
- Center bushing
- Hole punch
- Cutting pad

### Operating range

- For preparing rubber, PTFE, graphite etc. sealing rings
- Rings should ideally not have metal inserts
- Gasket inner diameter: from approx. 30 mm
- Gasket outer diameter: up to approx. 1,000 mm

### How it works

Use the hole punch and cutting pad provided to punch a centering hole in the gasket material. Then clamp it on the cutting plate. Set the desired diameter on the scale and then cut the circular sealing ring out of the gasket sheet.



### Advantages

- Ideal for rapid repairs and on-site work
- Can be used to cut small quantities of tanged inserts
- Can be used to make many different shapes, by tracing for example

## Gasket nibbler 9615

### Features

The gasket nibbler 9615 is an electrically-driven gasket cutter with accessories. It is used to produce medium-sized batches of sealing rings and gaskets of any other shape.

### Operating range

- Voltage: 230 V
- Radius: at least 100 mm
- Gasket diameter: from approx. 60 mm to approx. 1,500 mm
- Gasket thickness: max. 3 mm
- Thickness of the metal insert: 0.2 mm
- Minimum edge width depends on the material

### Gasket cutter 9614 variants

Form as supplied		
Set	Gasket cutter	9614
Spare parts	Spare blade	9614/A
	Blade holder	9614/K
	PVC sheet	9614/E
	Perspex plate	9614/B
	Cutting arm, short	9614/C
	Cutting arm, long	9614/L
	Center bushing	9614/D
	Center mandrel	9614/I
	Hole punch	9614/F
	Cutting pad	9614/G
Accessories	Special blade for cutting Statotherm graphite gaskets with smooth or tanged insert	9614/SK

### Gasket nibbler 9615 variants

Form as supplied		
Set	Gasket nibbler	9615
Spare parts	Spare upper blade	9615/OM
	Spare lower blade	9615/UM
	Hole punch, diameter 20 mm	9615/LO
	Clamping lever, M6 thread	9615/KL
	Finger guard (perspex)	9615/FI
	Tilt/clamping lever, M4 thread	9615/KKH
	Metabo type 030/PKU6872 curve shears	9615/KS
	Screw for upper blade M4 x 16 (engineered)	9615/OMS
	Screw for lower blade M3 x 12 (countersunk Allen type)	9615/UMS
	Scale/ruler without bracket and mandrel	9615/S



#### Advantages

- Keeps screws movable
- Helps to prevent corrosion
- High temperature stability
- Reduces friction losses
- Water repellent

## Joudol lubricant and anti-seize agent SM 8152

#### Features

Joudol® SM 8152 is a universal heavy duty graphite-based anti-seize agent and lubricant.

#### Operating range

Temperature

- Continuous operation:  
t = -200 °C ... +500 °C

#### Joudol SM 8152 variants

Form as supplied	Contents	Packaging unit	
Tub	1 kg	5 tubs	8152
Tube	230 g	10 tubes	8152



### Advantages

- Easy to handle
- Reduces the time taken to replace gaskets
- Protects the shaft during packing changes

## Packing extractor 9611

### Features

The non-twisting, bendable, tension and compression-resistant form of the packing extractor 9611 allows packings to be gripped perfectly and removed without leaving anything behind, even in inaccessible stuffing box chambers. This special tool is ideal for removing compression packings from pumps, agitators, valves, fittings etc.

### Operating range

Safe and easy removal of the old packing when required



### Advantages

- No material wastage
- Quick and easy to use
- Creates a precise butt joint

## Packing cutter 9612

### Features

The packing cutter 9612 is an easy to use special tool for cutting packing rings into lengths. It is used for packing rings for shaft diameters up to 110 mm, depending on the packing cross-section. An extension scale for shaft diameters up to 250 mm is also available.

### Operating range

For cutting packing cords to length with a straight cut

### How it works

Precisely set the required packing length by moving a stop along the scale. Then clamp the packing cord in place and cut to length with a knife.

### Packing extractor 9611 variants

Form as supplied	Diameter	Length	
Set	3.5 mm, 6 mm, 8 mm and 10 mm		9611/SA
Each	3.5 mm	120 mm	9611
	6 mm	160 mm	9611
	8 mm	210 mm	9611
	10 mm	260 mm	9611

### Packing cutter 9612 variants

Form as supplied		
Each	Packing cutter	9612
Spare part	Scale slider	9612/A
	Replacement scale for gluing in place	9612/AS
	Block A, with lever	9612/I
	Block B, without lever	9612/B
	Cutting pad	9612/E
	Knife	9612/F
Accessories	Extension scale	9612/G

### Advantages

- No material wastage
- Quick and easy to use
- Creates a precise butt joint



## Packing cutter 9616

### Features

The packing cutter 9616 is an easy to use special tool for cutting rings into lengths. The packing cutter is used to cut packing rings to size with a slanted cut for valves, mixers and kneaders with a cut length of up to 460 mm.

### Operating range

For cutting packing cords to length with a slanted cut

### How it works

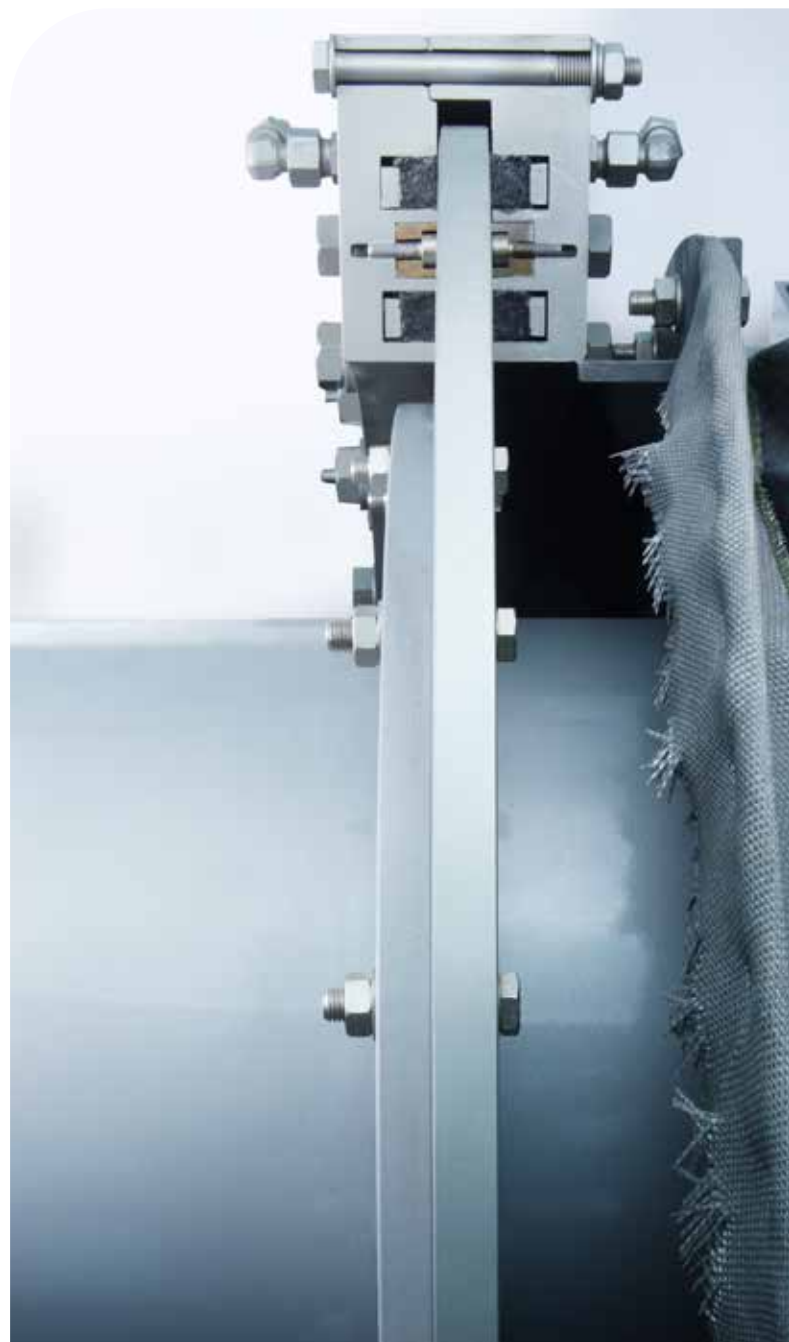
Precisely set the required packing length by moving a stop along the scale. Then clamp the packing cord in place and cut to length with a knife.

### Packing cutter 9616 variants

#### Form as supplied

Each	Packing cutter	9616
Spare part	Scale slider	9616/A

Section overview





Espey Magna500+  
DR0 rotary kiln sealing system

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182





Espey Magna500+ with stand

## Advantages

- Split casing is easy to install and remove (shaft does not have to be removed)
- Long service life
- Easy to maintain
- Sealing rings are segmented and so easy to replace

## Espey Magna500+

### Features

- Multi-part sealing ring, overlapped and mortised with gas-tight joints (adjustable)
- Split housing
- Smallest possible operating gap - sealing rings slide on the shaft
- Dry running
- Self-adjusting sealing rings
- Sealing rings follow radial shaft deflections
- Compensates for axial shaft deflections
- Short in axial direction
- No seal components are mounted on the shaft which prevents additional shaft vibrations

### Operating range

Pressure: p = Vacuum ... 2 bar abs.

### Temperature

- $t_{max} = 500\text{ °C}$
  - Inert environment:  $t_{max} = 800\text{ °C}$
- Sliding velocity:  $v_g = \text{max. } 40\text{ m/s}$   
 Radial clearance: max. 5.0 mm  
 Axial movement: theoretically infinite

### Materials

Sealing ring: Carbon, PTFE compound  
 Casing: 1.4021, 1.4571, Hastelloy, titanium, Inconel etc.  
 Tension spring / locking mechanism: 1.4571, Hastelloy, titanium, Inconel

### Recommended applications

- Industries
- Chemical industry
  - Waste incineration and disposal industry
  - Pulp and paper industry
  - Lime, gypsum and cement industry
  - Mining
  - Water and waste water technology

### Mechanical units

- Mid-sized and large cooling fans and blowers
  - Separation seals for gearboxes and engines
  - Steam turbines
  - Mixers and dryers
  - Mills (ball, hammer and beater mills)
  - Centrifuges
- Media
- Gases
  - Combustion and flue gases, gases with a high solids content, flammable (Atext), acidic and toxic gases
  - Steam (with a high solids content), liquid mist
  - Oil mist, penetrating oil
  - Water

### Available dimensions

Seal diameter  
 $d = \text{max. } 3500\text{ mm}$

### Standards and releases

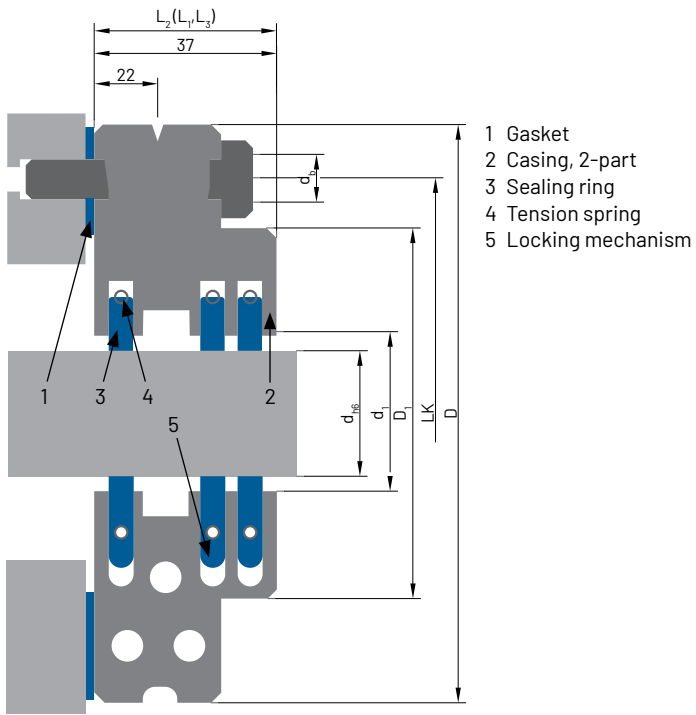
- FDA

## Espey Magna500+ variants

Form as supplied

Special sealing system

Magna500+





## Advantages

- Reduced pollutant emissions
- Clean residue incineration
- Considerable saving on primary energy
- Long service life with low wear
- Plannable downtimes (e.g. annual overhauls)

## DRO rotary kiln sealing system

### Features

- Special sealing system for rotary kilns
- Permanently live-loaded sealing cords (self-adjusting) for continuous, optimal contact with the sealing disk, with visual wear indicator
- Pressurized buffer gas possible
- Optional dust discharge at expansion joint
- Optional flushing connection for removing dust deposits on the sealing disk
- Dual-action sealing rings for barrier with process-compatible gas, or extraction of toxic and aggressive gases
- Broad range of applications due to use of state-of-the-art materials
- Not possible to partially fall below the temperature required for combustion of residues by drawing in leakage air (no dioxin formation)
- Can be retrofitted into existing systems
- Safe operation

### Operating range

Diameter:  
 $d_1 = 2,000 \dots 8,000$  mm  
 Pressure:  $p = -50 \dots +250$  mbar  
 Temperature  

- Max. surface temperature of the kiln:  $t = 300$  °C

 Speed of rotation: max. 2.5 m/s  
 Radial mobility: max. 35 mm (greater values upon request)  
 Axial mobility: 150 mm (greater values upon request)

### Materials

Metal parts:  
 Steel S235JR (St 37-2 /1.0037)  
 CrNiMo steel (1.4571)  
 Other materials upon request

### Recommended applications

Industries  

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Residue and waste incineration
- cement production
- Calcination
- Reduction

 Media  

- Toxic, dangerous, chemical media

### Available dimensions

Diameter:  
 $d_1 = 2,000 \dots 8,000$  mm

### How it works

The sealing system consists of a base flange welded to the rotary tube. The halves of the casing, which are connected to one another, engage via the sealing disk bolted to the base flange. The two halves consist of two or four sealing rings (depending on requirements) which are pressed against the sealing disk via a pressure ring. The contact pressure needed for the sealing rings is generated by springs. Axial changes in the rotary tube caused by thermal expansion and inevitable kiln migration are absorbed by an expansion joint specially designed for the process. Co-rotation of the seal retainer is prevented by suitable torque reaction supports attached to the side for this purpose.

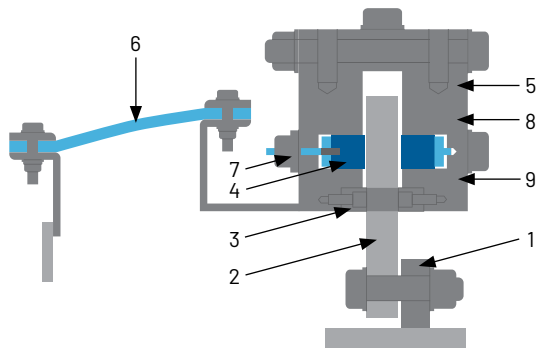
The complete sealing system, apart from the sealing disk, moves freely and runs on idler rollers in these supports. As a result, the seal is able to follow all movements of the kiln, and maintains its full tightness as a result. Radial deflection of the rotary kiln, due to ovality, for example, are compensated by the extent to which the sealing disk penetrates into the seal casing.

## Rotary kiln sealing system DRO variants

Form as supplied

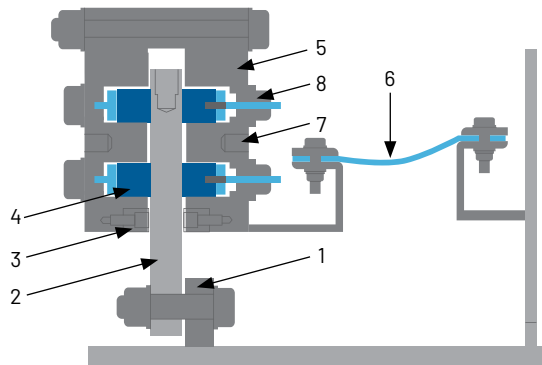
Special sealing system

DRO



**DRO seal**

- 1 Mounting flange (rotary tube)
- 2 Sealing disk (rotating)
- 3 Bronze seal face
- 4 Packing ring (static)
- 5 Casing
- 6 Expansion joint
- 7 Live-loading system
- 8 Temperature sensor connection
- 9 Flush water connection



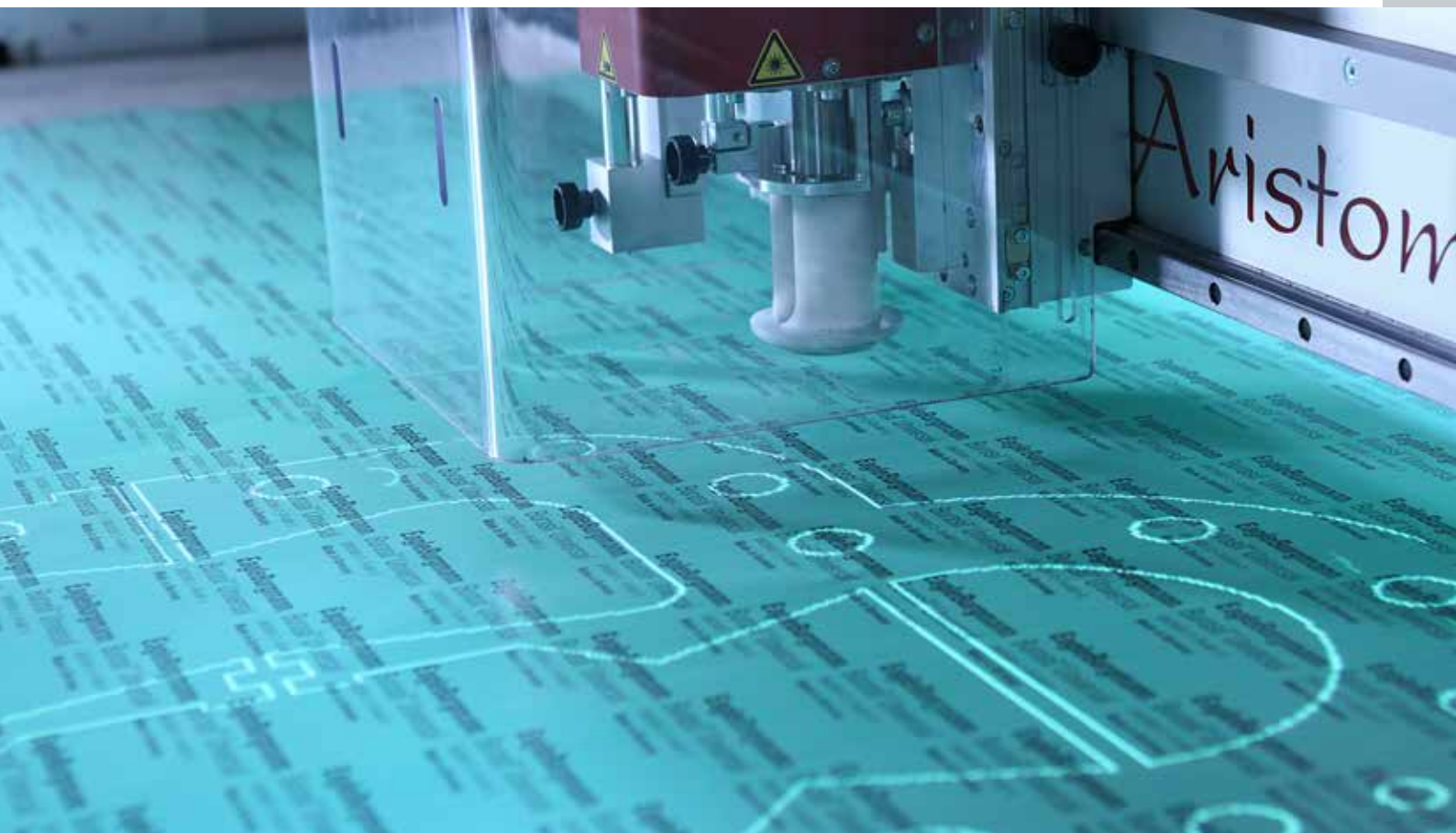
**DRO double seal**

- 1 Mounting flange (rotary tube)
- 2 Sealing disk (rotating)
- 3 Bronze seal face
- 4 Packing ring (static)
- 5 Casing
- 6 Expansion joint
- 7 Flush water connection
- 8 Live-loading system





## Section overview



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## EagleBurgmann TotalSealCare Service

The EagleBurgmann TotalSealCare service offers a flexible and modular solution for every application and any requirement on site. The "On-Site Service" module for packings and gaskets has proven successful over many years in a number of different industrial sectors. EagleBurgmann provides customized service in the plant with its perfectly equipped service units in the form of trailers or containers. Perhaps your need is for procurement, provision and production of seals, deployment of experienced sealing experts for fittings and pumps or special jobs such as turning sealing surfaces on site? This is no problem for our wide range of services.



### Servicing

In the plant or in the service center, qualified fitters and technicians look after all aspects of seal maintenance: installation, startup, servicing, conversion, overhaul and repair. Function-related data are recorded and documented.



### Technical analysis & support

Sealing specialists work to eliminate process disruptions or bad actors. Using the most modern of methods, we diagnose critical positions for operation of the plant and prepare corrective measures.



### Inventory management

We can develop a concept for inventory management and storage of seals and spare parts that is tailored to your individual requirements and the applicable quality specifications. We can also optimize your stocks held on site (e.g. in advance of major shutdowns) or at the EagleBurgmann Service Center.



### Consulting & engineering

When all of the seals in a plant have been recorded and analyzed, we then prepare standardization concepts. In the process, we optimize the number of seal types, sizes and materials used and improve the key figures for the plant. We provide advice on rules as well as legal regulations and illustrate necessary measures.



### Service agreements

Our customers are offered specific agreements which can be combined with our service modules, whether for individual seal systems, critical process elements, specific plant areas, or comprehensive seal service for complete plants.



### On-site service

This includes, among other things, inspection service and retrofitting of industrial plants. For that purpose we set up a service unit directly at your site, equipped with the basic range of seals or a stock tailored to your needs and staffed by qualified personnel. On site we produce the required gaskets on mobile cutting plotters, take care of the complete documentation and advise our customers during the selection and installation of seals.



### Seminars & training

Our EagleBurgmann Academy offers extensive further education programs on seal technology for servicing and maintenance personnel, engineering superintendents and production engineers from all sectors of the industry. We can provide group seminars, individual training courses, or courses tailored specifically to individual needs.

# EagleBurgmann Flange Integrity Management FIM



## Join now for complete flange reliability

- Application engineering support and troubleshooting with incorporation of experienced seal specialists
- Support in the selection, configuration and seal assembly from qualified service employees on site

- Inspection service during plant shutdown for quality assurance of the flange connections
- Taking of measurements, documentation and preparation of special solutions
- Reduction of material variety and development of standardization concepts together with the customer

- Monitoring of plant inspection on site, supervising, managed assembly
- Provision of sealing requirement for pipelines and instruments
- GasketXpress 24-hour service for engineered seals
- Customized packaging of gaskets
- Mobile flange facing for sealing surfaces
- Mechanical adaptations

- Certification of plant personnel as competent assemblers of bolted connections in compliance with DIN EN 1591-4 by our qualified trainers in our own modern training and practice rooms or on the customer's premises

Long operating periods of the plant, safely and without problems, dependable conformity with safety and environmental standard as well as emission values – these are the demands of our customers which we can fulfill with individually tailored services for plant shutdown and inspection services.

We have developed services from our proven TotalSealCare program specifically for our Flange Integrity Management (FIM). The benefits to you: Complete safety for all flange connections in your plant, reduction of costs, e.g. through standardization and sealing point optimization.

Our FIM full package includes all the necessary services from training installation personnel (EN 1591-4), taking in analyses, flange inspections and seal packaging, through to installation and complete documentation.

This is how our customers' plants achieve 100% flange safety – all from a single source.

**Make an appointment  
with us now for a non-binding  
consultation:**

**Telephone +49 (0) 8171 23 0**

## On-site service

### Satisfactory solutions to service requirements: Two case studies

One of our service trailers was called out to a German brown coal power station. Equipped with the necessary special machinery and tools, and accompanied by an EagleBurgmann expert in static seals for valves and flanged connections, it was able to fulfill a whole range of customer wishes over a period of 21 days. The deployment covered providing technical seal-related advice and support for the power station team, and particularly the conversion of regulating valves to sealing sets with live-loading system. Other points of focus were the direct provision or urgent procurement of seals and sealing materials, and the correct cutting to size of gaskets and compression packings.

The excellent cooperation and our proven expertise enabled us to win another extensive service contract just one month later.

The deployment for one of our service engineers started at one of the largest refineries in Europe. Over a 41-day period, our sealing expert supported both the refinery team and the local fittings service partner.

The services provided included measuring the dimensions and recording the seal compartments of over 600 fittings and cutting gaskets made from graphite, PTFE and fiber materials to size on site. In addition, special graphite-coated cover plate and serrated gaskets were supplied with diameters up to 800 mm.

After successful completion of this assignment, one year later the customer booked a two-man EagleBurgmann service team and our trailer with the mobile cutting plotter for gaskets for 26 days on-site service.

### **EagleBurgmann on-site service: Flexible and versatile**

Our services can be combined to create customized packages for any sealing point, e.g. in pumps and fittings, for flanges, apparatuses, housings, tanks, covers, heat exchangers and much more. A detailed inspection and record are taken working closely with the operator, i.e. all the fittings to be converted during an overhaul conforming to the Technical Instructions on Air Quality Control (TA-Luft). The resulting database then serves as the basis for the design, supply and implementation of the overhaul or conversion work. Any necessary adaptations will be carried out directly during the conversion.





**The benefits to our customers:**

- Application and industry knowledge, experience in all sealing and application matters
- Planning reliability and no need for the plant operator to arrange additional manpower (saving time and money)
- Sealing solutions all reflect the latest technology and conform to legal requirements
- Service trailer or container means flexibility in terms of location
- Can be combined with service for mechanical seals and expansion joints

**Our service portfolio:**

**Extensive and customer-focused**

- Advice and technical service (selection, design and support for seal assembly and installation) by qualified service staff on site
- Development of standardization concepts together with the customer, reduction of the variety of materials
- Taking of measurements, documentation and preparation of special solutions
- Complete documentation as per customer specification
- On-site creation of CAD drawings for seal cutting plotters
- Cutting service for gaskets, manually or on a CAD-based plotter
- Making up of tailored packings and gaskets on site
- Maintaining equipment databases (seals, fitting, pumps)
- Supervision and managed assembly (fittings, pumps)
- Assembly and commissioning
- Mobile flange facing for sealing surfaces up to 600 mm
- Mechanical adaptations (e.g. housing, spring sleeves)
- Approvals, certificates and certificate management
- Replenishment hotline to head office, 24-hour delivery service
- 24 / 48 hour delivery service for special seals





## On-site service

### Optimally equipped for every call-out:

#### Mobile service trailer and container

- Defined in-stock range of seals and materials to suit customer requirements
- Tools and equipment, e.g. for cutting seals and packings
- Fully-equipped IT and CAD workstations, calculation and documentation software

### ... and we bring high-quality products from the EagleBurgmann range with us on the call-out:

- Universal or engineered compression packings by the meter, pre-pressed rings or Burajet injectable packings
- Buratal valve gasket sets conforming to the TA Luft
- All types of gasket, such as fiber seals, gasket sheets and tapes made from graphite, PTFE and other materials in DIN/ASME dimensions or plotted
- Metal seals such as serrated seals, Spiraltherm and ring-type joints

### Satisfied customers from all branches of industry:

#### An extract from our list of references

##### Power stations and energy technology

- AXPO power stations, Switzerland
- EnBW AG - conventional and nuclear power stations (Germany)
- E.ON AG - conventional and nuclear power stations (Germany)
- RWE AG - conventional power stations (Germany)

##### Chemical industry

- BASF SE (Germany)
- DOW Olefinverbund GmbH (Germany)

##### Refinery

- BP Europa SE
- MiRO Mineraloelraffinerie Oberrhein GmbH & Co. KG (Germany)
- OMV AG/ Borealis AG (Austria)
- PCK Raffinerie GmbH (Germany)
- SC MAZEIKIU NAFTA - ORLEN Group (Lithuania)
- TOTAL Raffinerie Mitteldeutschland GmbH (Germany)

##### Paper and pulp industry

- StoraEnso AG (Germany)
- UPM Sales GmbH (Germany)

##### OEMs and industry services

- ANDRITZ AG Hydro (Germany)
- ASE Armaturen Service & Engineering GmbH (Germany)
- BIS Shared Services Leuna GmbH (Germany)
- Bopp & Reuther Messtechnik GmbH (Germany)
- Furmanite Technische Dienstleistungen GmbH (Germany)
- KSB AG (Germany)
- SABO-Armaturen Service GmbH (Germany)
- WISAG Aviation Service Holding, previously ThyssenKrupp HiServ GmbH (Germany)



# Modular sealing service

## TotalSealCare – EagleBurgmann’s Modular Seal Service

### Are you planning an overhaul for your plant?

Do you need to retrofit all valves to conform to the TA Luft within a specific timeframe? Do you not have enough specialist personnel or do you not want to keep large stocks of parts? It is in exactly these situations that our mobile seal service can help. You decide what needs to be done. We advise you, do all the preparations and stock our mobile workshop with all the seals, spare parts and materials and tools to precisely suit your needs. And on the agreed date, we arrive at your door with our trained and experienced technicians. And then we get to work.

### The benefits to you

- Reliable planning (costs and time)
- No unnecessary stocks
- No additional personnel required
- Sealing solutions all reflect the latest technology and conform to legal requirements
- Location-independent service container and trailer
- Our knowledge and experience of sealing technology for pumps and valves

### Gasket cutting service

EagleBurgmann has a number of gasket cutting centers strategically located around the world; here we can offer round-the-clock turn-round times for custom-made gaskets. Our state-of-the-art CNC machines can produce one-off gaskets or small to medium-sized batches flexibly and cost-effectively.

### The benefits to you

- No tool costs
- Almost every gasket material can be cut to size, however complex the shape.
- You can reduce your stock of spare parts since they can be delivered in just a few hours (if discussed in advance)
- Reduce your downtimes caused by unavailability of critical gasket components.



## GasketXpress production



### **A product portfolio tailored to your needs**

From stock we can supply: Pipe and flange gaskets to ASME and EN standard dimensions, including Spiraltherm spiral wound gaskets, serrated gaskets or ring-type joints. We also produce non-standard gaskets to the customer's specification or drawing, particularly gaskets for special equipment and heat exchangers. Our portfolio also includes soft gaskets cut to any shape on a CNC knife cutter.

### **Fast delivery to where you need it**

In urgent cases, we aim to deliver to you as soon as possible after receiving your order. Our GasketXpress center is in Germany. From here we supply our subsidiaries all across Europe and – if you want – we can deliver directly to your site. We also run other production units at various locations worldwide.

When you need a gasket now – Call your local EagleBurgmann contact.



# Installation training to DIN EN 1591-4



## Target group

Fitters, service technicians, supervisors and engineers who need to be able to fit sealing elements verifiably and to existing regulations, or are responsible for this work.

## Aim of the course

Certification as a competent assembler of bolted connections in compliance with DIN EN 1591-4.

## Topics

- Storage, transportation and handling of various sealing elements
- Work safety requirements while fitting and removing seals
- Flange shapes, assessing the sealing faces, selecting suitable seal types and geometries
- Seal installation: Selection of suitable tools and the fitting and tightening method, practical application of different fitting methods, investigation of the effects on the flange connection.
- Types of clamping element and their effects on the sealing system, correct selection and application of the required torques, introduction to commonly used bolts and aids. Illustration of the impact of lubrication and the bolt condition, interaction between bolt elongation, bolt force and sealing surface compression.
- Effect of fitting errors and faulty elements, reasons why sealing systems fail.
- Seal removal

## City

EagleBurgmann Germany  
Plant III, Wolfratshausen

Section overview



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[psi]

ASME

DN

[inch]

[MPa]

DIN

Bolts

EN

[Nm]

[mm]

PA

type

ANSI

## Standards and releases

for seals and sealing materials  
Germany and Europe

DIN EN 1514	DIN EN 12560	Flanges and their joints - Dimensions of gaskets for PN-designated flanges
DIN EN 1514-1	DIN EN 12560-1	Gasket from non-metallic materials with or without insert
DIN EN 1514-2	DIN EN 12560-2	Spiral-wound gaskets for use with steel flanges
DIN EN 1514-3	DIN EN 12560-3	Non-metallic soft seals with PTFE jacket
DIN EN 1514-4	DIN EN 12560-4	Metal seals with corrugated, flat or notched profile for steel flanges
	DIN EN 12560-5	Metal ring-type joint seals for steel flanges
DIN EN 1514-6	DIN EN 12560-6	Covered serrated metal gaskets for use with steel flanges
DIN EN 1514-7	DIN EN 12560-7	Covered metal jacketed gaskets for use with steel flanges
DIN EN 1514-8		Rubber O-ring gaskets for grooved flanges
DIN 2695		Diaphragm-weld packings and weld ring seals for flange connections
DIN 2696		Lenticular ring joint gaskets for flanged joints
DIN 28040		Gaskets for process vessels
DIN 3376		Gas meter connections
DIN 3376-1		Two pipes connection
DIN 3376-2		One pipe connection
DIN 3535		Gas supply seals
DIN 3535-5		Rubber/cork and rubber/cork synthetic fibre based gasket materials for use with gas valves, gas appliances and gas pipework; Safety requirements, testing
DIN 3535-6		Gasket materials based on fibres, graphite or polytetrafluoroethylene (PTFE) for gas valves, gas appliances and gas mains
DIN 7603		Sealing rings for pipe joints, blanking plugs, valves
DIN 28091		Technical delivery conditions for gasket sheets
DIN 28091-1		General requirements for gasket materials
DIN 28091-2		Requirements and testing for fibre-based gasket materials
DIN 28091-3		Requirements and testing for PTFE-based gasket materials
DIN 28091-4		Requirements and testing for graphite-based gasket materials

for seals and sealing materials  
USA and international

ASME B16.5	Flange and flanged connections NPS 1/2 to NPS 24
ASME B16.47	Large diameter steel flanges NPS 26 to NPS 60

## for flanges and their joints Germany and Europe

DIN EN 1092 (PN-designated)	DIN EN 1759 (class-designated)	Flanges and their joints Circular flanges for pipes, valves, fittings and accessories
DIN EN 1092-1	DIN EN 1759-1	Steel flanges
DIN EN 1092-2		Cast iron flanges
DIN EN 1092-3	DIN EN 1759-3	Copper alloy flanges
DIN EN 1092-4	DIN EN 1759-4	Aluminium alloy flanges
DIN 1591		Flange and their joints Design rules for gasketed circular flange connections
DIN 1591-1		Calculation
DIN 1591-2		Gasket parameters
DIN CEN/TS 1591-3		Calculation method for metal to metal contact flanged joints
DIN 1591-4		Qualification of personnel competency in the assembly of the bolted connections of critical service
DIN CEN/TS 1591-5		Calculation method for full face gasketed joints

## for flanges and their joints USA and international

ASME B16.20	Metallic gaskets for pipe flanges: Ring-type seals, spiral-wound gaskets and metal-jacketed gaskets
ASME B16.21	Non-metallic gaskets for pipe flanges

## Testing methods

DIN EN 13555	Flange and their joints Gasket parameters and test procedures relevant to the design rules for gasketed circular flange connections
DIN 28090	Static gaskets for flange connections
DIN 28090-1	Gasket parameters and test procedures
DIN 28090-2	Gaskets made from sheets - Special test procedures for quality assurance
DIN 28090-3	Gaskets made from sheets - Chemical resistance test procedures
ISO 15848	Industrial valves Measurement, test and qualification procedure for fugitive emissions
ISO 15848-1	Classification system and qualification procedures for type testing of valves
ISO 15848-2	Production acceptance test of valves
ISO 10497	Testing of valves Fire type-testing requirements

# Standards in pipeline construction

## Directives, laws and ordinances

Pressure equipment directives	PED 97/23/EC   Directive 2014/68/EU
Pressure equipment ordinance (14th ProdSG ordinance)	Druckgeräte V

## Technical principles

Graphical symbols for technical drawings, pipes	
General	DIN 2429-1
Functional representations	DIN 2429-2
Guide for procurement of power station plant, equipment and systems	
High-pressure piping systems	DIN EN 45510-7-1
Boiler and high pressure piping valves	DIN EN 45510-7-2
Pipework components - Definition and selection of DN (nominal size)	DIN EN ISO 6708
Fluid power systems and components – Nominal pressures	ISO 2944
Identification of pipelines according to the fluid conveyed	DIN 2403

## Metallic industrial piping

General	DIN EN 13480-1
Materials	DIN EN 13480-2
Design and calculation	DIN EN 13480-3
Fabrication and installation	DIN EN 13480-4
Testing and inspection	DIN EN 13480-5
Additional requirements for buried piping	DIN EN 13480-6
Guidance on the use of conformity assessment procedures	DIN EN 13480-7
Additional requirements for aluminium and aluminium alloy piping	DIN EN 13480-8

## Technical basic standards

Definition and classification of grades of steel	DIN EN 10020
Designation systems for steels	
Short names	DIN EN 10027-1
Numbering system	DIN EN 10027-2
Designation systems for steels, additional symbols	CR 10260
Seamless and welded steel tubes - Dimensions and masses per unit length	DIN EN 10220
Metallic products - Types of inspection documents	DIN EN 10204

## Publically available specifications

Pipe classes for process plants	
General principles for creating pipe classes based on EN 13480	PAS 1057-1
Fittings – Special models	PAS 1057-5
Technical delivery conditions for pipe components made from alloyed and unalloyed steels with fixed properties at high temperatures, group 1.1 and 1.2 (CR ISO 15608)	PAS 1057-10
Technical delivery conditions for pipe components made from austenitic stainless steels, group 8.1 (CR ISO 15608)	PAS 1057-11
Standard pipe classes PN 10 to PN 100 pipe components made from unalloyed and alloyed steels with fixed properties at high temperatures, group 1.1 and 1.2 and austenitic stainless steels, group 8.1 (CR ISO 15608)	PAS 1057-100



### Seamless steel tubes for pressure purposes

Non-alloy steel tubes with specified room temperature properties	DIN EN 10216-1
Non-alloy and alloy steel tubes with specified elevated temperature properties	DIN EN 10216-2
Alloy fine grain steel tubes	DIN EN 10216-3
Non-alloy and alloy steel tubes with specified low temperature properties	DIN EN 10216-4
Stainless steel tubes	DIN EN 10216-5

### Welded steel tubes for pressure purposes

Non-alloy steel tubes with specified room temperature properties	DIN EN 10217-1
Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties	DIN EN 10217-2
Alloy fine grain steel tubes	DIN EN 10217-3
Electric welded non-alloy steel tubes with specified low temperature properties	DIN EN 10217-4
Submerged arc welded non-alloy steel tubes with specified elevated temperature properties	DIN EN 10217-5
Submerged arc welded non-alloy steel tubes with specified low temperature properties	DIN EN 10217-6
Stainless steel tubes	DIN EN 10217-7

### Sheet metal material and forged parts

Steel forgings for pressure purposes (general requirements, ferritic and martensitic steels, nickel steels, weldable fine grain steels with high proof strength, martensitic, austenitic, duplex steels)	DIN EN 10222-1 to 5
Flat products made of steels for pressure purposes	DIN EN 10028-1 to 6

### Pipelines for gas and combustible liquids

Petroleum and natural gas industries - Steel pipes for pipeline transportation systems	DIN EN ISO 3183
Steel pipes for pipelines for combustible fluids - Requirement class C	DIN EN 10208-3

### Pipe accessories

Steel threaded pipe fittings	DIN EN 10241
Threaded pipe fittings in malleable cast iron	DIN EN 10242
Butt-welding pipe fittings from non alloy and ferritic alloy steels with specific inspection requirements	DIN EN 10253-2
Butt-welding pipe fittings from stainless steels with specific inspection requirements	DIN EN 10253-4
Corrugated metal hoses and hose assemblies	DIN EN ISO 10380
Corrugated metal hose assemblies for pressure applications	DIN EN 14585
Metal bellows expansion joints for pressure applications	DIN EN 14917

## Standards in pipeline construction



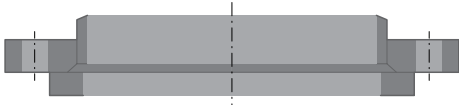
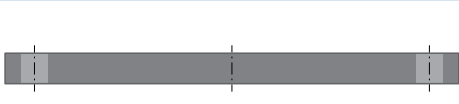
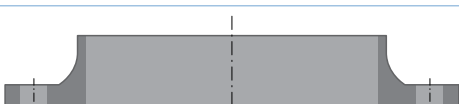





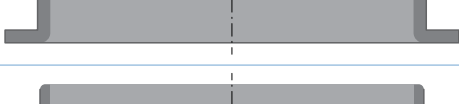
### Guidelines for ordering and manufacturing pressure equipment as per the PED

General requirements	PAS 1010-1
Unfired pressure vessels	PAS 1010-2
Industrial piping	PAS 1010-3
Pressure-maintaining components	PAS 1010-4
Components with safety functions	PAS 1010-5
Assemblies	PAS 1010-6

### Flanges and their joints

<b>Circular flanges by PN</b>	
Made from steel	DIN EN 1092-1
Made from cast iron	DIN EN 1092-2
Made from copper alloys	DIN EN 1092-3
Made from aluminium alloys	DIN EN 1092-4
<b>Gaskets for PN-designated flanges</b>	
Gasket from non-metallic materials with or without insert	DIN EN 1514-1
Spiral-wound gaskets for use with steel flanges	DIN EN 1514-2
Non-metallic soft seals with PTFE jacket	DIN EN 1514-3
Metal seals with corrugated, flat or notched profile for steel flanges	DIN EN 1514-4
Covered serrated metal gaskets for use with steel flanges	DIN EN 1514-6
Covered metal jacketed gaskets for use with steel flanges	DIN EN 1514-7
Round sealing rings	DIN EN 1514-8
<b>Bolts and nuts</b>	
Selection of bolts and nuts	DIN EN 1515-1
Classification of bolt materials for steel flanges, PN designated	DIN EN 1515-2
Classification of bolt materials for steel flanges, class designated	DIN EN 1515-3
Selection of bolting for steel flanges subject to the Pressure Equipment Directive	DIN EN 1515-4
<b>Design rules for gasketed circular flange connections</b>	
Calculation methods	DIN EN 1591-1
Background information	DIN EN 1591-1 suppl. 1
Gasket parameters	DIN EN 1591-2
Calculation method for metal to metal contact type flanged joint	DIN CEN/TS 1591-3
Qualification of personnel competency in the assembly of the bolted connections of critical service pressurized systems	DIN EN 1591-4
Calculation method for full face gasketed joints	DIN CEN/TS 1591-5
<b>Circular flanges for pipes, valves, fittings and accessories, class-designated</b>	
Steel flanges, NPS 1/2 to 24	DIN EN 1759-1
Copper alloy flanges	DIN EN 1759-3
Aluminium alloy flanges	DIN EN 1759-4
<b>Gaskets for class-designated flanges</b>	
Gasket from non-metallic materials with or without insert	DIN EN 12560-1
Spiral-wound gaskets for use with steel flanges	DIN EN 12560-2
Non-metallic soft seals with PTFE jacket	DIN EN 12560-3
Metal seals with corrugated, flat or notched profile for steel flanges	DIN EN 12560-4
Metal ring-type joint seals for steel flanges	DIN EN 12560-5
Covered serrated metal gaskets for use with steel flanges	DIN EN 12560-6
Covered metal jacketed gaskets for use with steel flanges	DIN EN 12560-7
Quality assurance inspection and testing of gaskets in accordance with the series of standards EN 1514 and EN 12560	DIN EN 14772
Gasket parameters and test procedures relevant to the design rules for gasketed circular flange connections	DIN EN 13555

# Flange types to DIN EN 1092-1

Type	previous standard	Profile	Flange
01	DIN 2573/2576 + 28031		Smooth flange for welding
02	DIN 2641/42 + 2655/56		Slip-on flange for plain collar (see type 32) or lapped pipe end (see type 33)
04	DIN 2673		Slip-on flange for welding neck (see type 34)
05	DIN 2527		Blind flange
11	DIN 2627 to 2635		Weld-on flange
12	DIN 86029 + 86030		Hubbed slip-on flanges for welding
13	DIN 2558/2565 to 2567		Scewed flanges with socket
21	DIN 2527		Integral flange
32	DIN 2641/42 + 2655/56		Plain collar
33	DIN 2641 + 2642		Lapped pipe end
34	DIN 2673		Short stub end

## Seal faces to DIN EN 1092-1 (2018)



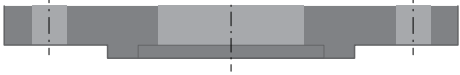
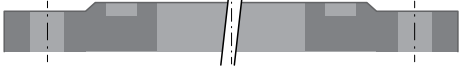


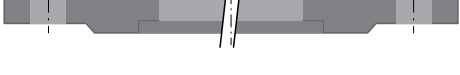


The machining method specified in DIN EN 1092-1(2018) is "turning". According to this standard, "turning" comprises any machining method that creates either concentric or spiral grooves. The cutting edge radius of the tool for styles A, B1, E and F should be at least 1 mm. The radius is not defined for styles B2, C, D, G and H.

Seal face to DIN EN 1092-1	Cutting edge radius of the tool [mm]	R <sub>a</sub> [μm] to DIN EN 1092-1	R <sub>z</sub> [μm] to DIN EN 1092-1
Style A	1.0	3.2 ... 12.5	12.5 ... 50
Style B1 <sup>2)</sup>	1.0	3.2 ... 12.5	12.5 ... 50
Style B2 <sup>3)</sup>	-	0.8 ... 3.2	3.2 ... 12.5
Style C		0.8 ... 3.2	3.2 ... 12.5
Style D		0.8 ... 3.2	3.2 ... 12.5
Style E	1.0	3.2 ... 12.5	12.5 ... 50
Style F	1.0	3.2 ... 12.5	12.5 ... 50
Style G		0.8 ... 3.2	3.2 ... 12.5
Style H		0.8 ... 3.2	3.2 ... 12.5

<sup>1)</sup> no finer than 40 μm

<sup>2)</sup> normal application PN 2.5 ... PN 40

<sup>3)</sup> normal application PN 63 and PN 100

Profile	Flange	Previous standard	Seal face as per previous standard	Note
	without raised face	DIN 2573/6	Style A	no requirement
			Style B	$R_z = 160$ , turned <sup>1)</sup>
	with raised face	DIN 2630 to 2635	Style C	$R_z = 160$ , turned <sup>1)</sup>
			Style D	$R_z = 40$ , turned
			Style E	$R_z = 16$ , turned
	with spring	DIN 2512	Style F	
	with groove		Style N	
	with projection	DIN 2513	Style V13	
	with recess		Style R13	
	with projection for O-rings	DIN 2514	Style V14	
	with groove for O-rings		Style R14	
	Flanges for lenticular seals	DIN 2696	Style L	
	Flanges for diaphragm-weld packings	DIN 2695	Style M	

## Preload forces and tightening torques

for stretch bolts at 20 °C

Bolt diameter	Material	5.6		8.8		10.9		12.9		1.1181 Ck 358		1.7258 24 CrMo 5			
		min. yield strength [MPa]		300		660		940		1,100		280		440	
		Preload force [kN]		Tightening torque [N]		[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]
M 10		-	-	-	-	-	-	-	-	7.5	12	11.7	20		
M 12		-	-	-	-	-	-	-	-	11	23	17.3	36		
M 14		-	-	-	-	-	-	-	-	15.3	35	24	55		
M 16		-	-	-	-	-	-	-	-	22.2	58	34.8	92		
M 18		-	-	-	-	-	-	-	-	25.9	80	40.7	125		
M 20		-	-	-	-	-	-	-	-	34.5	110	54.2	175		
M 22		-	-	-	-	-	-	-	-	44.3	150	69.5	240		
M 24		-	-	-	-	-	-	-	-	49.8	190	78.2	300		
M 27		-	-	-	-	-	-	-	-	64.5	275	101.5	435		
M 30		-	-	-	-	-	-	-	-	81.3	390	128	610		
M 33		-	-	-	-	-	-	-	-	100	520	157	820		
M 36		-	-	-	-	-	-	-	-	116	660	182.5	1,050		
M 39		-	-	-	-	-	-	-	-	143	880	225	1,400		
M 42		-	-	-	-	-	-	-	-	62.5	1,100	255.5	1,700		
M 45		-	-	-	-	-	-	-	-	194	1,400	305	2,150		
M 48		-	-	-	-	-	-	-	-	216.5	1,650	340	2,600		
M 52		-	-	-	-	-	-	-	-	258.5	2,001	407	3,350		
M 56		-	-	-	-	-	-	-	-	297.5	2,650	468	4,150		

for double-end bolts at 20 °C

Bolt diameter	Material	5.6		8.8		10.9		12.9		1.1181 Ck 358		1.7258 24 CrMo 5			
		min. yield strength [MPa]		300		660		940		1,100		280		440	
		Preload force [kN]		Tightening torque [N]		[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]
M 10		12.2	21	26	44	38.2	64	44.7	75	11.4	19	17.9	30		
M 12		17.6	35	37.6	75	55.3	110	64.7	130	16.5	33	29.9	52		
M 14		24.2	56	51.5	120	75.7	175	88.6	205	22.5	52	35.4	82		
M 16		33	85	70.3	180	103.5	265	121	310	30.8	79	48.4	125		
M 18		40.3	120	88.7	260	126.5	370	148	430	37.6	110	59.1	170		
M 20		51.5	165	113	360	161	520	188.5	600	48	155	75.5	240		
M 22		63.6	220	140	485	199.5	690	233.5	810	59.4	205	93.3	320		
M 24		74.1	285	163	630	232.5	890	272	1050	69.2	265	108.5	415		
M 27		96.4	415	212	910	302	1,300	353	1500	90	390	141.5	610		
M 30		118	570	259	1,250	369	1,800	432	2100	110	530	173	830		
M 33		146	760	321	1,700	457	2,400	534	2800	136	710	214	1,100		
M 36		172	980	377	2,150	538	3,100	629	3600	160	920	251.5	14,500		
M 39		205	1,250	451	2,800	642	3,950	752	4650	191.5	1,200	301	1,850		
M 42		235	1,550	517	3,450	737	4,900	862	5,800	219.5	1,450	345	2,300		
M 45		273	1,950	601	4,300	855	6,100	1,000	7,100	255	1,800	400	2,850		
M 48		309	2,400	679	5,200	967	7,400	1,130	8,700	288	2,200	453	3,500		
M 52		370	3,000	813	6,700	1,160	9,500	1,355	11,100	345	2,850	542	4,450		
M 56		426	3,800	938	8,300	1,335	11,800	1,065	13,900	398	3,500	625	5,500		

Preload forces [kN] and tightening torques [N] for stretch and double-end bolts at 70% of the minimum yield strength  
Friction coefficient = 0.14



1.7709 21 CrMoV 57		1.7711 40 CrMoV 47		1.4923 X 22 CrMoV		1.4913 X 19 CrMoVNbN 111		1.4986 X 8 CrNi MoBNb 1616		2.4952 NiCr 20 TiAl		for calculation for other yield strengths	
550		700		600		780		500		600		1,000	
[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]
14.6	24	18.6	31	16	27	20.8	35	13.3	22	16	27	26.6	44.5
21.6	44	27.4	57	23.5	49	30.6	63	19.6	40	23.5	49	39.2	80.5
30	69	38.2	88	32.8	75	43.6	98	27.3	63	32.8	75	54.6	125
43.5	115	55.4	145	47.5	125	61.7	160	39.6	105	47.5	125	79.1	208
50.8	155	64.7	195	55.4	170	72.1	220	46.2	140	55.4	170	92.4	280
67.8	220	86.2	280	73.9	240	96.1	310	61.6	200	73.9	240	123.2	399
87	300	110.5	380	94.9	325	123.5	425	79.1	270	94.9	325	158.2	545
97.8	370	124.5	475	106.5	405	138.5	530	88.9	340	106.5	405	177.8	875
126.5	545	161	690	138	590	179.5	770	115	495	138	590	230.3	985
160	770	203	980	174.5	840	226.5	1,100	145.5	700	174.5	840	290.5	1,395
196.5	1,000	250	1,300	214	1,100	278.5	1,450	178.5	930	214	1100	357	1,860
228.5	1,300	290.5	1,650	249	1,400	324	1,850	207.5	1,200	249	1400	415.1	2,365
281	1,750	358	2,200	307	1,900	399	2,450	255.5	1,550	307	1900	511	3,150
319	2,100	406	2,700	348	2,300	453	3,000	290	1,950	348	2300	580.3	3,850
381	2,700	485	3,450	415	2,950	540	3,850	346	2,450	415	2950	692.3	4,900
425	3,250	541	4,150	464	3,550	603	4,600	386	2,950	464	3550	773	5,900
508	4,150	647	5,300	554	4,550	721	5,900	462	3,800	554	4550	924	7,550
585	5,200	744	6,600	638	5,600	829	7,300	532	4,700	638	5600	1,036	9,400

1.7709 21 CrMoV 57		1.7711 40 CrMoV 47		1.4923 X 22 CrMoV		1.4913 X 19 CrMoVNbN 111		1.4986 X 8 CrNi MoBNb 1616		2.4952 NiCr 20 TiAl		for calculation for other yield strengths	
550		700		600		780		500		600		1,000	
[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]	[kN]	[Nm]
22.3	38	28.4	48	24.4	41	31.7	53	20.3	34	-	-	40.6	68.5
32.3	65	41.2	82	35.3	71	45.9	92	29.4	59	-	-	85.8	118
44.3	100	56.4	130	48.3	110	62.8	145	40.3	93	-	-	80.5	187
60.4	155	76.9	200	65.9	170	85.7	220	55	140	-	-	109.9	283
73.9	215	94.1	275	80.6	235	105	305	67.2	195	-	-	134.4	393
94.3	300	120	385	103	330	134	425	85.8	275	-	-	171.5	548
116.5	405	148.5	510	127.5	440	165.5	570	106	365	-	-	212.1	733
136	520	173	660	148.5	570	192.5	740	123.5	475	-	-	247.1	947
176.5	760	225	970	193	830	250.5	1,100	160.5	690	-	-	321.3	1,385
216	1,050	275	1,300	235.5	1,100	306	1,500	196.5	950	-	-	392.7	1,891
267	1,400	340	1,800	291.5	1,500	379	2,000	243	1,250	-	-	486	2,540
315	1,800	400	2,300	343	1,950	446	2,550	286	1,650	-	-	571.9	3,273
376	2,300	478	2,950	410	2,500	533	3,300	342	2,100	-	-	683.2	4,220
431	2,900	549	3,650	470	3,150	612	4,100	392	2,600	-	-	784	5,230
500	3,600	637	4,500	546	3,900	710	5,100	455	3,200	-	-	910	6,480
566	4,300	720	5,500	617	4,700	803	6,100	515	3,950	-	-	1,029	7,880
678	5,600	862	7,100	739	6,100	961	7,900	616	5,100	-	-	1,232	10,100
782	6,900	995	8,800	853	7,600	1110	9,800	711	6,300	-	-	1,421	12,600

## Other EagleBurgmann products

### Mechanical seals for pumps

EagleBurgmann has an entire range of liquid and gas lubricated seals for sealing pump shafts. These are available as standard seals or special versions, as single or multiple seals. There is also a full range for all categories and arrangements as defined in API 682. A wide range of high-grade material qualities and surface technologies, such as the innovative DiamondFace coating, rounds off the program.



### Carbon floating ring seals

The carbon floating ring seal is a maintenance-free compact labyrinth cartridge seals with high operational performance and low leakage. Movable, self-adjusting sealing rings seal radially to the shaft and make a very small operating gap possible. The seal requires no additional lubrication and is designed for dry contacting. Carbon floating ring seals can be used for Atex applications, toxic media and media with a high solids content, flue gases, dusts and powder, vapours and liquid mist, oil mist and penetrating oils, in addition to pure gases.

### Mechanical seals for agitators

For sealing in normal and sterile processes. Economic and technical requirements are completely satisfied through the rugged construction designed for practical application and the choice of materials.



### Mechanical seals for compressors

The complete sealing program for all types of process gas compressor from a single source. Available as a single / double seal, tandem and tandem seal with intermediate labyrinth. Rugged, non-wearing and contract-free for the most stringent of permanent requirements.



### Magnetic couplings

The most consistent sealing technology for areas of application with very high requirements. Hermetically sealed magnetic couplings guarantee leak-free and maintenance-free pumping and mixing. Media are reliably kept in closed system circuits.



### Expansion joints

As the flexible connecting elements in air and exhaust ducts and also pipeline systems, the task of expansion joints is to compensate pressure and temperature fluctuations, vibrations and misaligned joints. They also must be reliably tight and media-resistant. Custom designs in the form of soft or metal expansion joints are the first choice, depending on the specific application.

### Special products

Special applications demand individual and innovative solutions. These must be based on excellent fundamental knowledge, many years' experience and - most of all - the ability to implement ideas in practice.



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

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, power, water and many more. About 6,000 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need. [Rely on excellence.](#)

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