General information

Product information

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■ Index and product compare

Seals can be broadly sub-divided into static and dynamic seals.

Static seals

These seals are used to seal two elements that are permanently stationary in relation to each other. Examples of this are pipe sections joined by means of flanges and gasket to guarantee the leakproof transport of e.g. liquids or gases. Parts of equipment such as e.g. heat exchangers are also provided with static seals to prevent leakage and to make the efficiency of the appliance as high as possible. Static seals can be sub-divided into:

- Metallic and semimetallic gaskets (camprofile gaskets, spiral wound gaskets, Ring Joint gaskets, lens (shaped) rings, welded membranes, superseals)
- Sheet gaskets (Aramid fibre, graphite, PTFE)

Dynamic seals

This is the sealing of two elements that in are motion in relation to each other. This can be rotating as well as oscillating movements. Examples of this are e.g. the stems of valves and piston-rods in pneumatic cylinders. Higher (peripheral) speeds occur on the output shafts of e.g. pumps or compressors. These applications require very special seals, which are referred to as mechanical seals.
In this catalogue we restrict ourselves to the product groups gland packings and O-rings.

General sealing technology

Seals form an essential part of the pipework and equipment in modern chemical and petrochemical installations (e.g. heat exchangers). Installation reliability depends for great part on the correct functioning of seals. Clearly, with modern technology and the increasingly extensive environmental requirements, the reliability of seals must taken seriously.
The primary demands on a seal are the following:

- temperature resistance
- compressive strength
- resistance to the medium to be sealed

Besides choosing the correct type of seal and/or the correct sealing material, it is of great importance that the flange parts between which the gasket must be fitted are suitable for the chosen seal with regards to flange roughness and it must be possible to generate sufficient gasket pressure to realize the seal.
Another, very important factor is the installation of the gasket. For critical uses in particular, it is of crucial importance that the gasket is installed with the correct gasket stress being applied. It is highly desirable to use a torque wrench to ensure that the bolts are tightened in a balanced and controlled manner.
An accurate calculation of the flange joint can be made for heat exchangers as well as for flange joints. This is generally not necessary for standard flanges but for non standard equipment a calculation is often made. This calculation indicates what forces will be present in the flange joint during installation and operation. The gasket and bolt forces are also evaluated.

Sealing principle

Gaskets are used to realize a static seal between two elements that are stationary in relation to each other, and to maintain this seal during operating conditions with varying pressures and temperatures.
If it would be possible to manufacture flanges that are very smooth and that would connect perfectly to each other and would maintain perfect contact during the most extreme operating conditions, there would be no need for gaskets. In practice this is not possible due to:

- The dimensions of the piping flanges or equipment flanges
- In practice it is impossible to keep such smooth flange facings undamaged during handling
- Corrosion and erosion will affect the flange facings during duty.

As a consequence of this a sealing material, in the form of a gasket, must be fitted between the flanges. In general, external forces (mainly bolt forces) will compress the sealing material into the microscopic surface unevenness of the flanges to be connected.
This in turn leads to the following points that must be taken into account for the design of a well-functioning seal:

- There must be sufficient (bolt) force available to initiate the seal, i.e. during the fitting phase, there must be sufficient gasket load available to cause the sealing material to flow into the (micro) flange unevennesses .
- Due to internal system pressure, hydrostatic forces tend to move the flanges away from each other and in this way reduce the gasket stress. During operating conditions (under pressure and temperature) sufficient gasket stress must remain to ensure that the flanges/gasket combination stays a tight unit and that no leakage or blowout takes place.
- The choice of the sealing material must be such that it is can withstand forces exerted by the joint and internal pressure on the gasket material. Special account must be taken of the mechanical strength properties in the temperature range within which the gasket is deployed. The gasket material should also be resistant to the medium to be sealed in combination with the temperature.

Surface roughness

Another important factor for obtaining a good seal is the surface roughness of the flange facings. In general it can be stated that for soft gasket material the flange facings need to be rougher than for metallic gaskets.

- For soft gasket material such as Novus® sheet gaskets and PTFE, the roughness of the flange facings must ensure that the mechanically rather weak gasket material is not blown out as a result of the internal pressure. The flange roughness ensures increased friction between gasket material and flange facing (stock finish)
- Conversely, for metallic gaskets the flange facings must be very smooth to allow the metallic sealing material to flow into the unevenness of the flange under high gasket stress (special finish).
- For semi-metallic gaskets such as spiral wound gaskets and camprofile gaskets the required flange roughness lies in between (smooth finish)

Flange roughnesses

Special finish	0.8 – 1.6 µm Ra	32 – 64 µinch
Smooth finish	3.2 – 6.3 µm Ra	125 – 250 µinch
Stock finish	6.3 – 12.5 µm Ra	250 – 500 µinch

Recommended flange roughness per gasket sort

	Stock finish	Smooth finish	Special finish
Fibre sheet gasket (Novus®)	X	X	
Uniflon®	X	X	
Graphite sheet gasket	X	X	
Spiral wound gaskets	X	X	
Camprofile gaskets		X	X
Metal jacketed gaskets			X
Ring Type Joints			X

DIN 2505 - gasket factors

Gasket type	Material	m	õVU	õVO	õBO				
					[N/mm2]				
					100 °C	200 °C	300 °C	400 °C	500 °C
Sheet gaskets	Uniflon 50 – 2 mm	1.3	22	100	50	40			
Sheet gaskets	Uniflon 51 – 2 mm	1.3	30	100	60	45			
Sheet gaskets	Uniflon 53 – 2 mm	1.3	30	100	60	45			
Sheet gaskets	Novus 30 – 2 mm	2.0	25	150	80	50			
Sheet gaskets	Novus 34 – 2 mm	2.0	30	180	100	60			
Sheet gaskets	Novus Graftec – 2 mm	2.5	21	120	100	80	60		
Sheet gaskets	Econgraph FI – 1.5mm	1.3	20	100	100	80	60	50	
Sheet gaskets	Econgraph TI – 1.5mm	1.3	30	160	160	150	140	120	
SPW one-sided closed form	SS / Graphite, PTFE	1.3	20	110	110	100	95	85	
SPW two-sided closed form	SS / Graphite, PTFE	1.3	20	300	170	160	150	140	130
Camprofile gaskets	SS / Graphite, PTFE	1.1	20	450	430	420	390	360	340

õVU = lower limit at assembling, õVO = upper limit at assembling, õBO = upper limit at operational conditions

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The gasket is generally seen as the most important component of a seal. Flanges and bolts are also important parts. All components together ensure the correct functioning of the seal.

Flanges must be sufficiently rigid and have the correct surface roughness. The flange must also be very clean. Damage to the flange surface, especially in a radial direction, are potential causes of leakage. The gasket must be chosen in such a way that it is suitable for the intended use with regards to pressure, temperature resistance and resistance to the medium. Gaskets may never be re-used.

The bolt force must be sufficient, particularly at the operating temperature. If bolts are re-used, they must be inspected, cleaned and oiled or lubricated with special purpose products that are used to reduce the coefficient of friction. Besides the correct selection of the gasket, flanges and bolts, the correct fitting of the gasket is of great importance.
At important and/or non-standard flange joints we recommend making a calculation to determine the correct gasket load, bolt forces and the associated tightening torques to be applied.
For the correct assembling of gaskets, the following points must be taken into account:

1. Use a torque wrench
Without the use of a torque wrench, it is practically impossible to tighten the bolts to the correct bolt tension and to distribute the total bolt force evenly across the gasket surface. For the seal to function properly, it is important that the total required bolt force is distributed evenly across the surface of the gasket.

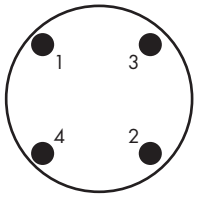
2. Centre the gasket correctly
It is important that the gasket is properly centered when fitting, especially when using "stretch bolts". Apart from the chance that the piping can be partially blocked by the gasket, an asymmetric loading of the flange construction can take place, meaning that the gasket force is unevenly distributed across the surface of the gasket.

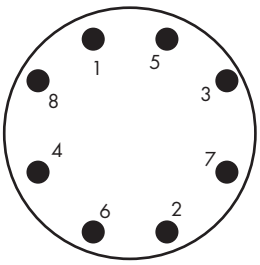
3. Don't use any add. joining mat. (glue, grease)
The use of joining materials such as glue and grease to keep the gasket in place during fitting is absolutely prohibited. Under operation conditions (raised temperature) these materials burn, leading to a loss of mass, which results in reduced gasket stress at these points. In many cases, this will result in leakage. The use of grease as a joining material causes a reduction in the friction between the gasket and flange surface. The consequence of this can be that the gasket blows out.

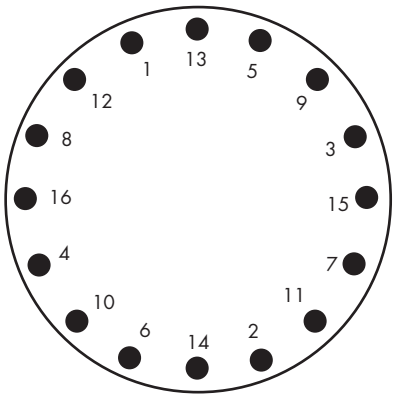
4. Nuts, bolts and washers
As stated earlier, bolts must be inspected and lightly oiled or lubricated with special purpose products that are used to reduce the coefficient of friction between nut and bolt. As the greatest friction occurs between nut and flange, the use of special flat washers is recommended. The contact between the nut and washer should also be lubricated with a product that reduces the friction.

5. Flange spreader
The installation of gaskets is simplified, by the use of tools that push the flanges apart and thereby improves the accessibility of the flange facings.

6. Tighten bolts / nuts crosswise
To distribute the total required bolt force evenly across the surface of the gasket it is important that all bolts are tightened to the same bolt tension. To achieve this it is necessary that the required tightening torques are applied in several steps. This usually happens in three steps: 50% - 80% - 100%. This tightening must occur crosswise. Below you will find examples of crosswise tightening:







After the last bolt is tightened to the correct torque, all bolts must be checked one more time against the target torques.

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econosto®

Rubber gaskets

- fig. 1021133 (CR)
- fig. 1021533 (CR)
- fig. 1021163 (EPDM)
- fig. 1021563 (EPDM)
- fig. 1021173 (NBR)
- fig. 1021573 (NBR)
- fig. 1021192 (SBR)
- fig. 1021592 (SBR)

- Max. temp.: 120 °C
- PN 10-PN16
- Gasket stress 2 - 10 N/mm²
- SBR - NBR - EPDM - CR
- DIN - ASME

General

Flat-faced rubber gaskets are generally used in low pressure and temperature applications. Max. 16 bar pressure range and maximum temperature up to 120 °C, depending on the rubber grade used.
Fibre-reinforced rubber gaskets are often used in PN 10-16 pressure rating applications to increase blow-off efficiencies.
Chemical resistance depends strongly on rubber quality.
Rubber gaskets are often used on so-called Full-Face flanges. The outside diameter of these gaskets is equal to the outside diameter of the flange and is provided with holes for the bolts.
Rubber gaskets seal well at very low gasket stresses (2 N/mm²) and can withstand up to approximately 10 N/mm² loads.

Chemical resistance tables

See chemical resistance tables in section IA-05.

Frequently used rubber grades

SBR – Styrene butadien rubber 70° Shore (A)
Frequently used, economical synthetic rubber quality for simple applications such as cold water, dredging, etc.
Maximum service temperature +70 °C
Minimum service temperature -30 °C

NBR – Acrylnitril butadien rubber 65° Shore (A)
Very good oil-resistant type for flange gaskets in oil, petrol (leaded) and gas.
Maximum service temperature +100 °C
Minimum service temperature -20 °C

EPDM – Ethylene propylene rubber 70° Shore (A)
Not oil-resistant. Suitable for acid and caustic solution and hot water applications
Maximum service temperature +120 °C
Minimum service temperature -40 °C

CR - Chloroprene rubber 65° Shore (A)
A very common type of rubber for gaskets. Reasonably resistant to oil and seawater
Maximum service temperature +70 °C
Minimum service temperature -10 °C

Gaskets

Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting and water-jet cutting, different sizes and shapes can be supplied (on request) at short notice.

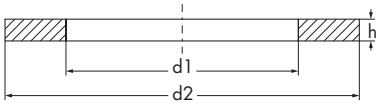
Remarks

The rubber gaskets are also available with FF (Full Faced, with holes) and with one or two reinforcements. Please specify your preference with the order.

Ordering information

Ordering code	Material	Sheet/Flange standard	Thickness [mm]
1021592	SBR	Rings/EN(DIN) RF	3
1021192	SBR	Rings/ASME RF	3
1021573	NBR	Rings/EN(DIN) RF	3
1021173	NBR	Rings/ASME RF	3
1021563	EPDM	Rings/EN(DIN) RF	3
1021163	EPDM	Rings/ASME RF	3
1021533	CR	Rings/EN(DIN) RF	3
1021133	CR	Rings/ASME RF	3

When ordering, specify the following data: Figure number, nominal size, pressure rating, thickness and reinforcements, if desired.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).



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Novus® 30

- Aramid / NBR
- Max. temp.: 250 °C
- General purpose
- Potable water
- Gas approval
- Colour: orange

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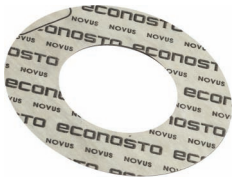

Novus® 34

- Aramid / NBR
- Anti-stick
- Max. temp.: 250 °C
- High quality
- Potable water
- Gas approval
- Oxygen approval
- Colour: Natural (light grey)

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Graftec®

- Aramid / Graphite
- General purpose
- Max. temp.: 300 °C
- Potable water
- Oxygen approval
- Easy to process
- Colour: Black

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Oleonoid (Oil paper)

- Very economical
- Cellulose fibres
- Oil and fuel resistant
- Temp. max.: 120 °C
- Colour: Brown

econosto®

Novus® 30 is a high quality synthetic fibre sheet comprising a mixture of Polyaramid and inorganic fibres bonded with a superior nitrile rubber binder. It is a general purpose gasket sheet for hot and cold water, steam, oils, fuels, gases and a wide range of generally used chemicals.

Temperature range
Maximum short term service temperature 400 °C
Maximum continuous service temperature 250 °C
Maximum operating temperature in hot water and steam: 200 °C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Novus® 30 complies with the requirements of BS 7351 Grade Y.
Novus® 30 is registered under the DIN-DVGW Reg. No.93 01 e 845 (Corresponding to DIN 3535 part 6FA). For use in gas applications.
Novus® 30 is registered under the WRAS Reg. No. 0008505 Potable water use (WRC).

Sheets
Novus® 30 sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes available on request.
Novus® 30 can also be supplied with a metal gauze wire insert, the Novus® 30 Metallic.

Gaskets
Flange gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		2.0
Tensile strength (Mpa)	ASTM F152	13
Compressibility (%)	ASTM F36	10
Recovery (%)	ASTM F36	50
Residual stress (Mpa)	BS 7531	15
Residual stress (Mpa)	DIN 52913	-
Gas permeability (cc/min)	BS 7531	0.1
ASTM Oil No. 1 (%)	Thickness increase	1
ASTM Oil No. 3 (%)	Thickness increase	2
ASTM Fuel B (%)	Thickness increase	3

Ordering information

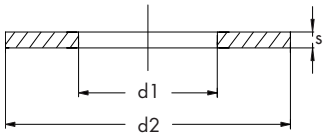
Ordering code	Sheet/Flange standard	Thickness [mm]
1001050	Sheet 1500x1500	0.5 - 0.75 - 1 - 1.5 - 2 - 3
1002550	Rings/EN(DIN) RF	1.5 - 2
1002150	Rings/ASME RF	1.5 - 2

Specify the following data when ordering:
Figure number and thickness. For flange gasket, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness of the gasket (s).

novus SEALING LIMITED

Novus® 30
- fig. 1001050
- fig. 1002150
- fig. 1002550

- Aramid / NBR
- Max. temp.: 250 °C
- General purpose
- Potable water
- Gas approval
- Colour: orange



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econosto®

Novus® 34 is a very high quality asbestos-free gasket sheet material with superior properties. Novus® 34 is produced from a special mixture of heat resistant fibres with a high quality nitrile rubber binder. Novus® 34 has a very high tensile strength, excellent impermeability to gas, as well as a very high resistance to flow at elavated pressures and temperatures. Novus® 34 has standard an anti-stick coating. It is a general purpose gasket for oils, solvents, gases, steam and almost all diluted acids and alkalis.

Temperature range
Maximum short term service temperature 450°C
Maximum continuous service temperature 250°C
Maximum operating temperature in hot water and steam: 250°C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Novus® 34 complies with the requirements of BS 7531 Grade X.
Novus® 34 is registered under the DIN-DVGW Reg. No.93 01 e 845 (Corresponding to DIN 3535 part 6FA). For use in gas applications.
Novus® 34 is approved for use in oxygen systems at pressures to 160 bar and temperatures to 90°C. (BAM test report 2393/06-II-1411).
Novus® 34 is independently tested and approved by Shell (MF 94-0960 Appendix 3).
Novus® 34 is registered under the WRAS Reg. No. 9903502.

Sheets
Novus® 34 gasket sheet is supplied standard in the dimensions 1500x1500 mm. Non-standard sheet sizes available on request.

Novus® 34 can also be supplied with a metal gauze wire insert, the Novus® 34 Metallic.

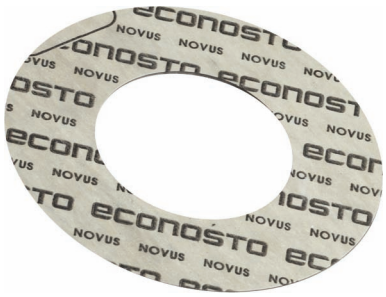
Gaskets
Flange gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		1.65
Tensile strength (Mpa)	ASTM F152	15
Compressibility (%)	ASTM F36	12
Recovery (%)	ASTM F36	55
Residual stress (Mpa)	BS 7531	26
Residual stress (Mpa)	DIN 52913	32
Gas permeability (cc/min)	BS 7531	<0,1
ASTM Oil No. 1 (%)	Thickness increase	1
ASTM Oil No. 3 (%)	Thickness increase	2.5
ASTM Fuel B (%)	Thickness increase	3

Ordering information

Ordering code	Sheet/Flange standard	Thickness [mm]
1001054	Sheet 1500x1500	0.5 - 0.75 - 1 - 1.5 - 2 - 3
1002554	Rings/EN(DIN) RF	1.5 - 2
1002154	Rings/ASME RF	1.5 - 2

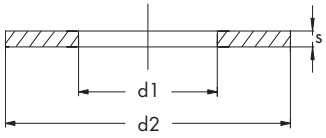
Specify the following data when ordering:
Figure number and thickness. For flange gasket, specify figure number, nominal size, rating and thickness. Standard, nominal size and pressure rating as per dimension tables. Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness of the gasket (s).



novus SEALING LIMITED

Novus® 34
- fig. 1001054
- fig. 1002154
- fig. 1002554

- Aramid / NBR
- Anti-stick
- Max. temp.: 250 °C
- High quality
- Potable water
- Gas approval
- Oxygen approval
- Colour: Natural (light grey)



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econosto®

Graftec® combines the excellent sealing characteristics of graphite with the advantages of a conventional sheet gasket based on aramid. Thanks to this unique material combination the Graftec® demonstrates excellent thermal and mechanical properties and very extensive chemical resistance. These properties ensure that Graftec® has a very wide field of application. This has the advantage that Graftec® can limit and possibly completely replace the diversity of conventional sheet gaskets based on aramid fibres, glass fibres or even pure graphite or PTFE. Thanks to the high percentage of graphite, Graftec® still performs exceptionally well when used in steam, and is also extremely gas-tight.

Temperature range
Maximum short term service temperature 400°C
Maximum continuous service temperature 300°C
Maximum operating temperature in water and steam: 280 °C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Graftec® complies with the requirements of BS 7531 Grade X.
Graftec® is approved for use in oxygen systems at pressures up to 160 bar and temperatures up to 90°C. (BAM test report II-3642/2000).
Graftec® 34 is registered under the WRAS Reg. No. 0004502.

Sheets
Graftec® gasket sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes available on request.

Gaskets
Flange gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		1.65
Tensile strength (Mpa)	ASTM F152	13
Compressibility (%)	ASTM F36	11
Recovery (%)	ASTM F36	>50
Residual stress (Mpa)	BS 7531	26
Residual stress (Mpa)	DIN 52913	32
Gas permeability (cc/min)	BS 7531	<1
ASTM Oil No. 1 (%)	Thickness increase	1
ASTM Oil No. 3 (%)	Thickness increase	2.5
ASTM Fuel B (%)	Thickness increase	2.5

Ordering information

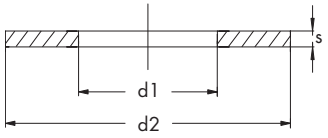
Ordering code	Sheet/Flange standard	Thickness [mm]
1001053	Sheet 1500x1500	0.5 - 0.75 - 1 - 1.5 - 2 - 3
1002553	Rings/EN(DIN) RF	1.5 - 2
1002153	Rings/ASME RF	1.5 - 2

Specify the following data when ordering:
Figure number and thickness. For flange gasket, specify figure number, nominal size, rating and thickness. Standard, nominal size and pressure rating as per dimension tables. Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness of the gasket (s).

novus SEALING LIMITED

Graftec®
- fig. 1001053
- fig. 1002153
- fig. 1002553

- Aramid / Graphite
- General purpose
- Max. temp.: 300 °C
- Potable water
- Oxygen approval
- Easy to process
- Colour: Black



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econosto®

Oleonoid is a gasket material, based on cellulose fibres, that is chemically treated to be resistant to oils, water, alcohol, greases, petrol and most solvents. Oleonoid is a very economical material. Oleonoid is not suitable for acids, alkalis and steam. The material should be protected from excessive variations in humidity and temperature to prevent the dimensions from deviating.

Applications
- Automotive industry
- Automotive carburettors
- Fuel pumps
- Oil pumps
- Oil filters
- Distributor covers
- Thermostat
- Water pump
- In gearboxes as cover gasket on the various inlets and outlets
- In axles as differential seal

Temperature range
Maximum operating temperature: 120°C.

Sheets
Oleonoid sheet is supplied standard on rolls of 1 metre width.

Gaskets
Oleonoid gaskets can be delivered in a variety of shapes and sizes by means of die cutting, water-jet cutting and laser cutting.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		0.8
Tensile strength (Mpa)	ASTM F152	13.79
Compressibility (%)	ASTM F36	25 – 40
Recovery (%)	ASTM F36	40
Distilled water (%)	Thickness increase	<30
ASTM Oil No.3 (%)	Thickness increase	<5
ASTM Fuel B (%)	Thickness increase	<5

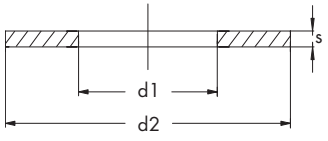
Ordering information

Ordering code	Sheet/Flange standard	Thickness [mm]
1030007	Sheet	0.15 - 0.2 - 0.25 - 0.4 - 0.5 - 0.8 - 1 - 1.6 - 2 - 3.2

Specify the following data when ordering:
Figure number 1030007 and thickness.
Gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

Oleonoid (Oil paper)
- fig. 1030007

- Very economical
- Cellulose fibres
- Oil and fuel resistant
- Temp. max.: 120 °C
- Colour: Brown



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Index and product compare

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Uniflon® 50

- Modified PTFE
- FDA-compliant
- Low gasket stress
- Weak flange constructions
- Gas-tight
- Excellent chemical resistance
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: blue

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Uniflon® 51

- Modified PTFE
- FDA-compliant
- Gas-tight
- Excellent chemical resistance
- Acids and alkalis
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: pink

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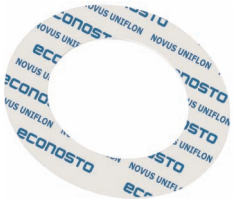

Uniflon® 53

- Modified PTFE
- FDA-compliant
- Gas-tight
- Excellent chemical resistance
- Fluorohydrogen resistant
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: white

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Inertex® SQ-S "V" RIGID

- Expanded PTFEE
- Excellent chemical resistance
- Compliant with FDA guidelines
- Very gas-tight
- Low gasket stress
- Weak flange constructions
- Max. temp.: +270 °C
- Colour: white

20080301

econosto®

Uniflon® 50 is a modified PTFE sealing material. The mechanical characteristics of Uniflon® 50 are considerably better than those of convertional PTFE sealing material, while the material still retains the unique sealing characteristics of PTFE. Uniflon® 50 offers an extremely good impermeability to gas and excellent resistance to nearly all chemicals. The biaxially-oriented structure of Uniflon® 50 ensures an equal strength in all directions, while the addition of fillers strongly reduces the adverse flow behaviour of conventional PTFE sheet gaskets. This keeps the gasket stress constant, and that is advantageous for the sealing characteristics.

Uniflon® 50 is specially developed for uses when a very good impermeability to gas must be guaranteed, even at low gasket stress. Especially suitable for glass, ceramic or PTFE-lined flanges.

Temperature range
For temperatures between -210° C and +260° C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Uniflon® 50 complies with the FDA 21 CFR 177.1550 regulations of the American Food & Drug Administration.

Sheets
Uniflon® 50 sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes up to a maximum of 2000x2000 mm are available on request.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting and water-jet cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		1.4
Tensile strength (Mpa)	ASTM F152	11
Compressibility (%)	ASTM F36	40
Recovery (%)	ASTM F36	30
Residual stress (Mpa)	BS 7531	>25
Gas permeability (cc/min)	DIN 3535	0.02

Ordering information

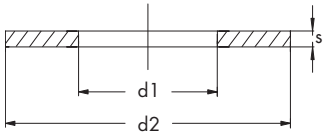
Ordering code	Type	Sheet/Flange standard	Thickness [mm]
1001025	Uniflon®50	Sheet 1500x1500	1.5 - 2 - 3
1002525	Uniflon®50	Rings/EN(DIN) RF	1.5 - 2
1002125	Uniflon®50	Rings/ASME RF	1.5 - 2

Specify the following data when ordering:
Figure number and thickness. For the rings, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

novus SEALING LIMITED

Uniflon® 50
- fig. 1001025
- fig. 1002125
- fig. 1002525

- Modified PTFE
- FDA-compliant
- Low gasket stress
- Weak flange constructions
- Gas-tight
- Excellent chemical resistance
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: blue



20080301

econosto®

Uniflon® 51 is a modified PTFE sealing material. The mechanical characteristics of Uniflon® 51 are considerably better than those of convertional PTFE sealing material, while the material still retains the unique sealing characteristics of PTFE. Uniflon® 51 offers an extremely good impermeability to gas and excellent resistance to nearly all chemicals. The biaxially-oriented structure of Uniflon® 51 ensures an equal strength in all directions, while the addition of fillers strongly reduces the adverse flow behaviour of conventional PTFE sheet gaskets. This keeps the gasket stress constant, and that is advantageous for the sealing characteristics.

Uniflon® 51 is particularly suitable for use in strong acids and alkalis, but also for general uses such as solvents, fuels, water, steam and chlorine. In comparison with conventional PTFE sealing material this variant has very reduced flow properties.

Temperature range
For temperatures between -210° C and +260° C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Uniflon® 51 complies with the FDA 21 CFR 177.1550 regulations of the American Food & Drug Administration.

Sheets
Uniflon® 51 sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes up to a maximum of 2000x2000 mm are available on request.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting and water-jet cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		2.2
Tensile strength (Mpa)	ASTM F152	15
Compressibility (%)	ASTM F36	7
Recovery (%)	ASTM F36	40
Residual stress (Mpa)	BS 7531	>32
Gas permeability (cc/min)	DIN 3535	0.01

Ordering information

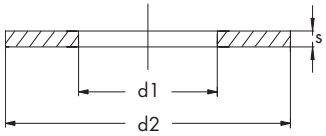
Ordering code	Type	Sheet/Flange standard	Thickness [mm]
1001026	Uniflon®51	Sheet 1500x1500	1.5 - 2 - 3
1002526	Uniflon®51	Rings/EN(DIN) RF	1.5 - 2
1002126	Uniflon®51	Rings/ASME RF	1.5 - 2

Specify the following data when ordering:
Figure number and thickness. For the rings, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

novus SEALING LIMITED

Uniflon® 51
- fig. 1001026
- fig. 1002126
- fig. 1002526

- Modified PTFE
- FDA-compliant
- Gas-tight
- Excellent chemical resistance
- Acids and alkalis
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: pink



20080301

econosto®

Uniflon® 53 is a modified PTFE sealing material. The mechanical characteristics of Uniflon® 53 are considerably better than those of convertional PTFE sealing material, while the material still retains the unique sealing characteristics of PTFE. Uniflon® 53 offers an extremely good impermeability to gas and excellent resistance to nearly all chemicals. The biaxially-oriented structure of Uniflon® 53 ensures an equal strength in all directions, while the addition of fillers strongly reduces the adverse flow behaviour of conventional PTFE sheet gaskets. This keeps the gasket stress constant, and that is advantageous for the sealing characteristics.

Uniflon® 53 is especially suitable for use with fluorohydrogen, but also very suitable for alkalis, solvents, fuels, water, steam and chlorine.

Temperature range
For temperatures between -210° C and +260° C

Chemical resistance
See chemical resistance table in section HB-05.

Approvals
Uniflon® 53 complies with the FDA 21 CFR 177.1550 regulations of the American Food & Drug Administration.

Sheets
Uniflon® 53 sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes up to a maximum of 2000x2000 mm are available on request.

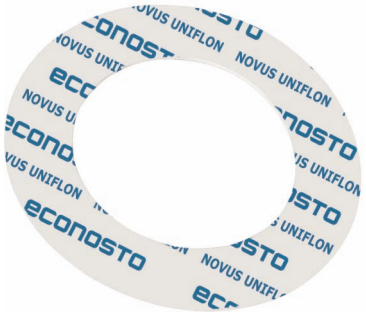
Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting and water-jet cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		3.0
Tensile strength (Mpa)	ASTM F152	14
Compressibility (%)	ASTM F36	5
Recovery (%)	ASTM F36	>40
Residual stress (Mpa)	BS 7531	>30
Gas permeability (cc/min)	DIN 3535	0.01

Ordering information

Ordering code	Type	Sheet/Flange standard	Thickness [mm]
1001027	Uniflon®53	Sheet 1500x1500	1.5 - 2 - 3
1002527	Uniflon®53	Rings/EN(DIN) RF	1.5 - 2
1002127	Uniflon®53	Rings/ASME RF	1.5 - 2

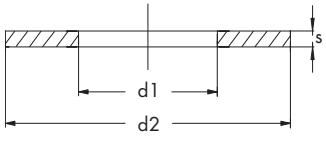
Specify the following data when ordering:
Figure number and thickness. For the rings, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).



novus SEALING LIMITED

Uniflon® 53
- fig. 1001027
- fig. 1002127
- fig. 1002527

- Modified PTFE
- FDA-compliant
- Gas-tight
- Excellent chemical resistance
- Fluorohydrogen resistant
- Max. temp.: +260 °C
- Min. temp.: -210 °C
- Colour: white



20080301

econosto®

Inertex® SQ-S "V" gasket sheet material consists of 100% expanded Teflon® with a very high density. This enables a higher leak tightness to be achieved than with other expanded PTFE sheet gaskets. According to TTRL (Tightness Testing Research Laboratory) Inertex® SQ-S "V" is one of the most gas-tight gaskets currently available. The special production process ensures that a gasket sheet is produced that has minimum creep and flow behaviour and also has the same tensile strength in all directions (biaxially expanded). This sealing material can be used universally even in difficult assembly situations. Inertex® SQ-S "V" is especially soft and very compressible. As a consequence, a good seal is created even at low gasket stresses which is particularly suitable for plastic and glass/ceramic flanges.
Inertex® SQ-S "V" is not liable to aging and is easy to process by means of cutting, even with a pair of scissors.

Temperature range
For temperatures between -268 °C to 270 °C
May be briefly subjected to a maximum of 315 °C

Chemical resistance
Resistant to all chemicals with the exception of elementary fluorine and molten alkali metals.

Approvals
Inertex® SQ-S "V" complies with the FDA 21 CFR 177.1550 regulations of the American Food & Drug Administration.
The printing ink complies with the FDA 21 CFR regulations.
American Bureau of Shipping's (ABS) Approval

Sheets
Inertex® SQ-S "V" sheet is supplied standard in the dimensions 1500x1500 mm.
Non-standard sheet sizes up to 1950x1950 mm available on request.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting and water-jet cutting cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight (g/cm³)		1.2
pH range		0 - 14
Compressibility (%)	ASTM F36	66
Recovery (%)	ASTM F36	23

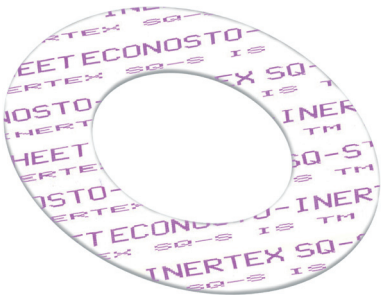
TTRL (Tightness Testing Research Laboratory) test

ROTTT gasket constants:	
Gb	811PSI
a	0.25
Gs	0.81 PSI
ROTT Tightness parameters (test medium is helium)	
@S100 psi	2560
@S1000 psi	4548
@S3000 psi	5983
@S10000 psi	8079
HOBT (Hot Blow Out Test)	
750 psi	560 °F(293 °C)
1000 psi	542 °F(283 °C)

Ordering information

Ordering code	Type	Sheet/Flange standard	Thickness [mm]
1001028	Inertex® SQ-S "V" RIGID"	Sheet 1500x1500	1.5 - 2 - 3
1002528	Inertex® SQ-S "V" RIGID"	Rings/EN(DIN) RF	1.5 - 2 - 3
1002128	Inertex® SQ-S "V" RIGID"	Rings/ASME RF	1.5 - 2 - 3
1002129	Inertex® SQ-S	Sheet 1500x1500	5 - 6

Specify the following data when ordering:
Figure number and thickness. For the rings, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

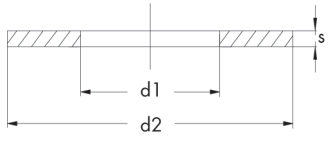


inertech, Inc.

Inertex® SQ-S "V" RIGID

- fig. 1001028
- fig. 1002528
- fig. 1002128

- Expanded PTFEE
- Excellent chemical resistance
- Compliant with FDA guidelines
- Very gas-tight
- Low gasket stress
- Weak flange constructions
- Max. temp.: +270 °C
- Colour: white



20080301

Index and product compare

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Econgraph® -TI (Tanged insert)

- Graphite
- Perforated SS insert
- Very rigid
- Good chemical resistance
- Suitable for steam systems
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black

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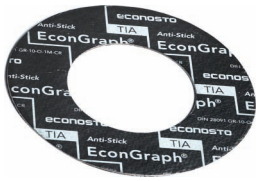

Econgraph® -TIA (Anti-stick)

- Graphite
- Perforated SS insert
- Anti-stick coating
- Very rigid
- Suitable for steam systems
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black

page 973

Econgraph® -FI

- Graphite
- Flat SS insert
- Very easy to handle
- Easy to process
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black

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Sigraflex Hochdruck®

- Graphite
- Flat SS inserts
- Anti-stick coating
- Very high residual stress
- Very safe against Blow-out
- Very rigid
- Max. temp.: +500 °C
- Min. temp.: -200 °C
- Colour: black

Econgraph®-TI is a reinforced graphite sheet with an insert of tanged SS-316 sheet with a thickness of 0.10 mm. No adhesive is required to bond the graphite layers to the insert as the graphite material is fixed to the insert by small, sharp teeth. We strongly advise against cutting gaskets by hand. Our cutting department has the correct tools to make the gaskets for you. Econgraph®-TI is very often used in flange joints for pipes and machinery. The high temperature range and the excellent residual stress make our Econgraph®-TI very suitable for use in steam systems, in the chemical and petrochemical industries, the process industry etc. In short, an exceptional and very versatile sealing material.

Chemical resistance
See chemical resistance table in section HB-05.

Temperature range
For temperatures between –200 °C and +450 °C.
Hot air maximum +400 °C

Sheets
Econgraph®-TI sheet is supplied standard in the dimensions 1500x1500 mm.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

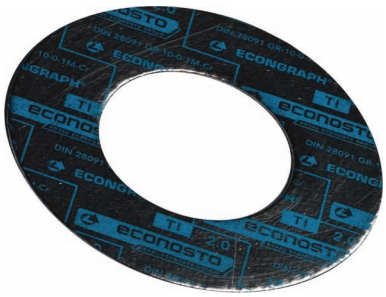
Properties	Standard	Value
Thickness [mm]		1.5
Specific weight graphite (g/cm³)		1.0
Ash content (%)		<2
Chloride content (ppm)		<50
Compressibility (%)	ASTM F36	30-35
Recovery (%)	ASTM F36	15-20
Residual stress (Mpa)	DIN 52913	>48
Gas permeability (cc/min)	DIN 3535	<0,6

Ordering information

Ordering code	Sheet/Flange standard	Thickness [mm]
1011032	Sheet 1000x1000	1 - 1.5 - 2 - 3
1011032	Sheet 1500x1500	1 - 1.5 - 2 - 3
1012532	Rings/EN(DIN) RF	1.5 - 2
1012132	Rings/ASME RF	1.5 - 2

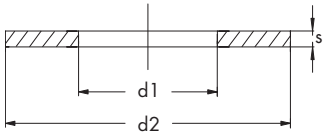
Specify the following data when ordering:
Figure number and thickness. For the rings, specify figure number, nominal size, rating and thickness.
Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

econosto®



Econgraph® -TI (Tanged insert)
- fig. 1011032
- fig. 1012132
- fig. 1012532

- Graphite
- Perforated SS insert
- Very rigid
- Good chemical resistance
- Suitable for steam systems
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black



20080301

Econgraph®-TIA is the same product as our Econgraph®-TI, however it has an anti-stick coating on both sides. Even though graphite can generally be considered as a non-adhesive material, a certain adhesion of the graphite to the flange facings does arise in some cases. This phenomenon is strongly reduced by the use of Econgraph®-TIA. The anti-stick coating is applied by a spraying process and fixed to the surface of the sheets in an oven.
Our Econgraph®-TIA quality is used particularly in those places where adhesion of graphite to the sealing surfaces must be prevented. This can be the case when a flange joint only allows a small opening when replacing the gasket, making cleaning of the surfaces very difficult. Otherwise, the application field is identical to that of the non anti stick coated equivalent, Econgraph®-TI.

Temperature range
For temperatures between -200° C to +450° C
Hot air maximum +400 °C

Chemical resistance
See chemical resistance table in section HB-05.

Sheets
Econgraph®-TIA sheet is supplied standard in the dimensions 1500x1000 mm.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

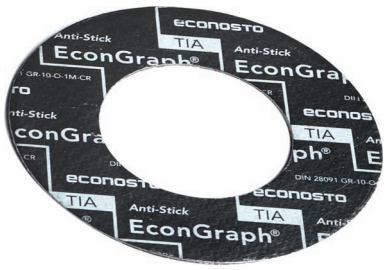
Properties	Standard	Value
Thickness [mm]		1.5
Specific weight graphite (g/cm³)		1.0
Ash content (%)		<2
Chloride content (ppm)		<50
Compressibility (%)	ASTM F36	30-35
Recovery (%)	ASTM F36	15-20
Residual stress (Mpa)	DIN 52913	>48
Gas permeability (cc/min)	DIN 3535	<0,6

Ordering information

Ordering code	Sheet/Flange standard	Thickness [mm]
1011021	Sheet 1500x1000	1 - 1.5 - 2 - 3
1012521	Rings/EN(DIN) RF	1.5 - 2
1012121	Rings/ASME RF	1.5 - 2

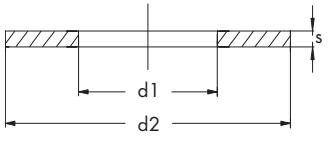
Specify the following data when ordering:
Figure number and thickness. For the rings, specify standard, nominal size, rating and thickness. Standard and pressure rating given in the dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

econosto®



Econgraph® -TIA (Anti-stick)
- fig. 1011021
- fig. 1011047
- fig. 1012121
- fig. 1012521

- Graphite
- Perforated SS insert
- Anti-stick coating
- Very rigid
- Suitable for steam systems
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black



20080301

Econgraph®-FI is a graphite sheet with one or more flat inserts of thin, flat SS-316. The thickness of the insert is 0.05 mm. The graphite sheet is fixed to the insert(s) by means of a very thin chloride-free adhesive layer. This reinforcement creates a sheet gasket that is very easy to handle and doesn't damage easily. The material is also ideal for manufacturing gaskets and ring gaskets. Econgraph®-FI is mainly used for small gaskets and for gaskets male/female with a narrow width. For example, ring gaskets for flanges with tongue and groove and flanges. The material is extensively used, in petrochemicals and the chemical industry.

Temperature range
For temperatures between –200 °C and +450 °C.
Hot air mass maximum +400 °C

Chemical resistance
See chemical resistance table in section HB-05.

Sheets
Econgraph®-FI sheet is supplied standard in the dimensions 1000x1000 mm.

Gaskets
By means of die cutting, water-jet cutting and laser cutting all sizes and shapes can be delivered (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight graphite (g/cm³)		1.0
Ash content (%)		<2
Chloride content (ppm)		<50
Compressibility (%)	ASTM F36	40-50
Recovery (%)	ASTM F36	10-15
Residual stress (Mpa)	DIN 52913	>45
Gas permeability (cc/min)	DIN 3535	<0,6

Ordering information

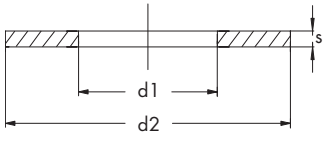
Ordering code	Sheet/Flange standard	Thickness [mm]
1011025	Sheet 1000x1000	1 - 1.5 - 2 - 3

Specify the following data when ordering:
Figure number and thickness.
Gasket rings as per a standard, specify the standard, nominal size, pressure rating and thickness. Nominal size and pressure rating are as given in the dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

econosto®

Econgraph® -FI
- fig. 1011025

- Graphite
- Flat SS insert
- Very easy to handle
- Easy to process
- Max. temp.: +450 °C
- Min. temp.: -200 °C
- Colour: black



20080301

econosto®

®Sigraflex Hochdruck is a very rigid sheet made up of multiple layers of 0.5 mm thick high quality graphite foil and 0.05 mm thick stainless steel inserts. Depending on the desired sheet thickness several layers of graphite and stainless steel foil are sandwiched together without adhesive by means of a special process. These inserts create a sheet gasket that is very easy to handle and doesn't damage easily. The construction of the gasket sheet also ensures that this gasket is blow-out proof. The material can be processed easily into gaskets and gasket rings. The material is extensively used in petrochemical and the chemical industry. ®Sigraflex Hochdruck does not adhere to other materials (anti-stick)

Temperature range
For temperatures between -200° C to +500° C.
Hot air maximum +400 °C

Chemical resistance
See chemical resistance table in section HB-05.

Sheets
Sigraflex Hochdruck® sheet is supplied standard in the dimensions 1000x1000 mm and 1500x1500 mm.

Gaskets
Ring gaskets in standard dimensions as per EN(DIN) and ASME are mostly delivered from stock. By die cutting, water-jet cutting and laser cutting different sizes and shapes can be supplied (on request) at short notice.

Properties	Standard	Value
Thickness [mm]		1.5
Specific weight graphite (g/cm³)		1.1
Ash content (%)		<0,15
Chloride content (ppm)		<20
Compressibility (%)	DIN E 28090 T.2	30 – 40
Recovery (%)	DIN E 28090 T.2	4 – 5
Residual stress (Mpa)	DIN 52913	>48
Gas permeability (cc/min)	DIN 3535	<0,3

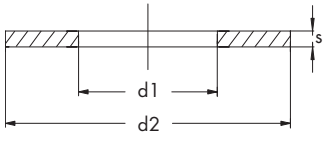
Ordering information

Ordering code	Sheet/Flange standard	Sigraflex type	Thickness [mm]
1011046	Sheet 1000x1000	V10011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1000x1000	V15011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1000x1000	V20011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1000x1000	V30011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1500x1500	V10011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1500x1500	V15011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1500x1500	V20011Z3I	1 - 1.5 - 2 - 3
1011046	Sheet 1500x1500	V30011Z3I	1 - 1.5 - 2 - 3
1012146	Rings/ASME RF		1.5 - 2
1012546	Rings/EN(DIN) RF		1.5 - 2

Specify the following data when ordering:
Figure number, sheet size and thickness. To order gaskets, specify figure number, nominal size, rating and thickness. Standard, nominal size and pressure rating as per dimension tables.
Non-standard gaskets can be ordered by specifying the outer diameter (d2), the inner diameter (d1) and the thickness (s).

Sigraflex Hochdruck®
- fig. 1011046
- fig. 1012146
- fig. 1012546

- Graphite
- Flat SS inserts
- Anti-stick coating
- Very high residual stress
- Very safe against Blow-out
- Very rigid
- Max. temp.: +500 °C
- Min. temp.: -200 °C
- Colour: black



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Index and product compare

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RF
Standard: EN 1514-1

- Standard (formerly DIN 2690)
- For RF DIN flanges

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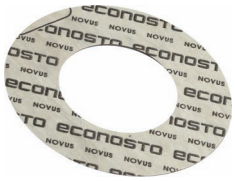

RF
Standard: ASME B16.21

- For RF flanges ASME B16.5
- For RF flanges ASME B16.47 series A
- For RF Flanges ASME B16.47 series B

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Tongue and groove
Male-female
Standard: EN 1514-1

- Standard (Formerly DIN 2691 and DIN 2692)
- For DIN Tongue and groove PN 10-160 flanges
- For DIN Male-female PN 10-100 flanges

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Tongue and groove
Male-female
Standard ASME B16.21

- For flanges ASME B16.5 tongue and groove
- For flanges ASME B16.5 male-female
- 150-1500 Lbs

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FF
Standard: EN 1514-1

- Standard (formerly DIN 86071)
- For FF DIN flanges

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FF
Standard ASME B16.21

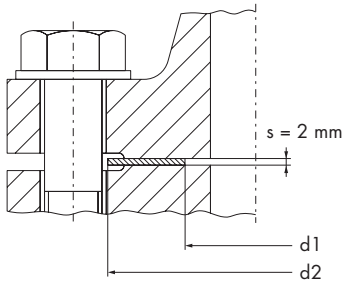
- For FF flanges ASME B16.5
- For FF flanges ASME B16.47 series A

econosto®

DN	d1		d2						
	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	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
175	195	185	-	-	-	-	-	-	277
200	220	210	262	262	273	273	284	290	309
250	273	264	317	317	328	329	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	1017	1011	1042	-	-
1000	1016	-	1090	1090	1124	1128	1154	-	-
1100	1120	-	-	-	1231	1228	1254	-	-
1200	1220	-	1290	1307	1341	1342	1364	-	-
1400	1420	-	1490	1524	1548	1542	1578	-	-
1500	1520	-	-	-	1658	1654	1688	-	-
1600	1620	-	1700	1724	1772	1764	1798	-	-
1800	1820	-	1900	1931	1972	1964	2000	-	-
2000	2020	-	2100	2138	2182	2168	2230	-	-
2200	2220	-	2307	2348	2384	-	-	-	-
2400	2420	-	2507	2558	2594	-	-	-	-
2600	2620	-	2707	2762	2794	-	-	-	-
2800	2820	-	2924	2972	3014	-	-	-	-
3000	3020	-	3124	3172	3228	-	-	-	-
3200	3220	-	3324	3382	-	-	-	-	-
3400	3420	-	3524	3592	-	-	-	-	-
3600	3620	-	3734	3804	-	-	-	-	-
3800	3820	-	3931	-	-	-	-	-	-
4000	4020	-	4131	-	-	-	-	-	-all dimensions in millimetres

RF
Standard: EN 1514-1

- Standard (formerly DIN 2690)
- For RF DIN flanges



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For RF flanges ASME B16.5

DN [inch]	d1	d2					
		150 lbs	300 lbs	400 lbs	600 lbs	900 lbs	1500 lbs
½	21	48	54	54	54	64	64
¾	27	57	67	67	67	70	70
1	33	67	73	73	73	79	79
1¼	42	76	83	83	83	89	89
1½	48	86	95	95	95	98	98
2	60	105	111	111	111	143	143
2½	73	124	130	130	130	165	165
3	89	136	149	149	149	168	171
3½	102	162	165	165	165	-	-
4	114	175	181	178	194	206	210
5	141	197	216	213	241	248	254
6	168	222	251	248	267	289	283
8	219	279	308	305	321	359	352
10	273	340	362	359	400	435	435
12	324	410	422	419	457	498	520
14	356	450	486	483	492	520	580
16	406	515	540	535	565	575	640
18	457	550	595	595	615	640	705
20	510	605	655	650	685	700	755
22	559	660	705	702	733	-	-
24	610	715	775	770	790	840	900

all dimensions in millimetres

For RF flanges ASME B16.47 series A

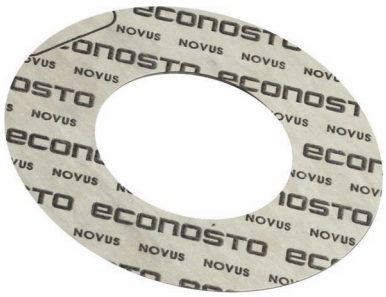
DN	d1	d2	d1	d2	d1	d2	d1	d2	d1	d2
[inch]	150 lbs		300 lbs		400 lbs		600 lbs		900 lbs	
26	660	775	700	835	685	830	675	865	670	885
28	710	830	750	900	735	890	720	915	720	945
30	760	885	805	950	785	945	770	970	770	1010
32	815	940	860	1005	840	1005	825	1020	820	1075
34	865	990	905	1055	885	1055	870	1075	875	1135
36	915	1050	955	1120	935	1120	920	1130	925	1200
38	965	1110	965	1055	960	1075	955	1105	940	1200
40	1015	1160	1015	1115	1010	1125	1005	1155	990	1250
42	1065	1220	1065	1165	1060	1180	1055	1220	1040	1300
44	1120	1275	1120	1220	1110	1230	1105	1270	1090	1370
46	1170	1325	1170	1275	1162	1290	1155	1325	1145	1435
48	1220	1385	1220	1325	1215	1345	1205	1390	1195	1485
50	1270	1435	1270	1380	1260	1405	1250	1450	-	-
52	1320	1490	1320	1430	1310	1455	1300	1500	-	-
54	1370	1550	1370	1490	1360	1520	1355	1555	-	-
56	1420	1605	1420	1545	1415	1570	1405	1615	-	-
58	1475	1665	1475	1595	1465	1620	1455	1665	-	-
60	1525	1715	1525	1645	1515	1685	1505	1720	-	-

all dimensions in millimetres

For RF Flanges B16.47 series B

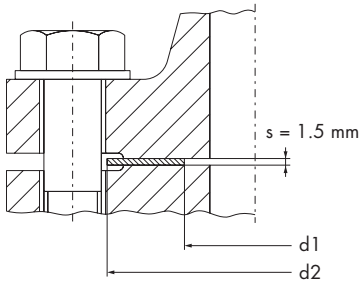
DN [inch]	Breadth			
	d1	d2		
		75 lbs	150 lbs	300 lbs
26	660	710	725	770
28	710	760	775	825
30	760	810	825	885
32	815	860	880	940
34	865	910	935	995
36	915	975	985	1050
38	965	1025	1045	1095
40	1015	1075	1095	1150
42	1065	1125	1145	1200
44	1115	1180	1195	1250
46	1165	1230	1255	1315
48	1220	1285	1305	1370
50	1270	1335	1355	1420
52	1320	1385	1405	1470
54	1370	1440	1465	1530
56	1420	1495	1515	1595
58	1475	1545	1580	1655
60	1525	1595	1630	1705

all dimensions in millimetres



RF
Standard: ASME B16.21

- For RF flanges ASME B16.5
- For RF flanges ASME B16.47 series A
- For RF Flanges ASME B16.47 series B



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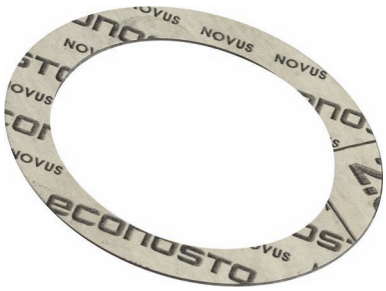
For DIN flanges with Tongue and groove PN 10-160

DN	d1	d2
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
500	549	575
600	649	675
700	751	777
800	856	882
900	961	987
1000	1062	1092
all dimensions in millimetres		

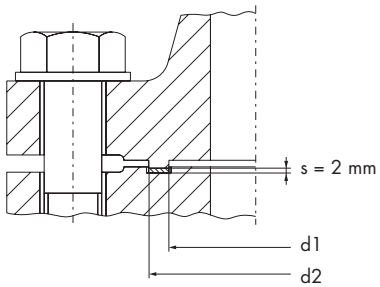
For DIN flanges with Male-female PN 10-100

DN	d1	d2
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
500	508	575
600	610	675
700	712	777
800	813	882
900	915	987
1000	1016	1002
all dimensions in millimetres		

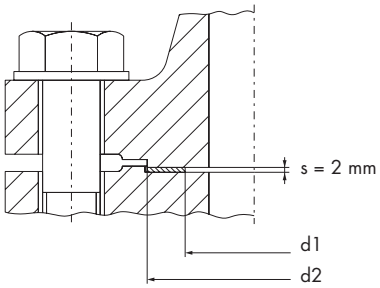


Tongue and groove
Male-female
Standard: EN 1514-1

- Standard (Formerly DIN 2691 and DIN 2692)
- For DIN Tongue and groove PN 10-160 flanges
- For DIN Male-female PN 10-100 flanges



tongue and groove



male - female

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For flanges ASME B16.5 tongue and groove

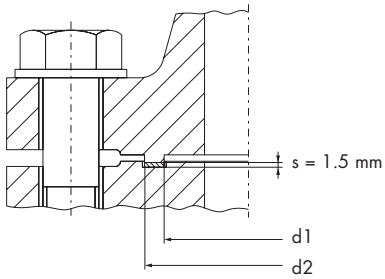
DN		Narrow	Wide
[inch]	d1	d2	
½	25	35	35
¾	33	43	43
1	38	48	51
1¼	48	57	64
1½	54	64	73
2	73	83	92
2½	86	95	105
3	108	118	127
3½	121	130	140
4	132	145	157
5	160	173	186
6	190	203	216
8	238	254	270
10	286	305	324
12	343	362	381
14	375	394	413
16	425	448	470
18	489	511	535
20	535	559	585
22	591	616	641
24	640	667	690
all dimensions in millimetres			

For flanges ASME B16.5 male-female

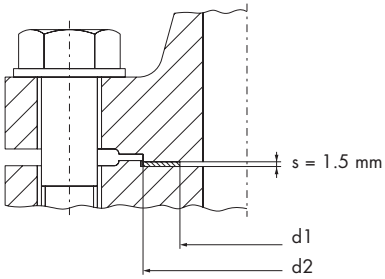
DN	Small		Wide	
[inch]	d1	d2	d1	d2
½	To be specified by customer	18	21	35
¾	To be specified by customer	24	27	43
1	To be specified by customer	30	33	51
1¼	To be specified by customer	38	42	64
1½	To be specified by customer	44	48	73
2	To be specified by customer	57	60	92
2½	To be specified by customer	68	73	105
3	To be specified by customer	84	89	127
3½	To be specified by customer	97	102	140
4	To be specified by customer	110	114	157
5	To be specified by customer	137	141	186
6	To be specified by customer	162	168	216
8	To be specified by customer	213	219	270
10	To be specified by customer	267	273	324
12	To be specified by customer	318	324	381
14	To be specified by customer	349	356	413
16	To be specified by customer	400	406	470
18	To be specified by customer	451	457	535
20	To be specified by customer	502	510	585
24	To be specified by customer	603	610	690
all dimensions in millimetres				

Tongue and groove
Male-female
Standard ASME B16.21

- For flanges ASME B16.5 tongue and groove
- For flanges ASME B16.5 male-female
- 150-1500 Lbs



tongue and groove



male - female

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DN	d1	D	K	d2	BG	D	K	d2	BG	D	K	d2	BG	D	K	d2	BG
		PN 2.5/6				PN 10				PN 16				PN 25			
DN	d1	D	K	d2	BG	D	K	d2	BG	D	K	d2	BG	D	K	d2	BG
		PN 2.5/6				PN 10				PN 16				PN 25			
10	18	75	50	11	4	90	60	14	4	90	60	14	4	90	60	14	4
15	22	80	55	11	4	95	65	14	4	95	65	14	4	95	65	14	4
20	27	90	65	11	4	105	75	14	4	105	75	14	4	105	75	14	4
25	34	100	75	11	4	115	85	14	4	115	85	14	4	115	85	14	4
32	43	120	90	14	4	140	100	18	4	140	100	18	4	140	100	18	4
40	49	130	100	14	4	150	110	18	4	150	110	18	4	150	110	18	4
50	61	140	110	14	4	165	125	18	4	165	125	18	4	165	125	18	4
60	72	150	120	14	4	175	135	18	8	175	135	18	8	175	135	18	8
65	77	160	130	14	4	185	145	18	4	185	145	18	4	185	145	18	8
80	89	190	150	18	4	200	160	18	8	200	160	18	8	200	160	18	8
100	115	210	170	18	4	220	180	18	8	220	180	18	8	235	190	22	8
125	141	240	200	18	8	250	210	18	8	250	210	18	8	270	220	26	8
150	169	265	225	18	8	285	240	22	8	285	240	22	8	300	250	26	8
200	220	320	280	18	8	340	295	22	8	340	295	22	12	360	310	26	12
250	273	375	335	18	12	395	350	22	12	405	355	26	12	425	370	30	12
300	324	440	395	22	12	445	400	22	12	460	410	26	12	485	430	30	16
350	356	490	445	22	12	505	460	22	16	520	470	26	16	555	490	33	16
400	407	540	495	22	16	565	515	26	16	580	525	30	16	620	550	36	16
450	458	595	550	22	16	615	565	26	20	640	585	30	20	670	600	36	20
500	508	645	600	22	20	670	620	26	20	715	650	33	20	730	660	36	20
600	610	755	705	26	20	780	725	30	20	840	770	36	20	845	770	39	20
700	712	-	-	-	-	895	840	30	24	910	840	36	24	960	875	42	24
800	813	-	-	-	-	1015	950	33	24	1025	950	39	24	1085	990	48	24
900	915	-	-	-	-	1115	1050	33	28	1125	1050	39	28	1185	1090	48	28
1000	1016	-	-	-	-	1230	1160	36	28	1255	1170	42	28	1320	1210	56	28
1100	1120	-	-	-	-	1340	1270	39	32	1355	1270	42	32	1420	1310	56	32
1200	1220	-	-	-	-	1455	1380	39	32	1485	1390	48	32	1530	1420	56	32
1400	1420	-	-	-	-	1675	1590	42	36	1685	1590	48	36	1755	1640	62	36
1500	1520	-	-	-	-	1785	1700	42	36	1820	1710	56	36	1865	1750	62	36
1600	1620	-	-	-	-	1915	1820	48	40	1930	1820	56	40	1975	1860	62	40
1800	1820	-	-	-	-	2115	2020	48	44	2130	2020	56	44	2195	2070	70	44
2000	2020	-	-	-	-	2325	2230	48	48	2345	2230	62	48	2425	2300	70	48

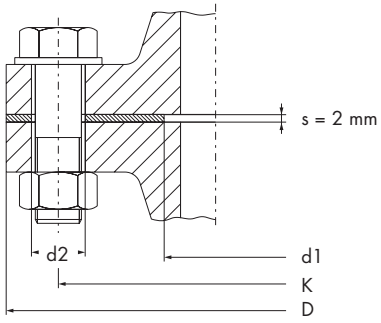
DN	d1	D	K	d2	BG
		PN 40			
10	18	90	60	14	4
15	22	95	65	14	4
20	27	105	75	14	4
25	34	115	85	14	4
32	43	140	100	18	4
40	49	150	110	18	4
50	61	165	125	18	4
60	72	175	135	18	8
65	77	185	145	18	8
80	89	200	160	18	8
100	115	235	190	22	8
125	141	270	220	26	8
150	169	300	250	26	8
200	220	375	320	30	12
250	273	450	385	33	12
300	324	515	450	33	16
350	356	580	510	36	16
400	407	660	585	39	16
450	458	685	610	39	20
500	508	755	670	42	20
600	610	890	795	48	20

BG=Number of bolt holes
all dimensions in millimetres

econosto®

FF
Standard: EN 1514-1

- Standard (formerly DIN 86071)
- For FF DIN flanges



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econosto®

For FF flanges ASME B16.5

DN [inch]	d1	D	K	d2	Number of bolt holes	D	K	d2	Number of bolt holes
		150 lbs				300 lbs			
½	21	89	60	16	4	95	67	16	4
¾	27	98	70	16	4	117	83	19	4
1	33	108	79	16	4	123	89	19	4
1¼	42	117	89	16	4	133	98	19	4
1½	48	127	98	16	4	155	114	22	4
2	60	152	121	19	4	165	127	19	8
2½	73	178	140	19	4	190	149	22	8
3	89	190	152	19	4	209	168	22	8
3½	102	216	178	19	8	228	184	22	8
4	114	229	190	19	8	254	200	22	8
5	141	254	216	22	8	279	235	22	8
6	168	279	241	22	8	317	270	22	12
8	219	343	298	22	8	381	330	25	12
10	273	406	362	25	12	444	387	29	16
12	324	483	432	25	12	520	451	32	16
14	356	535	476	29	12	584	514	32	20
16	406	595	540	29	16	647	572	35	20
18	457	635	578	33	16	711	629	35	24
20	510	700	635	33	20	774	686	35	24
22	559	749	692	35	20	838	743	41	24
24	610	815	750	35	20	914	813	41	24

all dimensions in millimetres

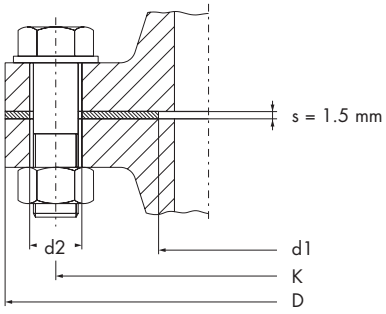
For FF flanges ASME B16.47 series A

DN [inch]	d1	D	K	d2	Number of bolt holes	d1	D	K	d2	Number of bolt holes
		150 lbs					300 lbs			
26	660	870	806	35	24	700	971	876	45	28
28	710	927	864	35	28	750	1035	940	45	28
30	760	984	914	35	28	805	1092	997	48	28
32	815	1060	978	42	28	860	1149	1054	51	28
34	865	1111	1029	42	32	905	1206	1105	51	28
36	915	1168	1086	42	32	955	1270	1168	54	32
38	965	1238	1149	42	32	965	1168	1092	41	32
40	1015	1289	1200	42	36	1015	1238	1156	45	32
42	1065	1346	1257	42	36	1065	1289	1207	45	32
44	1120	1403	1315	42	40	1120	1352	1264	48	32
46	1170	1454	1365	42	40	1170	1416	1321	51	28
48	1220	1511	1422	42	44	1220	1466	1372	51	32
50	1270	1568	1480	48	44	1270	1530	1429	54	32
52	1320	1625	1537	48	44	1320	1581	1480	54	32
54	1370	1682	1594	48	44	1370	1657	1549	60	28
56	1420	1746	1651	48	48	1420	1708	1600	60	28
58	1475	1803	1708	48	48	1475	1758	1651	60	32
60	1525	1854	1759	48	52	1525	1809	1702	60	32

all dimensions in millimetres

FF
Standard ASME B16.21

- For FF flanges ASME B16.5
- For FF flanges ASME B16.47 series A



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Medium	Novus® 30	Novus® 34	Graftec®	Ecnograph® -TI & TIA	Ecnograph® -FI	®Sigraflex Hochdruck	Uniflon® 50	Uniflon® 51	Uniflon® 53
Acetaldehyde	B	B	B	A	A	A	A	A	A
Acetamide	A	A	A				A	A	A
Acetic Acid 10%	A	A	A	A	A	A	A	A	A
Acetic Acid 100%	A	A	A	B	B	B	A	A	A
Acetone	B	B	A	A	A	A	A	A	A
Acetylene	A	A	A	A	A	A	A	A	A
Acrylon nitrile	B	B	B	A	A	A	A	A	A
Adipine Acid	A	A	A	A	A	A	A	A	A
Air	A	A	A	A	A	A	A	A	A
Alkali metals (molten)	C	C	C	B	B	B	C	C	C
Alum	A	A	A	B	B	B	A	A	A
Alumina	A	A	A	A	A	A	A	A	A
Aluminium Chloride	A	A	A	C	C	C	A	A	A
Aluminium salt	A	A	A				A	A	A
Ammonia	A	A	A	A	A	A	A	A	A
Ammonia	A	A	A	A	A	A	A	A	A
Ammonium Chloride	A	A	A	B	B	B	A	A	A
Ammonium hydroxide	A	A	A	A	A	A	A	A	A
Ammonium salt	A	A	A				A	A	A
Amyl Acetate	B	B	A	A	A	A	A	A	A
Aniline	C	C	A	A	A	A	A	A	A
Aqua Regia	C	C	C	C	C	C	A	A	A
Arcton 12	A	A	A	A	A	A	A	A	A
Arcton 22	B	B	B	A	A	A	A	A	A
Asphalt	A	A	A	A	A	A	A	A	A
Barium salt	A	A	A	A	A	A	A	A	A
Benzaldehyde	B	B	B	A	A	A	A	A	A
Benzene	A	A	A	A	A	A	A	A	A
Benzol° Acid	A	A	A	A	A	A	A	A	A
Benzoyl Chloride	A	A	A	A	A	A	A	A	A
Benzyl Alcohol	A	A	A	A	A	A	A	A	A
Blast furnace gas	A	A	A				A	A	A
Bleach	B	B	B	B	B	B	A	A	A
Borax	A	A	A	A	A	A	A	A	A
Boric Acid	A	A	A	A	A	A	A	A	A
Butane	A	A	A	A	A	A	A	A	A
Butanol	A	A	A	A	A	A	A	A	A
Butanon	B	B	A	A	A	A	A	A	A
Butyl Acetate	B	B	A	A	A	A	A	A	A
Butyl Alcohol	A	A	A	A	A	A	A	A	A
Butyric Acid	A	A	A	A	A	A	A	A	A
Calcium hydroxide	A	A	A	A	A	A	A	A	A
Calcium hypochlorite	A	A	A	B	B	B	A	A	A
Calcium salt	A	A	A				A	A	A
Calcium sulphate	A	A	A	A	A	A	A	A	A
Carbolic Acid	C	C	C	A	A	A	A	A	A
Carbon dioxide	A	A	A	A	A	A	A	A	A
Carbon disulfide	C	C	C	A	A	A	A	A	A
Carbon monoxide	A	A	A	A	A	A	A	A	A
Carbon tetrachloride	A	A	B	A	A	A	A	A	A
Caustic potash	B	B	B	A	A	A	B	B	B
Chlorine (dry)	A	A	A	A	A	A	A	A	A
Chlorine (wet)	B	B	B	C	C	C	A	A	A
Chlorine trifluoride	C	C	C	C	C	C	C	C	C
Chloroacetic Acid	B	B	A				A	A	A
Chlorobenzene	A	A	A	A	A	A	A	A	A
Chlorodiphenyl	A	A	A				A	A	A
Chloroform	B	B	B	A	A	A	A	A	A

Medium	Novus® 30	Novus® 34	Graftec®	Ecnograph® -TI & TIA	Ecnograph® -FI	®Sigraflex Hochdruck	Uniflon® 50	Uniflon® 51	Uniflon® 53
Chloromethane	B	B	B	A	A	A	A	A	A
Chromic Acid	C	C	C	C	C	C	A	A	A
Chromium salt	B	B	A				A	A	A
Citric Acid	A	A	A	A	A	A	A	A	A
Coolants	B	B	B	A	A	A	A	A	A
Copper salt	A	A	A	A	A	A	A	A	A
Creosote	B	B	A	A	A	A	A	A	A
Cresol	B	B	B	A	A	A	A	A	A
Cyclohexanol	A	A	A	A	A	A	A	A	A
Cyclohexanon	C	C	B	A	A	A	A	A	A
Decaline	A	A	A	A	A	A	A	A	A
Dibenzylether	C	C	C	A	A	A	A	A	A
Diethyl amine	A	A	A	A	A	A	A	A	A
Diethyl ether	A	A	A	A	A	A	A	A	A
Dimethyl formamide	C	C	C	A	A	A	A	A	A
Dioxan	A	A	A	A	A	A	A	A	A
Dipentene	A	A	A	A	A	A	A	A	A
Diphenyl methane	A	A	A	A	A	A	A	A	A
Diphil (<5> Dowtherm A)	A	A	A	A	A	A	A	A	A
Dry-cleaning naphtha	A	A	A	A	A	A	A	A	A
Ethane	A	A	A	A	A	A	A	A	A
Ethanol	A	A	A	A	A	A	A	A	A
Ethanolamine	A	A	A	A	A	A	A	A	A
Ether	A	A	A	A	A	A	A	A	A
Ethychloride	B	B	A	A	A	A	A	A	A
Ethyl alcohol	A	A	A	A	A	A	A	A	A
Ethyl benzene	A	A	A	A	A	A	A	A	A
Ethyl cellulose	A	A	A	A	A	A	A	A	A
Ethyl ether	A	A	A	A	A	A	A	A	A
Ethylacetate	A	A	A	A	A	A	A	A	A
Ethylene	A	A	A	A	A	A	A	A	A
Ethylene chloride	C	C	C	A	A	A	A	A	A
Ethylene diamine	A	A	A	A	A	A	A	A	A
Ethylene glycol	A	A	A	A	A	A	A	A	A
Fatty Acids of C10	A	A	A				A	A	A
Fluorine (liquid)	C	C	C	C	C	C	C	C	C
Fluorine dioxode	C	C	C	C	C	C	C	C	C
Fluorine gas	C	C	C	C	C	C	C	C	C
Fluorohydrogen	C	C	C	C	C	C	A	A	A
Fluorohydrogen	C	C	C	C	C	C	C	C	B
Formaldehyde	A	A	A	A	A	A	A	A	A
Formamide	B	B	B	A	A	A	A	A	A
Formic Acid 10%	A	A	A	A	A	A	A	A	A
Formic Acid 85%	B	B	B	A	A	A	A	A	A
Freon 12	A	A	A	A	A	A	A	A	A
Freon 22	B	B	B	A	A	A	A	A	A
Furfural	A	A	A	A	A	A	A	A	A
"Gas, generator"	A	A	A				A	A	A
"Gas, LPG"	A	A	A	A	A	A	A	A	A
Gelatine	A	A	A	A	A	A	A	A	A
Glacial acetic acid	C	C	C	B	B	B	A	A	A
Glucose	A	A	A	A	A	A	A	A	A
Glycerine	A	A	A	A	A	A	A	A	A
Glycol	A	A	A	A	A	A	A	A	A
Heptane	A	A	A	A	A	A	A	A	A
Hexane	A	A	A	A	A	A	A	A	A
Hydr. Fluid (ester based)	B	B	B	A	A	A	A	A	A
Hydr. Fluid (mineral oil)	A	A	A	A	A	A	A	A	A

A=Resistant B=Limited resistant C=Non-resistant

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Medium	Novus® 30	Novus® 34	Graftec®	Econgraph® -TI & TIA	Econgraph® -FI	®Sigraflex Hochdruck	Uniflon® 50	Uniflon® 51	Uniflon® 53
Hydrochloric Acid (concentr.)	C	C	C	C	C	C	A	A	A
Hydrochloric Acid (diluted)	B	B	B	C	C	C	A	A	A
Hydrochloric Acid 20%	B	B	B	C	C	C	A	A	A
Hydrochloric Acid 37%	C	C	C	C	C	C	A	A	A
Hydrofluorosilicic Acid	C	C	C	B	B	B	B	B	B
Hydrogen	A	A	A	A	A	A	A	A	A
Hydrogen Bromide	B	B	B	A	A	A	A	A	A
Hydrogen Chloride	B	B	B	A	A	A	A	A	A
Hydrogen peroxide (6%)	A	A	A	A	A	A	A	A	A
Hydrogen sulphide	A	A	A	A	A	A	A	A	A
Iron salt	A	A	A				A	A	A
Isobutyl alcohol	A	A	A	A	A	A	A	A	A
Iso-octane	A	A	A	A	A	A	A	A	A
Isopropyl acetate	A	A	A	A	A	A	A	A	A
Isopropyl Alcohol	A	A	A	A	A	A	A	A	A
Isopropyl ether	A	A	A	A	A	A	A	A	A
Kerosene	A	A	A	A	A	A	A	A	A
Lactic Acid	A	A	A	A	A	A	A	A	A
Lead salt	A	A	A	A	A	A	A	A	A
Magnesium hydroxide	A	A	A	A	A	A	A	A	A
Maleic Acid	A	A	A	A	A	A	A	A	A
Methane	A	A	A	A	A	A	A	A	A
Methanol	A	A	A	A	A	A	A	A	A
Methyl Alcohol	A	A	A	A	A	A	A	A	A
Methyl Chloride	B	B	B	A	A	A	A	A	A
Methyl ethyl ketone	B	B	B	A	A	A	A	A	A
Methylene Chloride	C	C	B	A	A	A	A	A	A
Naphtha	A	A	A	A	A	A	A	A	A
Naphthalene	A	A	A	A	A	A	A	A	A
Natural gas	A	A	A	A	A	A	A	A	A
Nickel salt	A	A	A				A	A	A
Nitric Acid	C	C	C	C	C	C	A	A	A
Nitrobenzene	C	C	C	A	A	A	A	A	A
Nitrogen	A	A	A	A	A	A	A	A	A
Octane	A	A	A	A	A	A	A	A	A
"Oil, Crude"	A	A	A	A	A	A	A	A	A
"Oil, diesel"	A	A	A	A	A	A	A	A	A
"Oil, engine"	A	A	A	A	A	A	A	A	A
"Oil, heating"	A	A	A	A	A	A	A	A	A
"Oil, hydraulic"	A	A	A	A	A	A	A	A	A
"Oil, linseed"	A	A	A	A	A	A	A	A	A
"Oil, lubricating"	A	A	A	A	A	A	A	A	A
"Oil, lubricating 100°C"	A	A	A	A	A	A	A	A	A
"Oil, lubricating RT"	A	A	A	A	A	A	A	A	A
"Oil, silicone"	A	A	A	A	A	A	A	A	A
"Oil, stem"	A	A	A	A	A	A	A	A	A
"Oil, thermal"	A	A	A	A	A	A	A	A	A
"Oil, transformer	A	A	A	A	A	A	A	A	A
"Oil, transmission"	A	A	A	A	A	A	A	A	A
Oleum	C	C	C	C	C	C	A	A	A
Oxalic Acid	B	B	A	C	C	C	A	A	A
Oxygen	B	B	B	B	B	B	B	B	B
Palmitic Acid	A	A	A	A	A	A	A	A	A
paraffin	A	A	A	A	A	A	A	A	A
Pentane	A	A	A	A	A	A	A	A	A
Perchloroethylene	B	B	B	A	A	A	A	A	A
Petrol	A	A	A	A	A	A	A	A	A

Medium	Novus® 30	Novus® 34	Graftec®	Econgraph® -TI & TIA	Econgraph® -FI	®Sigraflex Hochdruck	Uniflon® 50	Uniflon® 51	Uniflon® 53
Petroleum ether	A	A	A	A	A	A	A	A	A
Phenol	C	C	C	A	A	A	A	A	A
Phenyl ether	A	A	A	A	A	A	A	A	A
Phenyl hydrazine	A	A	A	A	A	A	A	A	A
Phosphoric acid	B	B	B	B	B	B	B	B	B
Phosphorus trichloride	B	B	B	A	A	A	A	A	A
Phthalic acid	A	A	A	A	A	A	A	A	A
Potassium Carbonate	A	A	A	A	A	A	A	A	A
Potassium Chlorate	A	A	A	A	A	A	A	A	A
Potassium Chromate	B	B	B	C	C	C	A	A	A
Potassium cyanide	B	B	B	A	A	A	A	A	A
Potassium hydroxide	B	B	B	A	A	A	B	B	B
Potassium hypochlorite	A	A	A	B	B	B	A	A	A
Potassium nitrate	A	A	A	B	B	B	A	A	A
Potassium permanganate	A	A	A	A	A	A	A	A	A
Propane	A	A	A	A	A	A	A	A	A
Propyl Alcohol	A	A	A				A	A	A
Pyridine	C	C	C	A	A	A	A	A	A
Salicylic Acid	A	A	A	A	A	A	A	A	A
Santotherm 66	A	A	A				A	A	A
Silver salt	A	A	A	A	A	A	A	A	A
Skydrol 500	A	A	A	A	A	A	A	A	A
Soap solutions	A	A	A	A	A	A	A	A	A
Sodium Carbonate	A	A	A	A	A	A	A	A	A
Sodium Chloride	A	A	A	B	B	B	A	A	A
Sodium Cyanide	B	B	B	A	A	A	A	A	A
Sodium hydroxide	B	B	B	B	B	B	B	B	B
Sodium salt	A	A	A	A	A	A	A	A	A
Sodium sulphate	A	A	A	A	A	A	A	A	A
Starch solutions	A	A	A	A	A	A	A	A	A
"Steam, high pressure"	B	B	B	A	A	A	B	B	B
"Steam, low pressure"	A	A	A	A	A	A	A	A	A
Styrene	A	A	A	A	A	A	B	B	B
Sulphur dioxide	C	C	C	A	A	A	A	A	A
Sulphur trioxide	C	C	C	C	C	C	A	A	A
Sulphuric Acid 30%	C	C	C	B	B	B	A	A	A
Sulphuric Acid 50%	C	C	C	B	B	B	A	A	A
Sulphuric Acid 96²%	C	C	C	C	C	C	A	A	B
Sulphurous Acid	B	B	B	A	A	A	A	A	A
Tannic Acid	A	A	A	A	A	A	A	A	A
Tar	A	A	A	A	A	A	A	A	A
Tartaric Acid	A	A	A	A	A	A	A	A	A
Tetrachloroethane	B	B	B	A	A	A	A	A	A
Tetraline	A	A	A	A	A	A	A	A	A
Tin salt	A	A	A	A	A	A	A	A	A
Toluene	A	A	A	A	A	A	A	A	A
Trichloroethylene	B	B	B	A	A	A	A	A	A
Triethanol Amine	A	A	A	A	A	A	A	A	A
Turpentine	A	A	A	A	A	A	A	A	A
Vinylacetate	A	A	A	A	A	A	B	B	B
Vinylchloride	A	A	A	A	A	A	B	B	B
Water	A	A	A	A	A	A	A	A	A
"Water, Chlorinated"	A	A	A	A	A	A	A	A	A
"Water, sea"	A	A	A	A	A	A	A	A	A
White spirit	A	A	A	A	A	A	A	A	A
Xylene	A	A	A	A	A	A	A	A	A
Zinc salt	A	A	A	A	A	A	A	A	A

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