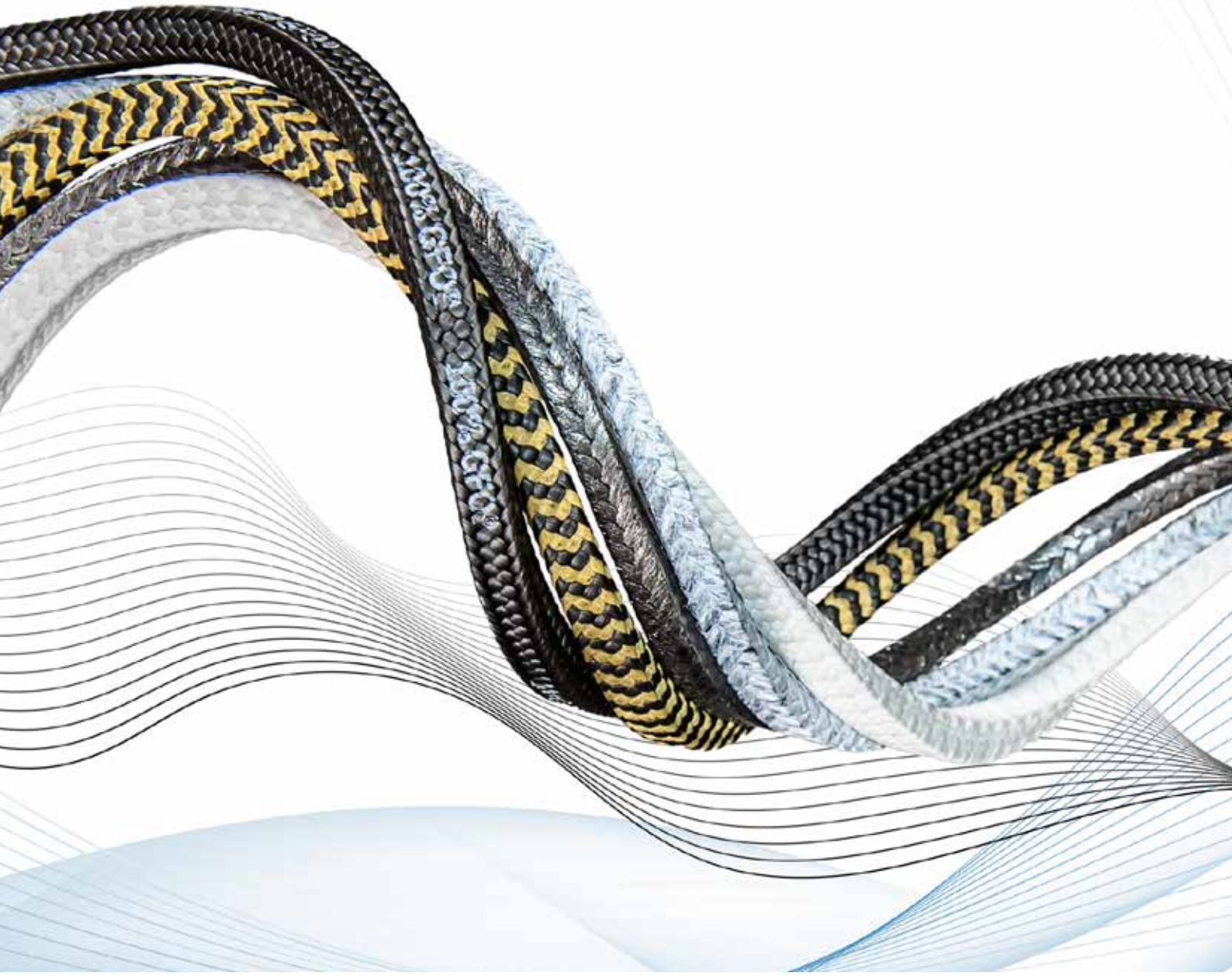
ProPack
DICHTUNGEN UND PACKUNGEN AG

Worldwide your competent partner for Sealing Technology



Trapezpacking

Elastomercore Packing

Hybridpacking

Gasket

Valve Packing

TECHNOLOGY MADE IN GERMANY

Packing set .

Pump packing

Table of contents

NET ZERO

We believe that industry does not have a choice to adopt Net Zero, it is an urgent requirement. It is possible to incorporate sustainability into company ethos, policies and practices, and product design. Betterworld solutions is our first step in supporting other industry leaders who like to join us to secure a more sustainable future for the planet.

PFAS FREE

PFAS chemicals will be regulated in the future to protect human health and the environment. The focus will be on volatile and water-soluble PFAS substances. There will be an official declaration on which substances will be banned or restricted. Whether PTFE as an important sealing and impregnation material in stuffing box packings and gaskets in industrial use is affected by this cannot be said at the moment. For interested users of packings and gaskets, we mark our products that are already PFAS-free in our catalog with the icon shown above.

Packing production

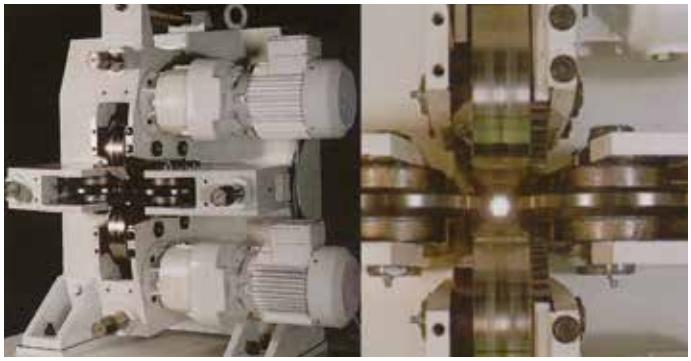
ProPack was founded in 1989. Our fundamental vision – which we still follow today – is to combine high quality raw materials with the best state of the art processing technology. Partner-orientated consultancy and the consequent implementation of special specifications and requirements of our customers, together with constant Quality Assurance, define - the service package of our company.

Users do not always wish or even need expensive, complex Sealing Systems. With the help of newly developed machinery and production processes – as an important basis – we apply the newest experience from tests and practice. Thereby the most modern, partly modified, asbestos-free raw materials are employed.



One of the largest packing inventories in our industry allows often same day delivery and offers our customers an incredible support during a shut down. Our stock is continuously monitored and the stock level is adjusted to actual turnover per product and dimension.

Precision re-machining



Further precision re-machining after braiding using a modern calander with 4 adjustable rolls allows to control the dimension in height and width, improves surface contact and reduces consolidation of the packing.

Packing Ring Production

Die-formed and pre-cut rings are user friendly solutions and provide at the same time the best sealing results without waste. The assembly is unproblematic and secure. A tool stock of about 2,000 dies of metric and imperial sizes allows us to meet the requirements of most users of pump and valve packing.

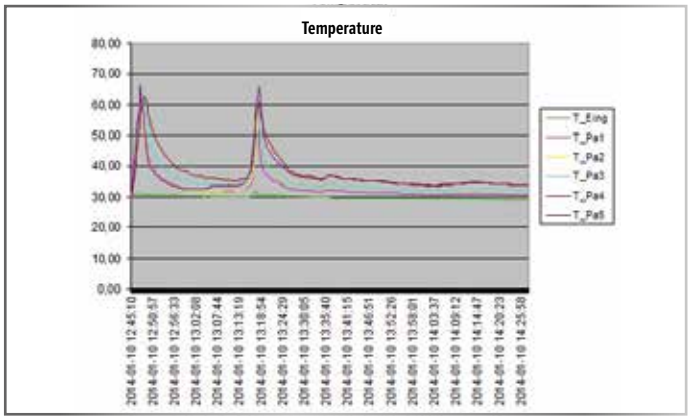
EDI Test rig for Pump packing

This test rig allows to measure on each installed packing ring on outer diameter:

- **Pressure drop**
- **Temperature**
- **Leakage**

In addition energy input and the total leakage on shaft and housing can be determined. A variable speed control allows to simulate the influence of miscellaneous and hydrodynamic friction on the seal performance and the running properties. The efficiency of lantern rings and neck bushes in different positions of the stuffing box can be examined as well.

Pump Packing Test Rig



EDI temperature protocol taken during a run in process

Production of Packing with continous braiding machine control

ProPack provides the complete range of packages for pumps and valves.

Other applications are in mixers, agitators, autoclaves, refiners, kneaders and similar units.

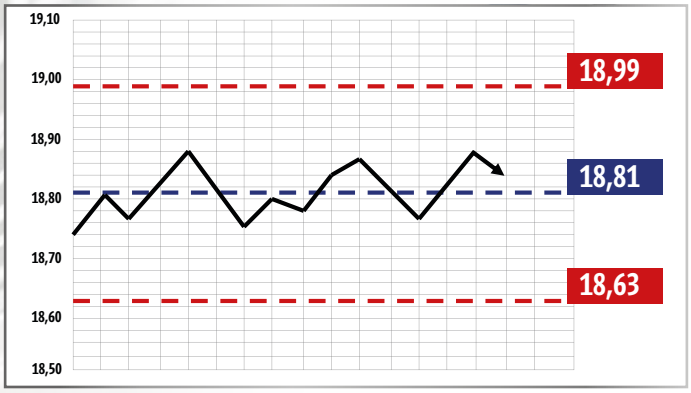
Modern Braiding Machines produce traditional as well as modern complex packing braids with a tight bonding technique.

A double, continuously variable velocity adjustment control enables a precise plying of the braiding fi bres and a maximum surface contact of the packing results. Braiding carriers with optimized tension and reduced friction, concentrate the dynamics of the braid structure into the centre of the packing. Skillful machine selection enables braiding with marginal and thus neutral core fi bres. Additional run-in lubricants and special dispersions provide the packing with optimal cross section density and running features.

Continuous braiding machine control

The Quality Management System used by ProPack fulfils the demands of DIN EN ISO 9001 and is governed by a yearly inspection through the TÜV Management Service.

Statistic Process Controlling Example: 19 mm Packing Style A22



The seal SPC – Statistic-Process Control - is a guarantee for constant quality with repeatable results, which leads to a higher operating reliability and prolonged application life expectancy for the user. Packing which bears the SPC Quality Seal is under a permanent control throughout the whole production process. This has the advantage that any discrepancy is immediately detected and corrected, whereas any size errors can be avoided.

Packings and their braiding types

Yarns are processed in a specific braiding method to form a flexible and wear-resistant structure..

High-quality yarns, the right impregnation, and the perfect braiding technique are the key components for producing an efficient and effective packing seal. Several factors can make the difference between a quality product that withstands an entire production cycle with minimal material wear and an inexpensive packing. Despite initial savings at purchase, inexpensive packing can incur many additional costs during its operational lifespan.

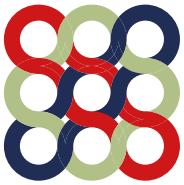
The selection of the braiding technique for a specific application depends on various factors, including the type of medium to be conveyed, operating conditions, and specific sealing requirements.

2-DIAGONAL BRAID

For dimensions from
3 to 60 mm

Characteristics:
- good pliability
- good elasticity

2-D braids are often used in applications where a large cross-section has to be bent around in a relation to the shaft or spindle diameter.

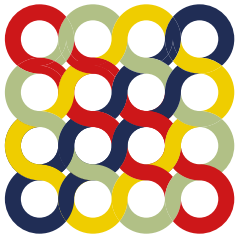


3-DIAGONAL BRAID

For dimensions from
5 to 9 mm

Characteristics:
- good cross-sectional stability
- dense braid structure

A 3-D braid offers enhanced strength and provides improved load distribution. This construction is used in hybrid braids.



4-DIAGONAL BRAID

For dimensions from
9,5 to 40 mm

Characteristics:
- very dense braid structure
- smooth surface
- high cross-sectional stability

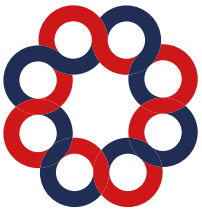
4D braids are wear-resistant due to the tight yarn interlocking in the packing cross-section.

TRAPEZOIDAL BRAID

For dimensions from 9,5 to 40 mm

Characteristics:
- lower friction heat
- optimal force distribution
- low wear on packing and shaft

The trapezoidal braided packing adapts perfectly to the stuffing box space. This ensures even pressure distribution, prevents external leakage due to increased sealability and minimises shaft and packing wear. This leads to shorter running-in times and reduced readjustment, combined with lower frictional heat. This means a longer service life and greater reliability.



ROUND BRAID

For dimensions
from 40 mm

Characteristics:
- dense surface

For very large dimensions up to 100 mm, several layers are braided around a core. This type of braiding is also used to produce gaskets for flanges.

Pump Packing

Pump Packing is used to seal slow to fast rotating shafts. It contains specially formulated lubricants to aid equipment start up and ensure packing pliability for a longer life.

Further applications can be found in mixers, agitators, autoclaves, refiners, kneaders and similar units.

Hybrid-Pack®

We differentiate between corner and running track reinforced Hybrid Packing. In principle a minimum of 2 different yarns are combined for example with a reinforcing characteristic as found with Aramid fibers and yarns containing graphite. The latter improve the heat conductivity. A corner reinforcement makes sense in axial motion machinery like plunger pumps. A positive side effect is to minimize the risk of gap extrusion.

Most applications for Hybrid-Pack® are found at rotating shafts. Running track reinforcement is preferred over corner reinforcement. The reason for this is the fact that the equal distribution of reinforcing material over the width of the packing assures a uniform load on the shaft surface. A side effect of the running track reinforcement is to stop the dynamic of abrasive particles, which can be induced by the shaft rotation and to protect a softer component of the packing.

H Install packing with Logo facing to housing side and in rotating applications with the arrow marking in the direction of rotation.

Reinforced corners for oscillating plungers

Reinforced running track for rotating shafts against churning product particles

P 1 Universal

Made with 100 % GORE® GFO® Fiber: ePTFE with Incorporated Graphite and Silicone Run-In Lubricant

Characteristics

- Extremely wide range of applications for all kind of industries
- Easy and safe installation and handling
- No ageing process
- Easy to disassemble
- Protection of shaft against wear (HRC 25)
- Superb heat conductivity
- Not recommended for abrasive media

Operating range

p [bar]	25	250	150
v [m/s]	25	2	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.55		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Autoclave
- Refiner
- Vacuum pumps

Suitable for

- Chemical industry
- Power plant technology
- Pulp and paper industry

- FOR INDUSTRIAL USE ONLY
  Not for use in food, drug, cosmetic or medical device manufacturing, processing, or packaging operations.

ADVERTISEMENT

The right packing for reliability and savings

A sustainable solution

Gore has tested packing made of 100% GORE® GFO® Fiber alongside generic graphite/PTFE packings*.

Packings made of 100% GORE® GFO® Packing Fiber achieve better results for all attributes. The differences in performance for each generic packing will have an impact on the operational costs. The example below shows an estimate of the savings that can be made by using packing made of 100% GORE® GFO® Packing Fiber.

- Up to **7x more creep resistant**
- Retain up to **15x more lubricant**
- Up to **11x more tight**
- Up to **15x more stable**

Operating Cost	Generic Packing	100% GORE® GFO® Fiber	Savings
Power consumption	$ 531	$ 227	$ 304
Water consumption	$ 228	$ 116	$ 112
Maintenance	$ 1,450	$ 245	$ 1,205
Total operating cost per pump, per year	$ 2,209	$ 588	$ 1,621
Initial cost of packing	$ 40	$ 65	$ – 25

Based on calculations for a 100 psi (6.9 bar) pump, 2 inch (50 mm) shaft; Drip rate 25,000 gallons (94.6 m³)/year; Packing = $40; Replacement of packing = 3 times per year; kWh = $0.12. Savings are estimated and annualized.

*The brand of the fiber used in generic packings is not specified.

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Quality assured

- Packing imprinted with **100% GFO®** — proof of authenticity
- **100% GFO® Packing Fiber** sticker on the packaging
- No blends of other material
- Consistent quality of material
- Quality assurance through audits
- Global network of authorized and trusted braiders
- GFO® Fiber — Made in America

gore.com/gfo

GORE

P 1P Budget

Braid of ePTFE Fiber with Incorporated Graphite and Silicone Run-In Lubricant

Characteristics

- Good heat conductivity
- Easy installation and safe handling
- No ageing process
- Resistant against Sewage, Boiler Feed Water, Acids, Alkaline solutions, Oil and Grease
- Recommended shaft surface hardness: HRC 25

Operating range

p [bar]	25	250	150
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.53		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Autoclave
- Refiner
- Vacuum pumps

Suitable for

- Chemical industry
- Power plant technology
- Pulp and paper industry
- Universal use
- Installation and maintenance shops

P 1X

Braid of ePTFE Fiber with Incorporated Graphite and Silicone Run-In Lubricant

Characteristics

- Good heat conductivity
- Easy installation and safe handling
- No ageing process
- Resistant against Sewage, Boiler Feed Water, Acids, Alkaline solutions, Oil and Grease
- Recommended shaft surface hardness: HRC 25

Operating range

p [bar]	25	250	150
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.60		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Autoclave
- Refiner
- Vacuum pumps

Suitable for

- Chemical industry
- Power plant technology
- Pulp and paper industry
- Universal use
- Installation and maintenance shops
- OEM

P 2P Super

100 % Para-Aramid continuous Fiber with PTFE-Blocking Agent and Silicone free dynamic Run-In Lubricant

Characteristics

- Excellent in highly abrasive products
- Wear resistent universal packing
- Minimized monitoring, short run-in period
- Shafts or shaft sleeves in HRC 60 recommended

Operating range

p [bar]	25	500	250
v [m/s]	25	2	
t °C	-50 ... +280		
pH	2 - 12		
g/cm³	1.25		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Autoclave
- Refiner

Suitable for

- All industries
- Chemical industry
- Waste water technology
- Pulp and paper industry

Variant

P 2 with Silicone Run-In Lubricant

P 7 Industrie

Para-Aramid Fiber Packing with PTFE Impregnation and Paraffin Run-In Lubricant

Characteristics

- Volume stable, pressure stable
- High cross section density through PTFE blocking agent, safety against penetration of crystallizing media
- Good protection against wear, with abrasive and hardening media
- Recommended shaft surface hardness: HRC 50

Operating range

p [bar]	25	100	100
v [m/s]	20	2	
t °C	-50 ... +250		
pH	2 - 12		
g/cm³	1.23		

Practical useful application data:
max. temperature: +200 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

- Pulp and paper industry
- Sugar industry
- Power plant technology
- Waste water technology
- Mining industry

Variant

- TP7 in Trapez-Shape
- P7A without lubricant for valves
- P7G dry graphitized

P 8E Ramie

Ramie Fiber with PTFE Blocking Agent and Paraffin Run-In Lubricant

Characteristics

- Universal packing for the lower temperature range
- Excellent value for money
- Shaft protecting, resistant to rotting
- Recommended shaft surface hardness: HRC 45
- Excellent in products containing solids

Operating range

p [bar]	25	100	100
v [m/s]	12	1.5	
t °C	-50 ... +140		
pH	4 - 11		
g/cm³	1.35		

Practical useful application data:
max. temperature: +120 °C
max. pressure centrifugal pumps: 15 bar

Main application

- Centrifugal pumps
- Gate valves
- Fittings
- Agitators
- Refiner
- Filter
- Stern Tube

Suitable for

- Universal use in lower temperature range
- Pulp and paper industry
- Sewage plants
- Marine industries

Variant

P 8 Ramie

P 9 Multi

Synthetic Fiber with PTFE Impregnation and siliconfree dynamic Run-In Lubricant

Characteristics

- High fatigue strength and flexibility
- Good acid resistance (e. g. hydrofluoric acid 15 % / 50 °C)
- High cross section density through PTFE blocking agent, good for crystallizing media
- Recommended shaft surface hardness: HRC 35
- Good pliability, therefore perfect adaption of uneven shaft surfaces

Operating range

p [bar]	20	60	100
v [m/s]	15	2	
t °C	-50 ... +280		
pH	1 - 13		
g/cm³	1.35		

Practical useful application data:
max. temperature: +180 °C

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Filter
- Extruder
- Refiner

Suitable for

- Chemical industry
- Sugar industry
- Pulp and paper industry

P 9 Gold

Polyimide Fiber with PTFE Impregnation and Silicone Run-In Lubricant

Characteristics

- High fatigue strength and flexibility
- Good acid resistance
- High cross section density through PTFE blocking agent, good for crystallizing media
- Recommended shaft surface hardness: HRC 35
- Good pliability, therefore perfect adaption of uneven shaft surfaces

Operating range

p [bar]	20	60	100
v [m/s]	15	2	
t °C	-100 . . . +280		
pH	0 - 12		
g/cm³	1.275		

Practical useful application data:
max. temperature: +180 °C

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Filter
- Extruder
- Refiner

Suitable for

- Chemical industry
- Sugar industry
- Pulp and paper industry
- Mining

Variant

P 17 Color Combination braid of ePTFE with incorporated Graphite and Polyimid Fiber with Silicone Run-In Lubricant

P 10 Service

PTFE-Graphite Fiber with Paraffin Run-In Lubricant

Characteristics

- Special lubricating graphite minimizes friction and guarantees greater heat conductivity
- Shafts or shaft sleeves in HRC 25 recommended
- Universal PTFE/Graphite packing with good value for money

Operating range

p [bar]	25	250	150
v [m/s]	20	2	
t °C	-50 . . . +280		
pH	0 - 14		
g/cm³	1.65		

Practical useful application data:
max. temperature: +180 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Autoclave

Suitable for

- Chemical industry
- Power plant technology
- Pulp and paper industry
- General industries

P 12 Kombi

Running Track reinforced Hybrid Braid of ePTFE with Incorporated Graphite and Para-Aramid Fiber with Silicone Run-In Lubricant

Characteristics

- Even and reduced shaft surface wear
- Excellent heat conductivity
- Recommended shaft surface hardness: HRC 45
- Safe and universal packing with abrasive media

Operating range

p [bar]	25	250	150
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	2 - 12		
g/cm³	1.5		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Filter

Suitable for

- Chemical industry
- Pulp and paper industry
- Sewage technology
- Waste water technology

P 17 Color

Combination Braid of ePTFE with Incorporated Graphite and Polyimid Fiber with Silicone Run-In Lubricant

Characteristics

- Combination braid with extended pH-range of 0 - 12
- Improved heat conductivity and increased mechanical strength due to special material combination
- Reduced wear of the shaft surface
- Recommended shaft surface hardness: HRC 35

Operating range

p [bar]	25	250	150
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	0 - 12		
g/cm³	1.5		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators

Suitable for

- Chemical industry
- Chemical Sewage
- Universal use

P 20 Carbon

Carbonfiber with special impregnation and Silicone free dynamic Run-In Lubricant

Characteristics

- Strong against abrasive mediums, yet low friction on shaft surface
- Recommended shaft/sleeve hardness HRC 45
- Volume stabile, minimal shrinkage, good heat conductivity
- Suitable as bullrings

Operating range

p [bar]	30	100	100
v [m/s]	25	2	
t °C	-50 ... +300		
pH	2 - 12		
g/cm³	1.48		

Practical useful application data:
max. temperature: +250 °C
max. pressure centrifugal pumps: 25 bar

Main application

- Boilerfeed pumps
- Refiner

Suitable for

- Chemical industry
- Pulp and paper industry
- Power plant technology
- Boiler houses

P 52

Synthetic Staple Fiber with special Graphite Impregnation and Paraffin Run-In Lubricant

Characteristics

- Volume stable, pressure stable
- High Cross section density due to special impregnation
- Excellent Value for money
- Graphitized all-round packing with Emergency run Capabilities
- Good wear resistance against abrasive and crystallizing products
- Recommended shaft surface hardness: HRC 45

Operating range

p [bar]	20	150	150
v [m/s]	20	2	
t °C	-50 ... +180		
pH	5 - 11		
g/cm³	1.35		

Practical useful application data:
max. temperature: +140 °C

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators

Suitable for

- Chemical industry
- Pulp and paper industry
- Waste water technology
- Community facilities

P 56 Carbomaster

Combination braid from Carbon reinforced expanded Graphite Tape and Carbon Fiber with Paraffin Run-In Lubricant

Characteristics

- High standardisation potential
- Wear resistant through running track reinforcement, nevertheless shaft protecting
- Recommended shaft surface hardness: HRC 45
- Excellent heat conductivity, suitable for dry running applications
- Non-hardening, good reset capability, coefficient of thermal expansion like steel
- Self lubricating excellent use in pumps, minimising the need of Flushwater

Operating range

p [bar]	25	100	100
v [m/s]	30	2	
t °C	-50 ... +300		
pH	2 - 12		
g/cm³	1.10		

Practical useful application data:
max. temperature: +250 °C

Main application

- Centrifugal pumps
- Boiler feed water pumps
- Mixer
- Agitators
- Refiner
- Kneader

Suitable for

- Power plant technology
- Boiler houses
- Pulp and paper industry
- Chemical and Petrochemical industry

P 58 Basis

Synthetic staple Fiber with PTFE Blocking Agent and Paraffin Run-In Lubricant

Characteristics

- Universal packing for the lower temperature range
- Excellent value for money
- Wear resistant nevertheless shaft protecting
- Recommended shaft surface hardness: HRC 45
- Excellent in products containing solids

Operating range

p [bar]	20	150	150
v [m/s]	20	2	
t °C	-50 ... +140		
pH	5 - 11		
g/cm³	1.35		

Practical useful application data:
max. temperature: +120 °C

Main application

- Centrifugal pumps
- Gate valves
- Agitators
- Filter

Suitable for

- Universal use in lower temperature range
- Pulp and paper industry
- General plant maintenance
- Sewage plants

P 60 CarboGraph

Braided from Expanded Graphite with integrated Carbon fiber Reinforcement

Characteristics

- Wear and extrusion stability through Carbon fiber reinforcement
- Non hardening, good reset capability, coefficient of thermal expansion similar to steel
- High temperature resistant and excellent heat and electric conductivity
- Self lubricating, excellent use in pumps, minimizing the need for flushwater
- Easy to cut, assemble and disassemble
- No shaft wear, excellent dry running characteristics

Operating range

p [bar]	20	65	300
v [m/s]	30	3	
t °C	-200 . . . +550		
pH	0 - 14		
g/cm³	1.00		

Practical useful application data: max. temperature in oxidizing atmosphere: +400 °C

Main application

- Centrifugal pumps
- Valves
- Control valves
- Gate valves
- Steam
- High Pressure and Temperature Valves

Suitable for

- Power plant technology
- Boiler houses
- Chemical industry
- Pulp and paper industry

P 82

Cotton packing with graphite/grease impregnation and Run-In Lubricant

Characteristics

- Universal packing for the lower temperature range
- Excellent cost-value relation
- Recommended shaft surface hardness: HRC 45
- Smooth braiding for damaged shaft surfaces

Operating range

p [bar]	10	50	
v [m/s]	10	2	
t °C	-20 . . . +120		
pH	5 - 9		
g/cm³	1.5		

Main application

- Centrifugal pumps
- Agitator

Suitable for

- Universal use in lower temperature range
- General plant maintenance
- Sewage plants

P 83

Cotton with tallow/grease and Run-In Lubricant

Characteristics

- Universal packing for the lower temperature range
- Excellent cost-value relation
- Recommended shaft surface hardness: HRC 45
- For products containing solids
- Highly pliable packing

Operating range

p [bar]	20	50	50
v [m/s]	10	2	
t °C	-20 ... +100		
pH	5 - 13		
g/cm³	1.45		

Main application

- Centrifugal pumps
- Agitators

Suitable for

- Universal use in lower temperature range
- Pulp and paper industry
- General plant maintenance
- Sewage plants

P 84

Para-Aramid Fiber Packing with with graphite/grease impregnation and Run-In Lubricant

Characteristics

- Wear-resistant universal packing
- Good structural strength
- Recommended shaft surface hardness: HRC 50
- Pliable braiding for damaged shaft surfaces
- Very good price-performance ratio

Operating range

p [bar]	15	65	
v [m/s]	10	2	
t °C	-20 ... +150		
pH	2 - 12		
g/cm³	1.5		

Main application

- Centrifugal pumps
- Mixer

Suitable for

- Waste water technology
- Pump industry

Variant

- P7 / TP7 with PTFE Blocking Agent and Paraffin Run-In Lubricant
- P7A with PTFE, without lubricant for valves

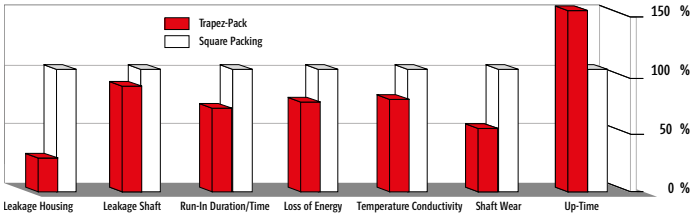
Our 18 braiding machines have an annual capacity of over 120 tonnes and produce packing in dimensions from 2 to 100 mm.

Trapez-Pack®

Lower compression forces and at the same time uniform distribution of the sealing forces.

This decisive modification of packing geometry substantially improves lifetime and sealability of a state of the art pump and valve packing.

Trapez-Pack® Advantage



- The braided trapezoid cross section forms into a perfect square shape during installation
- Even pressure in all directions inside the stuffing box
- No OD leakage due to significantly improved k - factor
- No excessive compression along the shaft therefore reduced friction and heat generation
- Reduced wear of shaft and packing
- Packing rings do not rotate with the shaft
- Reduced run-in procedure and minimized readjustment required.
- Optimized efficiency and longer lifetime

Packing bent to a ring.

The Square packing profile deforms uncontrolled. Trapez-Pack places itself evenly around the shaft.

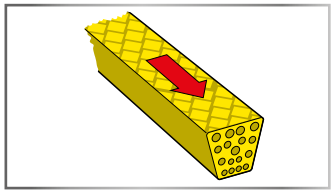
Square Braided Packing

Trapez-Pack®

Arrow marks for correct installation.

A red arrow marks the outer packing side (housing side) and should point in the direction of shaft rotation.

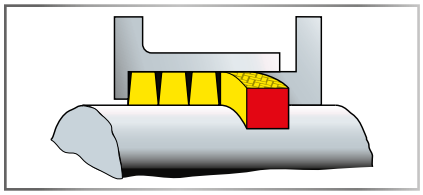
Arrow mark



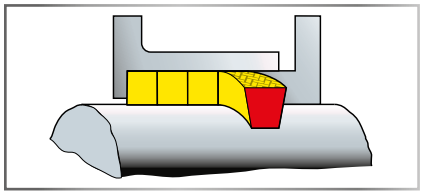
Installed situation

Conventional Square Packing results, when installed, in a bulk next to the shaft and shows voids on the stuffingbox housing.

Square Braided Packing



Trapez-Pack®

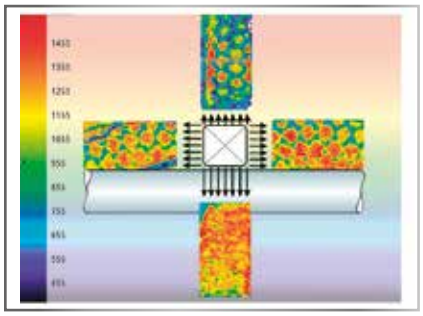


Trapez-Pack places itself evenly with parallel sides in the stufingbox.

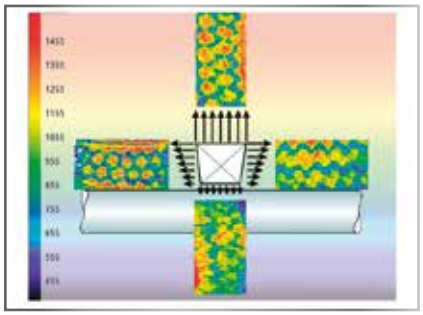
Compression distribution:

Square Packing overloads the shaft area and has minimal compression to the stuffingbox housing. The packing runs hotter and shows leckage along its outer diameter.

Square Braided Packing Pressure Distribution



Trapez-Pack® Pressure Distribution



Trapez-Pack shows equal load to all areas

Trapez-Pack®1

Braid of ePTFE yarn with Incorporated Graphite and Silicone Run-In Lubricant

Characteristics

- Excellent heat conductivity
- Maximum protection of shaft against wear (HRC 25 is sufficient)
- Extended MTBF
- Easy and safe installation and handling
- No ageing process

Operating range

p [bar]	25	250	100
v [m/s]	25	2	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.55		

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer
- Vacuum pumps

Suitable for

- Universal use
- Waste water technology
- Acids
- Alkaline solutions
- Oil and grease

Trapez-Pack®3

Meta-Aramid Fiber with PTFE Blocking Agent and Silicone Run-In Lubricant

Characteristics

- Wear resistant, universal packing for applications with abrasive content
- High cross section density and structural stability, yet elastic and pliable
- Low friction, low shaft wear (HRC 45 shaft shaft surface hardness is sufficient)
- Clean packing, no contamination of media

Operating range

p [bar]	25	100	100
v [m/s]	20	1.5	
t °C	-100 . . . +280		
pH	1 - 13		
g/cm³	1.40		

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

- Pulp and paper industry
- Sugar industry
- Waste water technology

Trapez-Pack®7

Para-Aramid Fiber Packing with PTFE Impregnation and Paraffin Run-In Lubricant

Characteristics

- Volume stable, pressure stable
- High cross section density through PTFE blocking agent, which protects against penetration of crystallizing media
- Good resistance against wear, with abrasive and hardening mediums
- Recommended shaft surface hardness: HRC 50

Operating range

p [bar]	25	100	100
v [m/s]	20	2	
t °C	-50 ... +250		
pH	2 - 12		
g/cm³	1.23		

Practical useful application data:
max. temperature: +200 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

- Pulp and paper industry
- Sugar industry
- Power plant technology
- Waste water technology
- Mining industry

Variant

Square shape P7

Trapez-Pack®12

Combination Braid of ePTFE with Incorporated Graphite and Para-Aramid Fiber Corner Reinforcement with Special Blocking compound and Silicone Run-In Lubricant

Characteristics

- Reinforced packing with reduced wear through improvedheat conductivity
- Recommended shaft surface hardness: HRC 50
- Safe universal packing for abrasive media
- Extrusion resistant, ideal for worn equipment with bigger gap width
- Development: Better sealability of stuffing box

Operating range

p [bar]	25	500	250
v [m/s]	20	3	
t °C	-100 ... +280		
pH	2 - 12		
g/cm³	1.50		

Practical useful application data:
max. temperature: +200 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

- Pulp and paper industry
- Sugar industry
- Waste water technology
- Chemical industry

Variant

Square shape S12K

Trapez-Pack® 16

Combination Braid of ePTFE with Incorporated Graphite and PTFE Fiber Corner Reinforcement with Special Blocking compound and Silicone Run-In Lubricant

Characteristics

- High cross section density and structural stability, elastic and pliable
- Special Impregnation prevents hardening of packing
- Improved friction properties minimizing shaft or sleeve wear
- Shaft hardness HRC 25 is sufficient
- Resistant against solvents, acids and crystallizing media

Operating range

p [bar]	25	250	250
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.65		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

- Pulp and paper industry
- Chemical industry
- Sugar industry

Trapez-Pack® 18 ProStar

Running Track reinforced Hybrid-Braid in W-Profile made of ePTFE/Graphite and Carbon/Graphite Yarn with additional X-Section Impregnation and Silicone Run-In Lubricant

Characteristics

- Preferred packing for sealing abrasive mediums in all manner of plant rotating equipment
- Excellent when used in crystalizing products
- Low Coefficient of friction and ultimate heat conductivity
- High plant standardization possibilities
- Recommended Shaft Surface Hardness HRC35

Operating range

p [bar]	25	250	150
v [m/s]	25	2	
t °C	-100 . . . +280		
pH	1 - 14		
g/cm³	1.55		

Main application

- Centrifugal pumps
- Mixers
- Kneaders
- Agitators
- Refiners
- Autoclave
- Filters

Suitable for

- Bauxit Industry
- General Mining
- Ash Slurrries in Power plants
- Pulp and paper industry
- Chemical industry
- Waste water technology
- Universal use

Trapez-Pack®30

High purity Carbon Fiber with cross section impregnation and Paraffin Run-In Lubricant

Characteristics

- Excellent Standardisation features
- Cross section impregnation avoids the penetration of crystallizing mediums
- Wear resistant against abrasive products and with minimal coefficient of friction
- Self lubricating fiber with high Carbon content, reduced shaft wear and excellent heat transfer characteristics
- Thermally balanced construction, the coefficient of expansion is similar to steel, the packing is volume stabile and does not shrink. Therefore minimal re-adjustment needed after installation
- Excellent chemical resistance
- Recommended shaft surface hardness: HRC 45

Operating range

p [bar]	30	100	100
v [m/s]	25	2	
t °C	-50 ... +300		
pH	2 - 12		
g/cm³	1.5		

Practical useful application data:
max. temperature: +250 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Refiner

Suitable for

- Pulp and paper industry
- Chemical industry
- Sugar industry

Approval

- Food Approval
  EC 1935:2004 in accordance with EU10/2011

Trapez-Pack®31

Combination braid of ePTFE Yarn Incorporated with Graphite, Meta-Aramid Fibers, special impregnation and Silicone Run-In Lubricant

Characteristics

- Excellent Standardisation possibilities
- High Cross Sectional density, yet still elastic and flexible
- Suitable for use with hardening and crystallizing products
- Displays reduced wear through special running track reinforcement
- Unique formulation impregnation improves flexibility, ensures packing will not harden
- Provides excellent chemical resistance
- Recommended shaft surface hardness: HRC 35

Operating range

p [bar]	25	150	150
v [m/s]	20	2	
t °C	-100 ... +280		
pH	1 - 13		
g/cm³	1.55		

EPractical useful application data:
max. temperature: +200 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Filter

Suitable for

- Pulp and paper industry
- Chemical industry

Trapez-Pack® 55 Grapho Carbo

Hybrid-Braid from carbon reinforced expanded Graphite and special Carbon Fiber corner reinforcement

Characteristics

- Universal plant wide use in static and rotating applications
- Wear and extrusion stability through carbon fiber corner reinforcement
- Non hardening, good reset capability, coefficient of thermal expansion corresponds to the coefficient of steel
- High temperature resistance and excellent heat and electric conductivity
- Self lubricating, excellent use in pumps, minimizing the need of flushwater
- Easy to cut, assemble and disassemble
- Low coefficient of friction minimizes the adjustment force in valves
- No shaft wear, excellent dry running characteristics
- Rings should be compressed in valve applications at assembly approx. 15 - 20 % in height
- Die formed rings are recommended

Operating range

p [bar]	25	100	300
v [m/s]	30	3	
t °C	-200 . . . +550		
pH	0 - 14		
g/cm³	1.08		

Practical useful application data:
max. temperature in oxidizing atmosphere: +400 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer
- Boilerfeed pumps
- Condensate pumps
- Fittings

Suitable for

- Power plant technology
- Boiler houses
- Petrochemical plants
- Pulp and paper industry

Variant

Square shape A55K available above 6 mm

Approval

- Fire Safe Test API 589
- BAM for gaseous oxygen 60 °C / 20 bar

Trapez-Pack® 63 Papermaster HS

Hybrid-Braid in W-Profile made of heat conductive ePTFE Yarn with Meta-Aramid Fiber reinforcement and Silicone Run-In Lubricant

Characteristics

- Clean packing with ultimate heat conductivity for abrasive products in pumps and other rotating equipment
- Recommended shaft surface hardness: HRC 35
- Porosity filling coating increases density and protects the packing in crystallizing mediums
- W-Profile Reinforcement reduces shaft wear

Operating range

p [bar]	20	100	100
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	1 - 13		
g/cm³	1.55		

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Kneader
- Filter

Suitable for

- Pulp and paper industry
- Chemical industry
- Power plant technology
- Waste water technology
- Applications with abrasive products and when white packing is required

Approval

- Food Approval EC 1935:2004 in accordance with EU10/2011

Trapez-Pack® 619

Hybrid-Braid in W-Profile of heat conductive ePTFE Yarn with Silicone Run-In Lubricant and form stable PTFE Fiber

Characteristics

- Wear resistant through Running Track Reinforcement
- Very high heat conductivity through employment of a special heat conductive Compound
- Clean packing, no contamination of medium
- Increases the operative lifetime due to high mechanical strength and excellent heat conductivity
- Provides maximum protection of shaft against wear
- Recommended shaft surface hardness: HRC 25

Operating range

p [bar]	20	100	100
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	1 - 14		
g/cm³	1.75		

Practical useful application data:
max. temperature: +200 °C
max. velocity centrifugal pumps: 16 m/s

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer

Suitable for

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

Approval

- FDA Conformity
- Food Approval EG 1935:2004 in accordance with EU 10/2011

ANZEIGE

combining strength and flexibility

Lenzing PROFILEN® PTFE Yarns

Lenzing PROFILEN® PTFE yarns for compression packing

For more than 40 years, we have been the only supplier specialized in yarns supplying the sealing packing industry. Due to our high quality requirements, we are also a member of the FSA and ESA, the world's leading industrial organizations in the sealing market.
Our portfolio is one of the largest in the market, ranging from PTFE filament yarn to ePTFE yarn, all the way to various hybrid constructions and impregnated yarns.

Contact PROFILEN® PTFE

Manuel Seyrl
tel.: +43 7672 33000 2710
mail: m.seyrl@lenzing-plastics.com

Lenzing Plastics GmbH & Co KG
Werkstraße 2, A-4860 Lenzing

www.lenzing-plastics.com

Lenzing Profilen

Valve Packing

Main usage in static Applications with higher pressures.

Valve packing does not content soluable ingredients like oil and will not become porous at higher temperatures. The surfaces are of fine braid texture and will seal even with low compression.
The construction is basically very extrusion resistant.

Main application:
Armatures, valves, gate valves, door and lid seals, eventually in slow speed applications in mixers and filters.

VDI 2440/TA Luft and EN15848 Valve Sets

These sets of packing rings and in some instances bull rings have been checked at renowned institutes for their ability to work according to TA-Luft (Technische Anleitung zur Reinhaltung der Luft) and are approved.
The tested leakage rates meet the VDI-Guidline 2440 with controlled leakage rates of $1{,}0 \cdot 10^{-4}$ mbar · l/(s·m) up to 200 °C and $1{,}0 \cdot 10^{-2}$ mbar · l/(s·m) up to 400 °C (test medium Helium) and are therefore recommended as (BAT) Best Available Technology an high grade sealing systems.

Recommendations

- Surface roughness: stem: Ra max 0.5 µm, housing Ra max 5 µm
- Gap between shaft/housing or shaft/gland max 2 % of the packing X-Section
- Precompression after installation: 50 - 60 MPa for short time
- Min. compression in service: 30 -40 MPa
- For pressure above 40 bar and frequently varying temperature and presure we recommend to use of Live Loading Systems (page 36)

VDI 2440 / TA Luft certified packings can also be supplied on spools. To be VDI 2440 / TA Luft compliant, the cut packing rings must be precompressed to the recommended densities individually per ring in the stuffing box or a similar device.

A 19 Spezial

100 % PTFE Fiber with Unique Blocking Agent

Characteristics

- In applications with high pressure or vacuum, die formed bullrings of Type S4 (no food approval) are recommended
- Very low coefficient of friction and displays low stem/spindle frictions
- Long lifetime
- No ageing
- Minimized maintenance and readjustment

Operating range

p [bar]	25	250	500
v [m/s]	2	1.5	
t °C	-200 . . . +280		
pH	0 - 14		
g/cm³	1.60		

Main application

- Valves
- Fittings
- Gate valves
- Flaps
- Plunger
- Door and lid seals

Suitable for

- Pulp and paper industry
- Chemical industry
- General Industry

A 190X Oxygen

100 % PTFE Fiber with special PTFE Dispersion

Characteristics

- In applications with high pressure or vacuum, die formed bullrings of S4 (no food approval) are recommended
- Low coefficient of friction and displays low stem/spindle frictions
- Long lifetime
- No ageing
- Minimized maintenance and readjustments

Operating range

p [bar]	25	250	500
v [m/s]	2	1.5	
t °C	-200 . . . +280		
pH	0 - 14		
g/cm³	1.85		

Main application

- Valves
- Fittings
- Gate valves
- Flaps
- Plunger
- Door and lid seals

Suitable for

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

Approval

- BAM oxygen gaseous and liquid 60 °C / 30 bar
- FDA conformity
- EC 1935:2004 in accordance with EU 10/2011

FDA

A 22 Graphostat

Graphite Filament yarn with High Temperature Graphite impregnation

Characteristics

- Yarn of highest puricity >99 % C content
- Universally chemical resistant
- The addition of high temperature Graphite impregnation increases the cross section density and works as a stable pressure cushion for the graphite fiber
- Flexible, ressistant ot wear and surface protecting
- Excellent in temperature cycling, since graphite has a similar coefficient of expansion as steel
- Excellent as bullring for packing made of expanded graphite

Operating range

p [bar]	30	0	300
v [m/s]	15	0	
t °C	-40 . . . +600		
pH	1 - 14		
g/cm³	1.05		

Practical useful application data: max. temperature in oxidizing atmosphere: +450 °C

Main application

- Valves
- Fittings
- Gate valves
- Flaps

Suitable for

- Power plant technology
- Boiler houses
- High pressure- and high temperature applications
- Digester

Approval

- BAM for gaseous oxygen 60 °C / 15 bar

A 33 Carbostat

Carbon Filament Yarn with High Temperature Graphite Blocking Agent

Characteristics

- High temperature blocking agent increases the cross section density and acts as a form stable pressure bed for the Carbographite fiber
- Flexible, wear resistant and valve stem protecting
- Perfect for temperature cycling loads as the coefficient of thermal expansion corresponds to that of steel
- Excellent as bullring in use with rings of expanded graphite

Operating range

p [bar]	30	0	300
v [m/s]	15	0	
t °C	-40 ... +550		
pH	2 - 12		
g/cm³	1.10		

Practical useful application data: max. temperature in oxidizing atmosphere: +400 °C. In steam +550 °C.

Main application

- Valves
- Fittings
- Gate valves
- Flaps

Suitable for

- Power plant technology
- Boiler houses
- High pressure- and high temperature applications

A 37 GraphoFlon

Braided from Expanded Graphite reinforced with Inconel Matrix and special PTFE impregnation

Characteristics

- No slip stick effect
- High cross section density
- High temperature resistant to minimize emissions
- Non hardening, good reset capability
- Coefficient of thermal expansion similar to steel
- Easy to cut, install and disassemble
- Low coefficient of friction minimizes the adjustment force in valves
- Recommended as die formed rings
- For valve applications rings should be approx. 25 - 30 % compressed at installation

Operating range

p [bar]	0	0	300
v [m/s]	0	0	
t °C	-200 ... +300		
pH	0 - 14		
g/cm³	1.30		

Main application

- Valves
- Fittings
- Gate valves
- Flaps
- Door and lid seals

Suitable for

- Power plant technology
- Boiler houses
- High pressure applications

Approval

- ISO 15848-1 CC1
- ISO 15848-1 CO3
- TA Luft / VDI 2440
- BAM 60 °C / 20 bar

A 44 Grapho

Braid of Flexible Expanded Graphite

Characteristics

- Universal use in pumps and valves
- Very good dry-running characteristics
- No wear, perfect thermal conductivity
- High quality pure graphite
- Coefficient of thermal expansion similar to steel
- Rings should be approx. 20 - 25 % compressed during assembly
- Recommended as die formed rings

Operating range

p [bar]	20	0	300
v [m/s]	20	0	
t °C	-200 . . . +550		
pH	0 - 14		
g/cm³	1.20		

Practical useful application data:
max. temperature in oxidizing atmosphere: +400 °C

Main application

- Valves
- Fittings
- Gate valves
- Flaps
- Door and lid seals

Suitable for

- Power plant technology
- Boiler houses
- Petrochemical plants
- High pressure- and high temperature applications

- For higher pressure and temperature applications use suitable bullrings.

A 44I Grapho Extra

Braid of Flexible Expanded Graphite reinforced with Inconel Wire

Characteristics

- Universal use valve packing
- Expanded graphite of higher quality
- Coefficient of expansion similar to steel
- For valve applications rings should be approx. 20 - 25 % compressed at installation
- Precompressed rings are recommended

Operating range

p [bar]	0	0	300
v [m/s]	0	0	
t °C	-200 . . . +550		
pH	0 - 14		
g/cm³	1.20		

Practical useful application data:
max. temperature in oxidizing atmosphere: +400 °C

Main application

- Valves
- Fittings
- Gate valves
- Flaps
- Door and lid seals

Suitable for

- Power plant technology
- Petrochemical plants
- Boiler houses
- High pressure- and high temperature applications

- For higher pressure and temperature applications use suitable bullrings.

A 55K

Braided from Carbon Fiber and carbon reinforced expanded Graphite Yarn

Characteristics

- Universal plant wide use in static and rotating applications
- Wear and extrusion stability through carbon fiber corner reinforcement
- Non hardening, good reset capability, coefficient of thermal expansion corresponds to the coefficient of steel
- High temperature resistance and excellent heat and electric conductivity
- Self lubricating, excellent use in pumps, minimizing the need of flushwater
- Easy to cut, assemble and disassemble
- Low coefficient of friction minimizes the adjustment force in valves
- No shaft wear, excellent dry running characteristics
- Rings should be compressed in valve applications at assembly approx. 15 - 20 % in height
- Die formed rings are recommended

Operating range

p [bar]	25	100	300
v [m/s]	30	2	
t °C	-200 . . . +550		
pH	0 - 14		
g/cm³	1.10		

Practical useful application data:
max. temperature in oxidizing atmosphere: +400 °C

Main application

- Centrifugal pumps
- Mixer
- Agitators
- Autoclave
- Filter
- Refiner
- Kneader
- Paddle dryer
- Boilerfeed pumps
- Condensate pumps
- Fittings

Suitable for

- Power plant technology
- Boiler houses
- Petrochemical plants
- Pulp and paper industry

Variant

above 10 mm available in trapezoid Shape Style Trapez-Pack®55 Grapho Carbo

Approval

- Fire Safe Test API 589
- BAM for gaseous oxygen 60 °C / 20 bar

A 66 Incograph HT

Braided of Flexible Expanded Graphite with high temperature resistant Inconel-Mesh Reinforcement

Characteristics

- Universal plant wide use in static applications
- Extrusion stability through ultrafine 10 myh Inconel mesh reinforcement on each strand
- Non hardening, good reset capability, coefficient of thermal expansion corresponds to the coefficient of steel
- High temperature and pressure resistance
- Easy to cut, assemble and disassemble
- Low coefficient of friction minimizes the adjustment force in valves
- For valve applications rings should be approx. 25 - 30 % compressed at installation
- A 66 can be used as bullrings for style A 44, A 44 I, P 60 and ARF
- Die formed rings are recommended

Operating range

p [bar]	0	0	500
v [m/s]	0	0	
t °C	-200 . . . +650		
pH	0 - 14		
g/cm³	1.15		

Practical useful application data:
max. temperature in oxidizing atmosphere: +400 °C

Main application

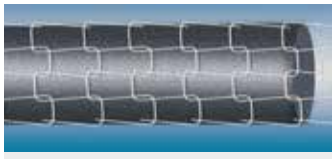
- Valves
- Fittings
- Gate valves
- Flaps

Suitable for

- Power plant technology
- Boiler houses
- Petrochemical plants

Approval

- BAM for gaseous oxygen 60 bar / 25 °C



Braided tape with High Temperature Inconel mesh reinforcement

A 99 Spezialgraph

Braided of Flexible Expanded Graphite with High Temperature Incone-Mesh Reinforcement

Characteristics

- Universal plant wide use in static applications
- Extrusion stability through ultrafine 10 myh Inconel mesh reinforcement on each strand
- Non hardening, good reset capability, coefficient of thermal expansion corresponds to the coefficient of steel
- High temperature and pressure resistance
- Easy to cut, assemble and disassemble
- Low coefficient of friction minimizes the adjustment force in valves
- For valve applications rings should be approx. 25 - 30 % compressed at installation
- A 99 can be used as bullrings for style A44, A 44 I, P60 and ARF
- Die formed rings are recommended
- Contains effective passive corrosion inhibitor

Operating range

p [bar]	0	0	500
v [m/s]	0	0	
t °C	-200 . . . +650		
pH	0 - 14		
g/cm³	1.35		

max. temperature in oxidizing atmosphere: +450 °C

Main application

- Valves
- Fittings
- Gate valves
- Flaps

Suitable for

- Power plant technology
- Boiler houses
- Petrochemical plants

Approval

- API 622
- Firesafe API 589
- BAM for gaseous oxygen 60 °C / 25 bar

Precompressed rings and ringsets reduce substantially the consolidation of packing and stabilise the sealing result.

ANZEIGE

sgl carbon

SIGRAFLEX®

High-performance carbon and graphite yarns for compression packings

- Comprehensive: broad portfolio fulfilling the most diverse demands
- Robust: reinforced flexible graphite yarns for high temperature, oxidation and corrosive environments; APX2® yarn showing only 1 % weight loss per hour at 670 °C
- Durable: high temperature stable graphite rayon and pan yarns with carbon contents >99 %
- Compliant: OXR yarns meeting requirements of latest Shell spec MESC SPE 85/204
- PFAS-free: flexible graphite yarns and textile yarns with graphite coating

SGL CARBON GmbH | SGL Technic LLC
Graphite Solutions
www.sigraflex.com

Optimizing Valve Sealing

Increase wear resistance and reduce friction while maintaining high sealability, for applications in the high temperature range.

Conventional valves may have stuffing boxes with 7 or more packing rings.

Current knowledge, based on the use of modern packing materials, recommends the use of a maximum of 5-6 packing rings. The remaining space should be filled e.g. with a temperature and pressure resistant spacer.

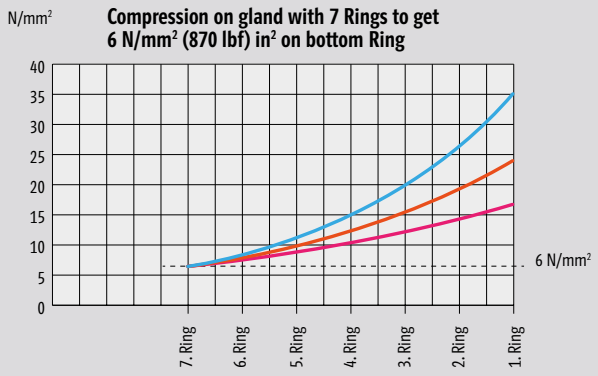
Step 1 - Reduce Stuffingbox Depth

Carbon bushings are used to reduce the gland forces necessary to compress the entire packing stack to the extent that a secure seal is achieved at the bottom of the stuffing box.

Type	Density	Compression strength	Temperature resistance	
			in Atmosphere	inert
PP4	1,7	100 (N/mm²)	500 °C	2500 °C
PP32	2,5	290 (N/mm²)	500 °C	550 °C
PP85	1,75	120 (N/mm²)	500 °C	2500 °C

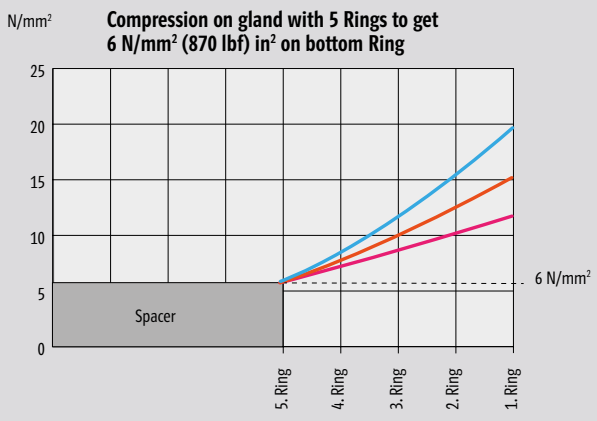
Carbon bushings are as well utilized especially on thinner and horizontally oriented spindles, to support the spindle when torsional forces attempt to bend it. These bushings can be split into 2 halves to simplify installation. The idea behind this is to equalize the available packing force between the packing rings. A welcome side effect is the reduction of the gap between stem and packing gland to the recommended 2% of the packing cross section P.

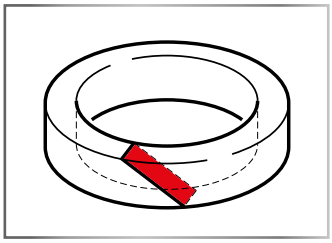
A reduction from 7 to 5 packing rings can cut the required compression of a low K-Value-packing to almost half. It also reduces the risk of extrusion of packing material between the packing gland and the stem, whilst the compression of the product-side packing ring is maintained.



Axial Compression Transformation (K Value)

- **0,75** Carbon Packing (A33)
- **0,80** eGraphite/Graphite Packing (A22, A44I, A66)
- **0,88** eGraphite and PTFE Packing (A19, A190X, A37, A99, TP55)





Step 2 - Use of precompressed packing rings and sealing sets

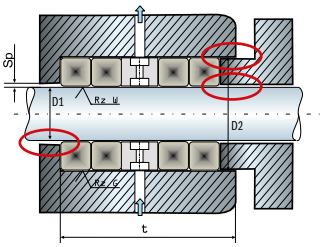
- Precompression leads to a higher reliability of the sealing result, since all packing rings have the same density. When using packing directly from the coil, the density decreases dramatically from the gland to the stuffing box base (see diagrams page 32). Precompressed packing rings provide greater possible adjustment travel for the packing gland before it gets contact with the stuffing box face.
- Precompression improves and enables sealing performance and contact around the stuffing box faces.
- Gasket sets eliminate cutting errors and greatly assist in faster and safer installation.

Precompression of the rings eliminates consolidation of spool packing:

- Carbon and graphite fiber packing 9-10 %
- PTFE packing 9-11 %
- ePTFE/graphite packing up to 20%
- eGraphite packing 8-20 %
- Please note with the total consolidation from spool packing to full operating density a compaction of up to 30 % can take place

Step 3 - Install Anti-extrusion rings to reduce the gap between gland and valve stem

- Often, even new valves have a larger than maximum recommended gap between packing and stem.
- To maintain the radially acting sealing force, a perfectly sized anti-extrusion ring made of PROFLON D3.5 or D3.6, A37 or A99 helps.
- We recommend only 2 % of the packing cross-section P as the maximum gap for valve applications.
- Example, for a 5 mm packing the maximum gap is 0.1 mm. For carbon steel valves, often 2 times and for stainless steel valves 5 times the above recommendation of 2 % is exceeded.
- Failure to reduce the gap will result in extrusion (indicated by red circles in sectional view) and loss of sealing capability at the stem.
- In most valve applications, the use of pre-pressed sealing rings is a must to achieve better long-term sealing capability.



Always install a valve packing developed according to the latest technology

Heavy-duty packing of expanded graphite A99 with Inconel matrix reinforcement (A37 with additional PTFE coating)

Characteristics

- Universal plant wide use in static applications
- Extrusion stability due to ultrafine 10 myh Inconel Mesh Reinforcement on each strand
- Non-hardening, good recovery, coefficient of thermal expansion similar to steel
- High temperature and pressure resistance
- Use A37 or A99 products as as bullrings for Grafoil Rings which are prone to extrusion
- Contains effective passive corrosion inhibitor

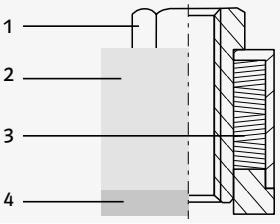
Technical Parameter

p [bar]	0	0	500
v [m/s]	0	0	
t °C	-200 . . . +650 (300 °C Typ A37)		
pH	0 – 14		
g/cm³	1,35		

Step 4 - Apply ProLoad LiveLoadingSystem

Characteristics

- The ProLoad LiveLoadingSystem bolts onto the existing stuffing box bolts and is tightened during installation until the visible assembly gap closes
- During operation, this gap serves as an indicator when wear or consolidation occurs and the LiveLoadingSystem needs simply to be retightened to the optimum set point. **A torque wrench is never required**
- The function of the LiveLoadingSystem is to automatically adjust the packing gland and keep the packing under constant pressure



	Part	Material
1	Nut/Boltextension	1.4301
2	Springcup	1.4305
3	Spring Assembly	1.8159 galCd
4	Springcover	1.4305

PROLOAD
LiveLoading Systems

LiveLoading
- Improves reliability
- Compensates for pressure deviations and temperature fluctuations
- Reduces maintenance costs
- Lower friction ensures functionality

PROLOAD-STAT LiveLoading for fittings

New generation encapsulated disc spring system with defined compression length.

Characteristics

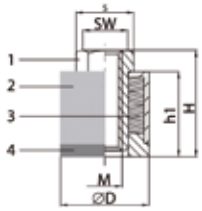
- One of the main advantages of the PROLOAD-STAT LiveLoading system is that it can work with the existing stuffingbox bolts, so there is no need to procure longer bolts to hold the disc spring assembly
- Springs slide on a smooth surface and cannot hang up on threads
- Spring stacks are protected against environmental influences and damage in a sleeve
- Spring stack is adjusted for optimum spring force and travel by spacer sleeve
- No torque wrench required for adjustment
- A decrease in compression due to packing settling or loss of volume due to abrasion is indicated by a maintenance gap. In this case, simply retighten the hex nut to restore full compression

Main application

- Valves
- Sootblowers

Materials

Pos.	Part	Material
1	Nut/Boltextension	1.4301
2	Springcup	1.4305
3	Spring	1.8159 galCd
4	Springcover	1.4305



Dimensions

M in (mm)	Order-Type	D in (mm)	H in (mm)	h_1 in (mm)	SW	s in (mm)	BBolt center to stemin (mm)	FE (N)	ME (Nm)
M8	L8	22	20.2	14.5	13	14.8	15	4,660	7
M8	L8HI	22	20.2	14.5	13	14.8	15	9,256	14
M10	L10	26	23	16	17	19.4	18	4,722	9
M10	L10HI	26	30.5	23.3	17	19.4	18	9,440	18
M10	L10Rußbläser	26	30.5	23.3	17	19.4	18	4,722	9
M12	L12	32	24	17.2	19	21.9	22	9,346	20
M12	L12HI	32	32	25.2	19	21.9	22	18,224	40
M12	L12Rußbläser	32	32	25.2	19	21.9	22	9,346	20
M14	L14	38	28	18	22	25.3	26	16,254	48
M14	L14HI	38	36	26	22	25.3	26	31,695	96
M16	L16	38	28	18	24	27.6	27	16,254	48
M16	L16HI	38	36	26	24	27.6	27	31,695	96
M18	L18	45	63.5	48.5	30	34.5	31.5	40,258	136
M18	L18HI	45	63.5	48.5	30	34.5	31.5	50,254	170
M20	L20	45	63.5	48.5	30	34.5	32.5	40,258	136
M20	L20HI	45	63.5	48.5	30	34.5	32.5	50,254	170
M22	L22	60	72	57	41	47	41	38,530	144
M24	L24	60	72	57	41	47	42	38,530	144

Dimensions

M in (inch)	Order-Type	D in (inch)	H in (inch)	h_1 in (inch)	s in (inch)	Bolt center to stemmin (inch)	FE (lbf)	ME (ftlb)
5/16"	L5/16"	0.87	0.80	0.57	0.58	0.59	1,048	5.2
5/16"	L5/16"HI	0.87	0.80	0.57	0.58	0.59	2,081	10.3
3/8"	L3/8"	1.02	0.91	0.63	0.76	0.71	1,062	6.6
3/8"	L3/8"HI	1.02	1.20	0.92	0.76	0.71	2,122	13.3
3/8"	L3/8"Rußbläser	1.02	1.20	0.92	0.76	0.71	1,062	6.6
7/16"	L7/16"	1.26	0.98	0.68	0.86	0.87	2,101	14.8
7/16"	L7/16"HI	1.26	1.31	0.99	0.86	0.87	4,097	29.5
1/2"	L1/2"	1.26	0.98	0.68	0.86	0.87	2,101	14.8
1/2"	L1/2"HI	1.26	1.31	0.99	0.86	0.87	4,097	29.5
1/2"	L1/2"Rußbläser	1.26	1.31	0.99	0.86	0.87	2,101	14.8
9/16"	L9/16"	1.50	1.10	0.71	1.00	1.02	3,654	35.4
9/16"	L9/16"HI	1.50	1.42	1.02	1.00	1.02	7,125	70.8
5/8"	L5/8"	1.50	1.10	0.71	1.09	1.06	3,654	35.4
5/8"	L5/8"HI	1.50	1.42	1.02	1.09	1.06	7,125	70.8
3/4"	L3/4"	1.77	2.30	1.91	1.36	1.28	9,050	100.3
3/4"	L3/4"HI	1.77	2.30	1.91	1.36	1.28	11,298	125.4
7/8"	L7/8"	2.36	2.83	2.24	1.85	1.61	8,662	106.2
1"	L1"	2.36	2.83	2.24	1.85	1.65	8,662	106.2

For best function and long-lasting performance, always use white Antiseize assembly paste to lubricate the threads of the eyeglass bolts.

Typical problem

The stack of springs is too long for the available bolt length.
As a result usually the bolts need to be replaced which is time and cost consuming.

Solution:

The PROLOAD-STAT LiveLoading system is simply screwed onto the existing bolt. The cup-like shape accommodates the uncompressed spring stack and creates the required extra length in its design. The system maintains the same preload during thermal expansion of the valves or flange components. The spring stack cannot be overcompressed because the PROLOAD-STAT housing dimensions specify the optimum preload.

Functional Description

When the packing or gasket settles in operation the springs maintain the gland pressure and hold the sealing force constant.
The consolidation is shown by a small inspection gap at the bottom of the housing.
At a routine inspection the PROLOAD-STAT LiveLoading System is simply torqued down till the gap is closed.

PROLOAD-DYN LiveLoading for agitators

New generation LiveLoading with encapsulated disc spring system and defined compression length for slow-moving shafts.

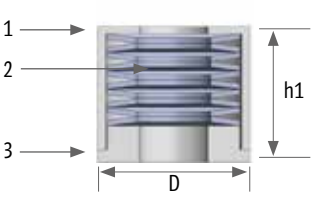
Characteritics

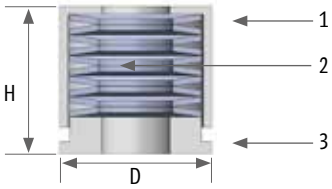
- One of the main advantages of the PROLAOD-DYN LiveLoading system is that the disc springs slide on a smooth surface and cannot cannot catch on thread turns
- The spring packs are protected in a housing against environmental influences and damage.
- The spring stack is adjusted for optimal spring force and spring deflection by a spacer sleeve and a defined maintenance gap.
- A torque wrench is not required for adjustment.
- A reduction in compression due to packing consolidation or volume loss through abrasion is indicated by a larger maintenance gap. In this case, simply tighten the gland nut to restore the desired compression.

Main application

- Slow-running units
- Agitators
- Mixers

Materials		
Pos.	Part	Material
1	Springcup	1.4305
2	Spring	1.8159 galCd
3	Springcover	1.4305





				Setting force		Tightening torque	
	Unclamped height (H)	Height of closed maintenance gap (h1)	Diameter (D)	Min	Max	Min	Max
	(mm)	(mm)	(mm)	(N)	(N)	(Nm)	(Nm)
R10	35	32	25	375	883	0.9	1.8
R10HI	35	32	25	560	2560	1.5	5.1
R12	43	37	30	661	1359	1.2	3.3
R12HI	43	37	30	1425	2926	2.5	6.9
R12XT	42	37	30	2778	5705	4.9	13.5
R14	47	40.5	36	1176	2597	2.3	7.2
R14HI	47	40.5	36	2796	6173	5.4	17.1
R16	47	40.5	36	1176	2597	2.5	7.8
R16HI	47	40.5	36	2796	6173	5.9	18.6
R20	51	44	45	1871	5701	6.1	22.2
R20HI	51	44	45	2975	8965	9.6	34.9

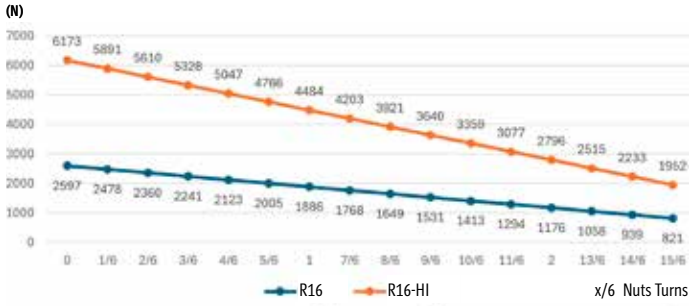
				Setting force		Tightening torque	
	Unclamped height (H)	Height of closed maintenance gap (h1)	Diameter (D)	Min	Max	Min	Max
	(inch)	(inch)	(inch)	(lbf)	(lbf)	(ftlb)	(ftlb)
R3/8	1.38	1.26	0.98	68	198	0.4	1.3
R3/8HI	1.38	1.26	0.98	101	575	1.0	3.8
R7/16	1.69	1.46	1.18	148	305	0.8	2.3
R7/16HI	1.69	1.46	1.18	309	657	1.8	5.0
R1/2	1.77	1.50	1.34	143	305	0.7	2.6
R1/2HI	1.77	1.50	1.34	319	639	1.5	5.4
R9/16	1.85	1.59	1.42	248	583	1.7	5.5
R9/16HI	1.85	1.59	1.42	585	1387	4.1	13.0
R5/8	1.85	1.59	1.42	215	583	1.9	6.0
R5/8HI	1.85	1.59	1.42	512	1387	4.5	14.2
R3/4	2.01	1.73	1.77	411	1281	4.4	16.1
R3/4HI	2.01	1.73	1.77	649	2015	6.9	25.3

For best function and long-lasting performance, always use white Antiseize assembly paste to lubricate the threads of the eyeglass bolts.

Installation instructions

The complete packing set is inserted into the stuffing box ring by ring, with the cut ends distributed symmetrically. The uppermost ring should be positioned at least 3 mm below the face of the stuffing box to ensure sufficient guidance for the gland follower. Then use the existing gland nuts to pre-tighten the packing rings in order to minimise further consolidation of the rings.

The nuts and spring columns are then placed on the gland bolts and tightened with the gland nuts. If the bolt length is not sufficient, longer bolts must be used. The nuts must be tightened so that the maintenance gap between part 1 and part 3 closes completely in order to achieve the maximum adjustment force. The required adjustment force is achieved by turning the gland nut back in 1/6 increments. This opens the maintenance gap.



Force reduction when opening the maintenance gap, for example type R16 and R16HI

In the R16 example, starting from a closed maintenance gap, the spring force of the spring column is reduced by approx. 281 N for the R16HI and approx. 118 N for the R16 for every 1/6 turn of the gland nut in accordance with the force curve above. The minimum compression force is reached after 15/6 turns. After setting the target value, the gland compression must be adjusted to the leakage. The width of the maintenance gap can be used as a guide.

Valve Packing Sets

Experience shows that optimally pre-pressed ring sets with an ideal cut for the applications and in combination with the respective material properties of selected packing qualities have improved sealing characteristics overall than packing qualities that are used individually..

Improved properties of sealing sets through suitable pairing and positioning of different packing types include

- Extrusion protection when very high pressures and gap widths greater than the maximum recommended 2 % of the packing width are present.
- Scraping effect when there are micro-deposits on the spindle and alternating loads, e.g., in control valves which stress the packing.
- Blow-out resistance when used for sealing highly compressed gases and vapors.
- Pliability with low gland forces and good readjustment and adaptability, e.g., during temperature cycles.

Emission tested Valve Packing Sets

Tested and approved for applications in accordance with TA-Luft (Technical Instructions on Air Quality Control), also available as coil goods. Complete conversion kits including reduction bushings, packing rings and LiveLoading for common control valve types are also available.

Valve stem packing set - TA 200

Pre-compressed Packing set of specially impregnated PTFE Fiber packing

Characteristics

- Ring set made of pure PTFE packing with a determined leakage of 6.3 x 10^{-6} mbar-l/(s-m) fulfils the leakage criteria according to VDI 2440 (Nov 2000 edition) at +200 °C with a maximum permissible leakage of 1 x 10^{-4} mbar l/(ms) at 40 bar

Operating range

p [bar]	25	250	500
v [m/s]	2	1.5	-
t °C	-200 . . . +280		
pH	0 - 14		

Main application

- Valves
- Flaps
- Gate valves
- Fittings

Suitable for

- Chemical industry
- Petrochemical plants

Approval

- TA Luft / VDI 2440 Certificate (Nov 2000 edition)
- BAM 60 °C / 30 bar
- FDA
- EU 10/2011, EC 1935:2004

FDA

Valve stem packing set - TA 200BR with bull rings

Pre-compressed Packing Set of specially impregnated PTFE Fiber packing

Characteristics

- Packing set made of PTFE packing rings with chamber rings made of PTFE discs fulfils the leakage criteria according to VDI 2440 (Nov 2000 edition) with a determined leakage of 4.2 x 10^{-5} mbar-l/(s-m) at +200 °C with a maximum permissible leakage of 1 x 10^{-4} mbar l/(ms) and can be used up to +200 °C

Operating range

p [bar]	25	250	500
v [m/s]	2	0	-
t °C	-200 . . . +280		
pH	0 - 14		

Main application

- Valves
- Flaps
- Gate valves
- Fittings

Suitable for

- Power plant technology
- Chemical industry
- Petrochemical plants

Approval

- TA Luft / VDI 2440 Certificate (Nov 2000 edition)

FDA

Valve stem packing set - TA 300

Pre compressed Packing set of expanded graphite with Inconel Matrix reinforcement and special PTFE coating

Characteristics

- Packing set made from special high-temperature resistant yarn and pore-filling cross-sectional impregnation fulfills the leakage criteria according to VDI 2440 (November 2000 edition) at 300 °C with 8.4 x 10^{-3} mbar·l/(s·m) @ +400 °C with 1.0 x 10^{-2} mbar·l/(s·m) at 40 bar.

Operating range

p [bar]	0	0	300
v [m/s]	0	0	-
t °C	-200 . . . +300		
pH	0 - 14		

Main application

- Valves
- Flaps
- Gate valves
- Fittings
- Control Valves

Suitable for

- Power plant technology
- Chemical industry
- Petrochemical plants
- Boiler houses

Approval

BAM 60 °C / 20 bar (Nov 2000 edition)
TA Luft / VDI 2440 Certificate
ISO 15848-1 CO3
ISO 15848-1 CC1

The ISO 15848-1 CO3 (July 2017 edition) test was fulfilled with 2,500 mechanical cycles and 4 thermal cycles (RT, +200 °C) with 4.2 x 10^{-4} mg/s/m.

The ISO 15848-1 CC1 (April 2006 edition) test was fulfilled with 20,000 mechanical cycles and 2 thermal cycles (RT, +200 °C) with 6.1 x 10^{-4} mg/s/m.

Valve stem packing set - TA 400

Pre-compressed ring-set made of expanded graphite and reinforcement to protect against extrusion

Characteristics

- Packing set produced by combining two expanded Graphite grades in order to avoid blow-out and extrusion and to improve sealing capability. At 8.6 x 10-3 mbar l/(sm), the packing set with integrated extrusion protection fulfills the leakage criteria according to VDI 2440 (Nov 2000 edition) @ +400 °C with 1.0 x 10-2 mbarl/(sm) at 40 bar

Operating range

p [bar]	0	0	500
v [m/s]	0	0	-
t °C	-200 . . . +650		
pH	0 - 14		

Empf. max. Temperatur in oxidierender Atmosphäre: +450 °C

Main application

- Valves
- Flaps
- Gate valves
- Fittings

Suitable for

- Power plant technology
- Chemical industry
- Petrochemical plants
- Boiler houses
- Refineries

Approval

- TA Luft / VDI 2440 Certificate (Nov 2000 edition)
- BAM 60 °C / 25 bar

Valve stem packing set - TA 400-2

Pre compressed Hybrid packing set made of expanded graphite with extrusion protection and special impregnation

Characteristics

- This valve gasket set combines two expanded graphite grades to prevent blow-out and extrusion and to improve sealing performance. The packing set has been tested and approved by Yarmouth Research, Maine in the USA.

- The tightness class is CH with <4.5E^{-3} mbar.l/s. The strength class is CO1 with 2 thermal cycles and 205 mechanical cycles. Number of packing adjustments (SSA) 1. test pressure: 20 °C @ 51.1 bar and 400 °C @ 34.7 bar. Test fluid: Helium. Performance category is ISO FE CH-CO1-SSA1-t400 C-ANSI Class 300 - ISO 15848-1.
- The seal kit is therefore recommended as a high-quality sealing system.

Operating range

p [bar]	0	0	500
v [m/s]	0	0	-
t °C	-200 . . . +400		
pH	0 - 14		

Packing set contains a small amount of PTFE

Main application

- Valves
- Flaps
- Gate valves
- Fittings

Suitable for

- Power plant technology
- Chemical industry
- Petrochemical plants
- Boiler houses
- Refineries

Approval

- ISO 15848-1 Certificate
- BAM 60 °C / 25 bar

Application specific ring sets

Experience shows that optimally precompressed ring sets with an ideal cut for the applications and in combination with the respective material properties of selected packing qualities show improved sealing characteristics in total, compared to packing qualities that are used individually.

Improved properties are:

- Extrusion resistance, if high pressures and gap widths greater than the maximum recommended 2 % of the packing width are present.
- Wiper function, if any micro scaling is found on the stem and at reciprocating movement, e.g. in control valves, stress the packing.
- Blow out safety, when sealing high compressed gases and fumes
- Pliability, with low gland forces as well good reset and adaptability for example in applications, e.g. with temperature cycles.

API LOW EMISSION PACKING SET 4337

Braided from specially formulated expanded graphite, reinforced with a proprietary inconel wire matrix and impregnated with a high sealability Compound and a Passive Corrosion Inhibitor

Characteristics

- Extrusion and blow out stability through ultrafine Inconel metal mesh reinforcement on each braided strand
- Non-hardening, excellent long term sealability
- Minimal Volume loss at temperature
- Coefficient of thermal expansion close to steel
- Easy to install and easy to remove
- Average Emission of only 5 PPMv Methan according to API 622 3rd edition test

Operating range

p [bar]	0	0	500
t °C	-200 . . . +300		
pH	0 - 14		

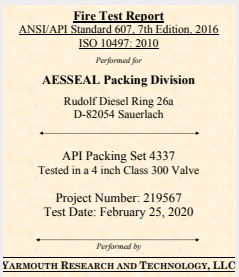
Main application

- This packing set was specifically formulated to minimize fugitive emissions and exceeds current emission regulations for valves in

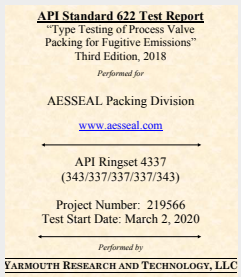
- HPI & CPI Industries
- Powerplants
- General Industries

Approval

- API 622 3rd edition Emission Test 260 °C / 41 bar
- API 607 7th edition Firesafe Test, ISO 10497 : 2010
- BAM approval for use in Oxygen at 60 °C / 20 bar



Fire Test Report
ANSI/API Standard 607, 7th Edition, 2016
ISO 10497: 2010
Performed for
AESSEAL Packing Division
Rudolf Diesel Ring 26a
D-82054 Sauerlach
API Packing Set 4337
Tested in a 4 inch Class 300 Valve
Project Number: 219567
Test Date: February 25, 2020
Performed by
YARMOUTH RESEARCH AND TECHNOLOGY, LLC



API Standard 622 Test Report
"Type Testing of Process Valve Packing for Fugitive Emissions"
Third Edition, 2018
Performed for
AESSEAL Packing Division
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Performed by
YARMOUTH RESEARCH AND TECHNOLOGY, LLC

Ring set 6655
For Control Valves and steam applications up to 550 °C steam. All rings are delivered as standard in skive cut.

Ring set 9951
High-quality seal ringset up to temperatures of 650 °C in use with steam with extrusion resistant base and cover ring with Inconel matrix. Flexible sealing elements made of carbon fiber-reinforced expanded graphite yarn of the second generation as adaptable center part. All rings are made with skive cut.

Ring set 9960
For Valves up to 650 °C steam. This ringset offers minimal volumeloss. The rings in the sealing zone are usually endless and as option can be also delivered in 2 halves or with a skive cut. Top and bottom ring are delivered with skive cut.

Ring set 9443
For valves in the highest temperature ranges. The special bull rings protect the inner graphite rings from oxidation. All rings are designed with a skive cut.

CONTROLSTAR FIV

Installation ready Control Valve Upgrade-Kits

Characteristics

- This Hybrid Control Valve packing design combines the low friction characteristics of PTFE, integrated with the low thermal expansion and flexibility of expanded Graphite. The 5-Ring Sets create the optimum sealing configuration for long term reliability even in temperature cycling situations
- The packing rings contain an ultra thin inconel wire matrix to eliminate extrusion. All the rings utilize an inorganic passive corrosion inhibitor to protect against valve stem pitting. All rings are die-formed for exact fit and increased sealability

Operating range

p [bar]			300
t °C	-200 . . . +300		
pH	0 – 14		

A higher temperature set Controlstar FIV HT is available

Main application

- Controlvalves

Suitable for

- All Industries

Approval

- BAM for gaseous oxygen
- 60 °C / 20 bar

Further Components

The LIVESTAR-STAT Live Loading System assembly fits over the existing gland bolts and needs to be tightened at installation till the visible assembly gap closes.

During operation it works as an indicator if wear or consolidation appear and the LIVESTAR-STAT Live Loading assembly needs to be retightened to its optimal set point. A torque wrench is not required. The feature of LIVESTAR-STAT Live Loading is to automatically adjust the gland and keep the packing set under constant pressure.

Carbon bushing s. below

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Operating range

p [bar]			300
t °C	-200 . . . +650		
pH	0 – 14		

Recommended max Temperature in oxydizing atmosphere: +450 °C

Main application

- Controlvalves

Suitable for

- All Industries

Further components

The carbon restriction bush is made from a high purity material with > 99 % C content with high compression strength. Precisely machined tolerances narrow the gap at the bottom of the stuffing box to a minimum and offer some bearing area for thinner and horizontal orientated valve stems. The length of the bush is readily made up to a depth utilizing the optimum amount of packing rings for best sealing performance and low friction of the stem as a result acknowledged by leading studies.

Proload Live Loading System s. above and page 36.

Beide Kits enthalten einen aus fünf vorgepressten Ringen bestehenden Packungssatz, eine axial geteilte Kohlebuchse und zwei voreingestellte Live Loading-Baugruppen. Da alle Dichtungs-Komponenten geteilt sind, werden sie in der Stopfbuchse installiert, ohne den Stellantrieb zu entfernen, wodurch die Installation vereinfacht wird. Alle Komponenten sind auch einzeln zu beziehen.

Scanset Classic

Combination of optimised packing styles and a lanternring

Characteristics

- Minimal volume loss
- Excellent pressure resistance
- Universal chemical compatibility
- Extrusion resistance
- Expansion factor of the total set close to the rate of steel
- Long service time

Operating range

p [bar]	30	100	300
v [m/s]	8	2	
t °C	-40 ... +250		
pH	1 - 14		

Main application

- Digester Feeders
- Digester Outlet Devices
- Hydro Pulpers
- Similar Applications

Scanset Flush

Combination of optimised packing styles and a lanternring

Characteristics

- Minimal volume loss
- Excellent pressure resistance
- Universal chemical compatibility
- Extrusion resistance
- Expansion factor of the total set close to the rate of steel
- Long service time

Operating range

p [bar]	30	100	100
v [m/s]	25	2	
t °C	-50 ... +250		
pH	2 - 12		

Main application

- Digester Feeders
- Digester Outlet Devices
- Hydro Pulpers
- Similar Applications

HD PRESSURE COVER RING

Braided from specially formulated expanded graphite, reinforced with a proprietary inconel wire matrix and impregnated with a passive, Inorganic Corrosion Inhibitor

Characteristics

- Extrusion and blow out stability through ultrafine Inconel metal mesh reinforcement on each braided strand
- Passive Corrosion Inhibitor
- Non-hardening, excellent long term sealability
- Minimal Volume loss at temperature
- Coefficient of thermal expansion like steel
- High temperature and high pressure capabilities
- Easy to install and easy to remove
- Does not require end cups

Operating range

p [bar]			500
t °C	-200 ... +650		
pH	0 - 14		

Temperature in oxidizing environment: +450 °C

Main application

- Designed for pressure cover seals in Power Generation, in HPI & CPI industries and Valves.

Suitable for

- Powerplant
- HPI Refineries

Approval

- BAM approval for use in Oxygen at 60 °C @ 25 bar

Form of delivery

This packing rings can be manufactured with 45° degree inner or outer bevel and in rectangular shape, in metric or imperial sizes depending on available dieforms.

Sootblower packing set

Carbon and Graphite Fiber combination with special impregnation

Characteristics

- Pressure stable and pliable packing material
- Temperatur resistant, minimal volume loss and consolidation
- Thermal coefficient of expansion of the packing set is similar to the packing housing material of the sootblower
- Wear resistant
- The construction uses in multiple layers extrusion resistant wiper rings in combination with rings, made from braided expanded graphite with integrated carbon fiber reinforcement. All rings are supplied with butt cut for troublefree installation and bidirectional operation
- The best result is achieved by combining a bearing bushing to center the lance Option1 and PROLOAD-STAT LiveLoading on the gland bolts Option 2

Operating range

p [bar]	25		300
v [m/s]	15		
t °C	-40 ... +550		
pH	2 - 12		

Temperature in oxidizing atmosphere +400 °C

Main application

- Sootblower in Powerplants
  Typical manufacturers:
  Bergemann, Diamond Power, Copes Vulcan... etc. with several blow elements and drives
- Similar applications

Form of delivery

Ready to install pre compressed die formed ring set assembled in the way of installation.

SOOTMASTER FLEX sootblower packing set

100 % Graphite-Carbon Yarn packing with special impregnation

Characteristics

- Highly elastic seal set with wedge technology to maintain sealing effect during lance movements
- Packing set made of braided flexible graphite with integrated carbon yarn reinforcement with special adapter end rings that serve as wipers for deposits on the lance and as extrusion protection
- Temperature-resistant, minimal volume loss, minimal settling behaviour
- The thermal expansion coefficient of the packing set is similar to the stuffing box housing material of the sootblower
- As a result of the bidirectional direction of rotation of the lance, the standard design has a butt cut.

- The best result is achieved by combining a bearing bushing to center the lance Option1 and PROLOAD-STAT LiveLoading on the gland bolts Option 2

Option 1

Best performance is achieved when assembling this bronze bearing bushing in the stuffing box. This supports the soot blower lance and the packing is radially not overloaded. In radial split design for easy installation. 2 Halves with axial threaded bore for easy removal. Wear indicators assure functionality.

Option 2

The best function with our Sootblower packing set is achieved in combination with our ProLoad Live Loading System. Special designs with softer spring force and enlarged spring way are available as L10RB, L12RB or L3/8RB, L1/2RB.

The Live Loading System ensures the compression of the packing set even in the event of load changes, temperature fluctuations or wear and repositioning of the packing.

Special packing and sealing systems

These packing styles utilize fibers and braiding processes which are specific for a certain field of applications.

The combination of different raw materials and lubricants are tailored to the conditions of use. This packingstyles may not be available ex stock in all crossections.

DVS ProInject - 2 Component Fiber sealing system

Packingcompound for Injection by a high pressurepump. Maximal adaptation even on worn surfaces and reloading during equipment operation possible.

Plungerpump packing with corner reinforcement to protect against extrusion.

Extruded and round braided packing for easy assembly and dissassembly. Very adaptable.

Approved Packing Styles for the Food Industry produced from high puricity Yarns and in conformity with EG1935:2004 in accordance with EU 10/2011. FDA

A 15

100 % PTFE round braided packing

Characteristics

- Low coefficient of friction
- Good adaption to any kind of surface
- Non ageing or hardening
- Can be installed as a spiral and allows simple assembly and disassembly in one piece

Operating range

p [bar]	20	20	100
v [m/s]	1	1	
t °C	-200 . . . +280		
pH	0 – 14		
g/cm³	1.45		

Practical useful application data:
max. temperature: +200 °C

Main application

- Valve Packing

Suitable for

- Chemical industry
- Universal use
- Installation and maintenance shops

S 4 Hochdruck

High strength ePTFE-Graphite

Characteristics

- Extrusion resistant even with large clearances
- Form stable, wear resistant, heat conductive and can be used as bull ring
- Shaft protecting (recommended surface hardness: HRC 25)
- In high pressure applications die formed rings are recommended

Operating range

p [bar]	30	800	500
v [m/s]	8	3	
t °C	-200 . . . +280		
pH	0 - 14		
g/cm³	1.35		

Main application

- High pressure plunger- and dosing pumps
- Bullrings for mixers, highpressure valves agitators, gate valves and valves

Suitable for

- Chemical industry
- Petrochemical plants
- High pressure machine constructions

Approval

- BAM for liquid and gaseous oxygen 60 °C/40 bar

S 6 Öko

PTFE Fiber with PTFE Blocking Agent and Paraffin Run-In Lubricant

Characteristics

- Highest chemical resistance for a packing in rotating equipment
- Pliable, easily compressible packing
- Self lubricating, dry running capability
- Shaft protecting surface hardness of HRC 25 is sufficient
- Non ageing

Operating range

p [bar]	15	100	100
v [m/s]	10	1.5	
t °C	-50 . . . +280		
pH	0 - 14		
g/cm³	1.70		

Main application

- Agitators
- Mixer
- Refiner
- Filter
- Slow speed Centrifugal pumps
- Metering valves

Suitable for

- Chemical industry
- General industry

Variant

- S6 PA with Food certification EG 1935:2004 in accordance with EU 10/2011
- FDA conformity

S 6SI

100% PTFE - Fiber with special PTFE Dispersion and FDA conform Food Grade Silicone Oil impregnated

Characteristics

- Highest chemical resistance for a packing in rotating equipment
- Pliable, easily compressible packing
- Self lubricating, dry running capability
- Shaft protecting surface hardness of HRC 25 is sufficient
- Non ageing

Operating range

p [bar]	15	100	100
v [m/s]	10	1.5	
t °C	-100 . . . +280		
pH	0 - 14		
g/cm³	1.90		

Main application

- Agitators
- Mixer
- Refiner
- Filter
- Slow speed Centrifugal pumps
- Metering valves

Suitable for

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

Approval

- FDA conformity
- EC 1935:2004 in accordance with EU 10/2011

FDA

S 12K Nylon

Combination Braid of ePTFE/Graphite and Para-Aramid Fiber Corner Reinforcement with Silicone Run-In Lubricant and braided Nylon Core.

Characteristics

- Good heat conductivity
- Suitable for abrasive products

A high strength Nylon Core allows to attach a weight on the packing in order to prestretch and locate it on the washer drum

Operating range

p [bar]	0	0	0
v [m/s]	15	0	
t °C	-100 . . . +280		
pH	2 - 12		
g/cm³	1.4		

Main application

- Pulp Washer Drums
- In units with larger gap widths, or in solids containing media

Suitable for

- Pulp and paper industry

Variant

P 3K

S 12K Plunger

Combination Braid of ePTFE with incorporated Graphite and Para-Aramid Fiber Corner Reinforcement with Special Blocking compound, with Silicone Run-In Lubricant

Characteristics

- Very form stable, Recommended shaft surface hardness: HRC 50
- Good heat conductivity therefore reduced wear
- Extrusion resistant at bigger gaps, can also be used as bullring
- Ability to withstand high pressure
- Safe and universal packing for abrasive products
- Die formed rings are recommended

Operating range

p [bar]	25	500	250
v [m/s]	20	3	
t °C	-100 . . . +280		
pH	2 - 12		
g/cm³	1.55		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar

Main application

- In all units with larger gap widths, or in solids containing media.
- Plunger pumps
- Fittings
- Gate valves

Suitable for

- General Industry
- Pulp and Paper Industry
- Sugar Industry

Variant

- Trapez-Pack® 12 braided in trapezoid shape with cross-sectional impregnation for improved performance and use in crystallizing products for example in sugar industry
- S12K Nylon with high strength Nylon core for safe positioning on Pulp washer Drum

S 26K Plunger

Combination Braid Made of PTFE and Para-Aramid Fiber with Run-In Lubricant

Characteristics

- Universal packing for abrasive media which need a reinforced, wear resistant and form stable packing
- Shaft protecting through good coefficient of fiction
- No contamination of media

Operating range

p [bar]	25	500	250
v [m/s]	20	2	
t °C	-100 . . . +280		
pH	2 - 12		
g/cm³	1.45		

Practical useful application data:
max. temperature: +200 °C
max. pressure centrifugal pumps: 20 bar
max. velocity centrifugal pumps: 15 m/s

Main application

- Centrifugal pumps
- Mixer
- Kneader
- Agitators
- Filter
- Extruder
- Refiner

Suitable for

- Chemical industry
- Pulp and paper industry

Variant

S26 Kombi with Para-Aramid running track reinforcement

S36K Plunger with Meta-Aramid corner reinforcement

S 43K Hochdruck Extra

ePTFE-Graphite Fiber with special Para-Aramid corners and Paraffin Run-In Lubricant

Characteristics

- Very form stable and wear resistant, good heat conductivity
- Recommended surface hardness HRC 60, suggested use on ceramic plungers
- Highest pressure resistance, practically no gap extrusion, can be used as bullring
- Safe and universal packing for abrasive media
- Precompressed rings are recommended for applications in plunger pumps

Operating range

p [bar]	25	1,500	500
v [m/s]	15	2	
t °C	-100 . . . +280		
pH	2 - 12		
g/cm³	1.35		

Practical useful application data:
max. temperature: +200 °C

Main application

- Plunger pumps

Suitable for

- High pressure plunger pumps and similar applications
- Bull rings

Variant

S12 K for lower pressure ranges

BR99 Brettschneid - Valve pressure lid seal tape

Multilayer construction of expanded graphite with Inconel reinforcement

Characteristics

- Universal suitable, rectangular preformed Sealing tape of expanded pure graphite with Inconel reinforcement
- Recommended gap width 0.5 mm, maximum gap width 1.0 mm
- Excellent adaptability on different housing forms and ovality
- Excellent transformation of axial compression into radial sealing force

Operating range

p [bar]	500
t °C	-200 . . . +650
pH	0 - 14

Practical useful application data:
max. temperature in oxidizing atmosphere: +450 °C

Main application

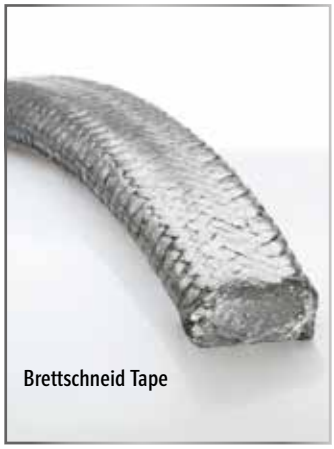
- Fittings
- Valve pressure rings
- Knife Gate Valves

Suitable for

- Power plant
- Boiler houses
- Recommended minimum surface pressure at assembly 20 N/mm²

Form of delivery

- 5 x 12 mm in 1 kg Spool approx. 8.5 mtr
- 7.5 x 15 mm in 2.5 kg Spool approx. 11.5 mtr
- 10 x 15 mm in 2.5 kg Spool approx. 8.5 mtr
- 12 x 24 mm in 5 kg Spool approx. 8.9 mtr
- 15 x 30 mm in 5 kg Spool approx. 5.7 mtr
- 19 x 30 mm in 5 kg Spool approx. 4.5 mtr
- Other crossections and profiles as well alternative delivery units on request



Brettschneid Tape

Braided Flange Sealant

Rectangular braided tube packing

Characteristics

- The elasticity of this gasket tape allows low uneveness of the flange surface
- The sealant can be reused after opening of flange
- Sealing of the cutted ends by inserted point lock

Main application

- Metal, glass, ceramic flanges on boilers
- centrifuges
- pipe flanges
- tanklid
- housings

Suitable for

- Flanges in General service

Variant

SL 4, made of ePTFE graphite yarn
SL 6, made of oiled PTFE yarn
SL 19, made of PTFE yarn dry
SL 44 I, made of expanded graphite, integrated Inconel reinforcement and with adhesive backing

Form of delivery

15 x 5 mm
16 x 3 mm
20 x 4 mm
22 x 3 mm
25 x 6 mm
30 x 4 mm
33 x 5 mm
50 x 7 mm

Other dimensions and basic materials – on request.

SL 44I

Gasket tape braided from expanded graphite with integrated Inconel reinforcement, self adhesive backing

Characteristics

- Can be universally applied
- High quality pure graphite - heat expansion coefficient similar to that of steel
- End connection with a skive cut, fix ends using a double sided adhesive tape between skive cutted ends
- Extrusionstability through Inconel reinforcement

Operating range

p [bar]			250
t °C	-200 . . . +400		
pH	0 – 14		

Recommended max. Temperature n oxidizing atmosphere: +400 °C.

Pressure max. value depends on flange design.

Main application

- Covers
- Flanges
- Lids
- Joint connections
- Oven and Furnaces

Suitable for

- Power stations
- Petrochemical industry
- Boiler houses
- For higher pressure application the tape should be installed in a retaining groove or a constraint flange design

Form of delivery

12,7 x 3,2 mm / 1/2" x 1/8"
on 1 kg spool,
Weight per 10 m: 0,55 kg

19,0 x 4,8 mm / 3/4" x 3/16"
on 2.5 kg spool,
Weight per 10 m: 1,10 kg

25,4 x 6,4 mm / 1" x 1/4"
on 2.5 kg spool,
Weight per 10 m: 1,9 kg

DVS-SP2

2 Component Fiber sealing system impregnated with PTFE and Silicone free dynamic Run-In Lubricant

Characteristics

- Simple installation
- Use without barrier fluid
- Maintenance free
- Shaft protecting
- No adjusting of gland
- Re-pressurize in operation

Operating range

v [m/s]	8
t °C	-10 ... +260
pH	2 - 12
g/cm³	1.10

Pressure Capability is dependent on design of endrings.

Main application

- Equipment which is badly accessible
- Worn shaft sleeves
- Non centric running shafts
- Pulper

Suitable for

- Universal use

DVS-SP30

2 Component Fiber Sealing System impregnated with Graphite and MoS2 lubricant

Characteristics

- Simple installation
- Use without barrier fluid
- Maintenance free
- Shaft protecting
- No adjusting of gland
- Re-pressurize in operation

Operating range

v [m/s]	12
t °C	-40 ... +315
pH	2 - 12
g/cm³	1.10

Pressure Capability is dependent on design of endrings

Main application

- Equipment which is badly accessible
- Worn shaft sleeves
- Non centric running shafts

Suitable for

- Higher Temperature applications

Accessories

Top and bottom HPU Endrings:
- Material HPU machined according to customer measurement
- Note: HPU is of allround use, please check if other compound is needed due to chemical or temperature in the application.

DVS-Injection Press:
- DVS TP 8200 Spindle Injection Press
- DVS TP 9001 Hydraulic press

Injectionpress DVS TP 9001 for easy reloading with DVS Component P.

2 Component System

- Component H:
- Is used for the basic manual fill of the stuffing box.
-
- Component P:
- Is used for Injection with press DVS TP 9001.

Functional description

Due to the special fiber compound and the proprietary lubricant mix, the Sealing Compound System DVS is suited to seal stuffing boxes with low pressure. The loose compound will be hold in place by a top and bottom ring, typically made of hydrolysed polyurethane HPU with a special developed geometry. Therefore extrusion of the Sealing compound is prevented and can not cause a premature failure of the DVS Sealing Compound System.

Contrary to braided packing the DVS needs little maintenance only.
Due to its loose and pliable structure it is absolutely gentle to the shaft or shaft sleeve surface.

Preferrably used on worn shafts and in offset or concentric shaft orientations.

DVS top and bottom Endring / DVS HPU STANDARD made of HPU, split or unsplit

DVS top and bottom Endring / DVS HPU UNIVERSAL unsplit or radially split; made of HPU and PTFE/Graphite compound. Can be used on non centric running shafts.

Form of delivery

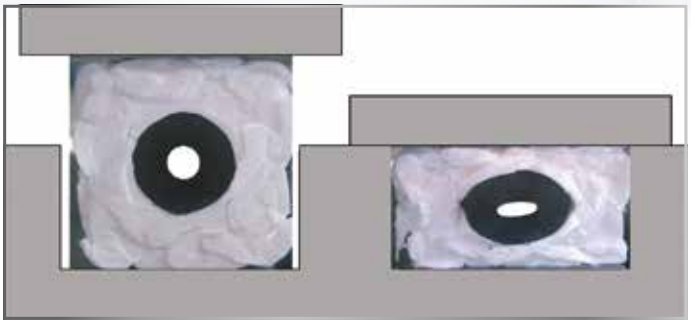
Unit for H- and P-Type:
Cans 1 kg,
Hobbock 20 kg

Elastomercore Packing

Packing for applications with radial shaft run out and on door and tank lids

Elastomercore packing

The braid incorporated tube core offers the packing highest flexibility and recovery in dynamic and static applications.



Material combinations

Typical elastomer materials are NBR, EPR, silicone and FKM. Alternative outer braid as well as core material on request.

Form of delivery

Elastomer Tube Core Packing above 12 mm and solid elastomer core packing from 8 mm cross section.

P 5 SKE Flexibel

PTFE fiber packing with integrated mechanical reinforcement, thermally conductive PTFE Impregnation, Run-In Lubricant and elastic EPR Tube Core

Characteristics

- High cross section density and structural stability, yet elastic and adaptive for bigger radial shaft run out
- Suitable for vacuum
- Mechanical stability for products with abrasive content
- Improved recovery

Operating range

p [bar]	25	-	-
v [m/s]	20	-	
t °C	-50 ... +280		
pH	1 - 13		
g/cm³	1.35		

Practical useful application data:

due to Elastomeric core max. temperature +150 °C

Main application

- Mixer
- Agitators
- Autoclave
- Kneader
- Paddle dryer

Suitable for

- For applications with radial shaft run-out or stuffing boxes with non centric positioned shafts.
- Products with abrasive content

Variant

- P3 SKS red for higher solids content

A 19 SKV

PTFE Fiber with PTFE Impregnation and elastic Viton Tube Core

Characteristics

- Chemical resistance
- For clean products and static sealing application

Operating range

p [bar]	25	-	-
v [m/s]	2	-	
t °C	-50 ... +280		
pH	0 – 14		
g/cm³	1.55		

Practical useful application data:
due to Elastomeric core max. mperature +200 °C

Main application

- Tank lid, door and lid seal

Suitable for

- For applications with radial shaft run-out or stuffing boxes with non centric positioned shafts.
- Static and slow rotating applications

S 6 SKV Flexchem

PTFE Fiber with PTFE Impregnation, Run-In Lubricant and elastic Viton Tube Core

Characteristics

- Chemical resistance
- For clean products and static sealing application

Operating range

p [bar]	25	-	-
v [m/s]	6	-	
t °C	-50 ... +280		
pH	0 – 14		
g/cm³	1.60		

Practical useful application data:
due to Elastomeric core max. temperature +200 °C

Main application

- Mixer
- Agitators
- Autoclave
- Kneader
- Paddle dryer

Suitable for

- For applications with radial shaft run-out or stuffing boxes with non centric positioned shafts.

S 6SI SKS Blue

PTFE Fiber with special PTFE Dispersion and FDA conform Run-In Lubricant impregnated and Silicone Tube Core in food grade quality

Characteristics

- Elevated heat conductivity
- High chemical resistance and for clean media

Operating range

p [bar]	20	-	-
v [m/s]	6	-	
t °C	-100 . . . +280		
pH	1 - 14		
g/cm³	1.80		

Practical useful application data: due to Elastomeric core max. temperature +160 °C

Main application

- Mixer
- Agitators
- Autoclave
- Kneader
- Paddle dryer

Suitable for

- For applications with radial shaft run-out or stuffing boxes with non centric positioned shafts.
- Products in the food processing industry

Approval

- EC 1935:2004 in accordiance to EU 10/2011
- FDA conformity

TP 619 SKS Blue

Hybrid-Braid of heat conductive ePTFE Yarn, PTFE Fiber, Silicon Run-In Lubricant and elastic Silicone Tube Core

Characteristics

- Elevated heat conductivity
- For higher shaft speeds
- High chemical resistance and for clean media

Operating range

p [bar]	20	-	-
v [m/s]	10	-	
t °C	-100 . . . +280		
pH	1 - 14		
g/cm³	1.60		

Practical useful application data: due to Elastomeric core max. temperature +160 °C

Main application

- Mixer
- Agitators
- Autoclave
- Kneader
- Paddle dryer

Suitable for

- Rotating Equipment with higher surface speed radial run out
- Products in food industry

Variant

TP63 SKS Blue for higher solids content with food grade conformity EG1935:2004 in accordance with EU10/2011

Approval

- EC 1935:2004 in accordance with EU 10/2011
- FDA (food conformity)

Fabric and Special seals , Glass- and Ceramic packing

Seals for high temperature use.

Tapes and fabrics made of glass or refined glass …

- for thermal and noise insulation, filtration, object protection
- with different temperature limits and technical properties
- free of melting beads - for constant high quality without defects

We advise you in questions of …
- mechanical resistance
- insulation effect
- water and gas tightness
- and in many other aspects

Products specifically adapted and optimized to your requirements.

Fabric seals

Profile gaskets and Special solutions, Expansion joints

Characteristics

- Perfect axial and radial flexibility, good stress relaxation and protection against wear
- Very low leakage values through outstanding cross section and surface density
- Without organic carrier fibers, no shrinkage under temperature
- Resistant against gases, vapours, oils, caustics and most of acids, also suitable for NH3 - gases, hydrogen, nitrogen and methanol
- Non hazardous to health (no Al2O3 content !)
- A specific vulcanisation technique for temperingsystem applications simplifies the installation and improves adaption to uneveness

Main application

Developed for highest thermal and mechanical strains, particularly proven in heat treatment systems, door and cover washers in foundries, power plants.

Construction

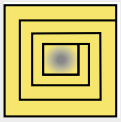
- Wrapped gaskets from texturised glass cloth with high temperature resistant, gas proof elastomeric binders
- Standard: Graphitised nonstick Coating
- Special: Raw, elastomercoated or PTFE impregnated Surface

Suitable for

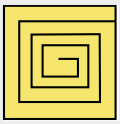
- Door- and Lid Seals in foundries, powerplants and heat treatment plants

Variant

- Permanent elastic core made of glass fiber GDK



- Wrapped through and through GD



Technical parameters

Styles	Max. temperature in inert atmosphere s [°C]	Max. temperature in oxidizing atmosphere [°C]
GDK 1000	1000	450
GDK 600	600	450
GD 1000	1000	450
GD 600	600	450
max. operation pressure: 10 bar		

Form of delivery

- By meter, endless rings, frames, special shapes, rectangular or round as well as tadpole tapes. Cores and wraps made of elastomeric bonded aramid fiber sheets. Alternative qualities on request.

S 70 Proglas

Glass Fiber Packing

Characteristics

- No irritation to skin, harmless to health (filament diameter: 6 - 10)
- Non flammable following DIN 4102 – ignition loss <1.5 %
- Resistant against oils, grease, steam, solvents and organic acids
- Hydrolytic resistance following DIN 12111: Class 1
- Does not content toxic substances or heavy metals
- Surface graphite impregnation on request for increasing compactness and nonstick effect
- A variety of products different in form and temperature resistance are available on request

Operating range

t °C	-100 . . . +550
pH	3 - 9

Variant

Braided in square or round X-Section
On request with surface graphite impregnation for increasing compactness and heat conductivity

Main application

- Furnace, boiler, vessel and chimney doors
- Fireplaces
- Pressureless service closures
- Tunnel furnaces
- Lid seals etc.

Suitable for

- Power plant
- Furnace construction

Square X-Section

Standard dimensions / Sales unit

Size	Weight [g/m]	Sales unit [m]
06 x 06	40	200
08 x 08	70	100
10 x 10	100	100
12 x 12	135	50
15 x 15	220	50
20 x 20	400	50
25 x 25	580	25
30 x 30	830	25
40 x 40	1.450	20

Form of delivery

Square braided by meter.
On request endless rings, frames, special shapes, rectangular or round as well as tadpole tapes.

S 71 Prokeram

Ceramic Fiber Packing with chrome steel wire

Characteristics

- High elasticity and volume are the premises for an extremely good insulation effect
- Resistant against acid and caustic except phosphoric or hydrofluoric acid or highly concentrated caustics
- Does not content toxic substances or heavy metals
- Non flammable following DIN 4102
- Product availability: Square, rectangular, round braid or round twisted reinforced with chrome steel wire
- Surface graphite impregnation on request for increasing compactness and nonstick effect
- Product contains approx. 20 % organic carrierfiber which decomposes at 200 °C

Operating range

t °C	-100 . . . +1,100
pH	1 - 13

Variant

Braided in square or round X-Section
On request with surface graphite impregnation for increasing compactness and heat conductivity

Main application

- Furnace, boiler, vessel and chimney doors
- Fireplaces
- Pressureless service closures
- Tunnel furnaces
- Boiler and vessel doors
- Lid seals etc.

Suitable for

- Power plant
- Furnace construction

Square X-Section

Standard dimensions / Sales unit

Size	Weight [g/m]	Sales unit [m]
10 x 10	61	100
12 x 12	88	50
15 x 15	115	50
20 x 20	200	50
25 x 25	350	25
30 x 30	542	25
40 x 40	996	20
50 x 50	1.340	15

Form of delivery

By meter, endless rings, frames, special shapes, rectangular or round as well as tadpole tapes.

Cores and wraps made of elastomeric bonded aramid fiber sheets.

Alternative qualities on request.

S 72 - HT 800

Glass Fiber Packing

Characteristics

- Non flamable
- High electric- and thermal isolation capability
- Dimensionally stabil
- Good mechanical structural strength

Operating range

t °C	-100 . . . +700
pH	3 - 9

Temperature: short term up to +800 °C

Main application

- Furnace, boiler and chimney doors
- Expansion joints
- Exhaust pipes

Suitable for

- Power plant
- Furnace construction

Square X-Section

Standard dimensions / Sales unit

Size	Weight [g/m]	Sales unit [m]
06 x 06	40	200
08 x 08	70	100
10 x 10	105	100
12 x 12	150	50
15 x 15	235	50
20 x 20	395	50
25 x 25	585	25
30 x 30	910	25
40 x 40	1.470	20

Form of delivery

Square braided.
On request round braided.
On request with surface graphite impregnation for increasing compactness and heat conductivity.

S 73 - HT 1050

Silicat Fiber Packing

Characteristics

- Non flamable
- High electric- and thermal isolation capability
- Dimensionally stabil
- Good mechanical structural strength
- Low shrinkage
- Low Volumeloss

Operating range

t °C	-100 . . . +1,050
pH	3 - 9

Temperature: short term up to +1,100 °C

Main application

- Furnace, boiler and chimney doors
- Expansion joints
- Exhaust pipes

Suitable for

- Power plant
- Furnace construction

Square X-Section

Standard dimensions / Sales unit

Size	Weight [g/m]	Sales unit [m]
08 x 08	58	100
10 x 10	95	100
12 x 12	140	50
15 x 15	180	50
16 x 16	200	50
20 x 20	353	50
25 x 25	540	25
30 x 30	780	25

Form of delivery

Braided in square X-Section
On request some X-Sections with 0.12 mm V4A wire reinforcement.

Packing rings and shaft seal rings

Die-Formed Packing rings

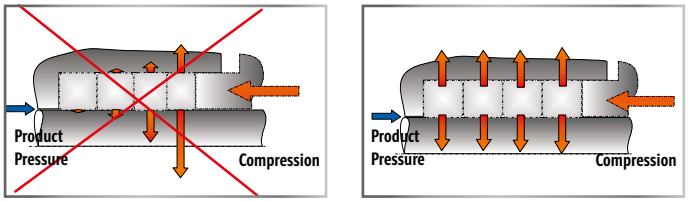
Best Technical Solution

Design
- Made of all common types of packing
- Rings or tubes, open, closed or glued ends
- More than 2,000 standarized quality tools

Advantages
- Better sealing effect - longer service life
- Faster and easier installation - error prevention
- Perfect cutted - elimination of waste
- Even pressure distribution - shorter run-in process
- Minimized energy loss due reduced friction

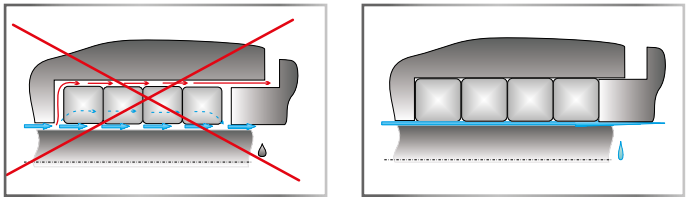
Form of delivery
- Precompressed or form cut rings, complete sets
- Available dimensions from 2.5 to 500 mm
- Custom made constructions on request following drawing details

Order text
- Packing Style
- Dimensions: Outer Diameter / Inner Diameter and Height
- Cut: Skive or Butt
- Amount of rings needed



Optimized pressure distribution with die formed rings

Compression distribution in a stuffing box
Precompressed rings offer the advantage to have the settling taken place already. In operation that results in a reduced way of adjustment and all packing rings will seal equally down to the stuffing box ground. This avoids a lift off effect of the product side rings through product pressure.



- Leckage along Packing OD
- Cross sectional leckage
- Leckage along the shaft

Controlled Leakage path through ring cuts with additional length

Select from over 2,000 die forms the best solution for your application

Die forming press

ARF Ring

Pure expanded graphite ring

Characteristics

- High cross section density
- Self lubrication and limited wear
- Dry running capability
- Coefficient of thermal expansion similar to steel
- Maintenance free and elastic, also under variable pressure
- Non ageing, high chemical resistance
- Attention! Precise tolerances and surfaces of application are requested

Operating range

p [bar]	-	-	800
v [m/s]	-	-	
t °C	-200 . . . +550*		
pH	0 – 14		
g/cm³	0		

* Max. Temperature in steam
Density 1.40 up to 1.80 g/cm3

Main application

- Fittings
- Pumps (high temperature)
- Covers
- Valves

Suitable for

- Valves and fittings of all Industries

Despite ARF rings are mainly designed for valves it also can be used in pumps at higher shaft speeds due to its high heat conductivity.
As this is a precision sealing element Stuffingbox needs to be in precise alignment and perfect surface condition.

Variant

- Graphite in Purity 98 %
- Graphite in Purity 99,85 %
- expanded graphite APX 2 foil with integrated oxidation protection

- Version with integrated metallic reinforcement and/or metallic end caps made of AISI 316

- ARF-TA with VDI 2440 test (November 2000 edition)
- (leakage rate 5.7 - 10-3 mbar - l/(s-m) 300 °C)

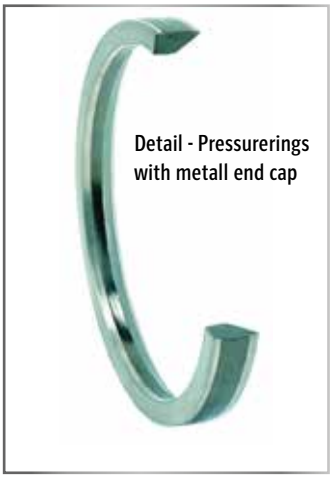
Approval

- Oxygen BAM 200 °C/250 bar
- DVGW and KTW

Form of delivery

- Standard: Endless rings
  As Option cut into half-shells or with skive cut
- Rings with or without metal reinforcement
- Pressure seals in any kind of geometry
- Graphite tape in in 10, 15, 20 or 25 mm width:
  - Corrugated, 0.38 mm thick mit density 1.1
  - 0.5 or 1.0 mm thick with density 1.0 and self adhesive backing

Pressurerings with metall end cap



Detail - Pressurerings with metall end cap

Shaft Seal Ring WDR

Pre-Loaded Packing Ring in Metal Casing

Characteristics

- WDR-rings are ready-to-fit sealing elements for shafts and axles
- The wide sealing surface offers extra protection against early wear on the shaft and as well on the seal
- WDR rings are located in the housing with interference fit. The sealing effect is facilitated through the pre-loaded encapsulated packing
- Different packing styles can be utilized depending on application

Gehäuse

Standard: Sheet Steel EN 10130 galvanized
Special variant: VA (1.4301) - CrNi

Standard Insert
P1 Universal to +200 °C

Main application

- Crank and drive shafts
- Guiding shafts
- Axles, spindles and similar equipment
- Sealing against fluid leakage and dust penetration
- Protection for bearings and drive units

Suitable for

- All Industries to seal against fluid loss or protect against dust and dirt ingress.

Variant

- A 22 up to +450 °C for high temperature application
- P 7/G up to +250 °C for applications in abrasive environment etc
- The packing insert selection depends on product and temperatue

Dimensions in mm

Inside	Outside	Height
12	22	07 mm
25	37	07 mm (VA)
28	40	07 mm (VA)
30	42	07 mm
30	47	07 mm
30	47	10 mm
30	52	07 mm
32	42	10 mm
35	47	07 mm
35	50	08 mm
35	55	08 mm
35	62	10 mm
40	52	07 mm (VA)
40	55	08 mm (VA)
40	60	08 mm
40	60	10 mm
40	60	12 mm
40	62	10 mm
(40	64	10 mm)
42	62	10 mm

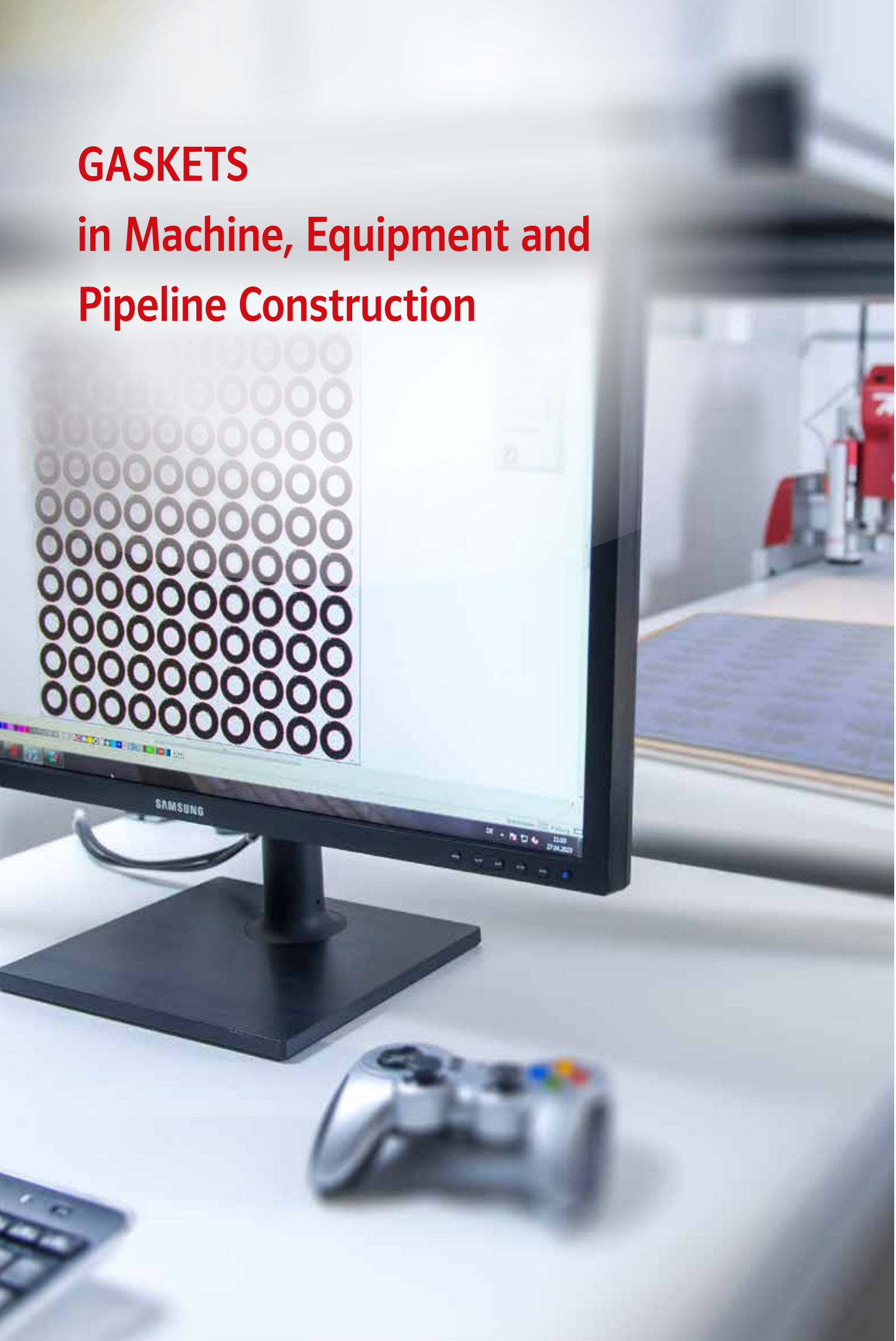
Inside	Outside	Height
45	60	08 mm
45	62	10 mm
45	65	10 mm
(46	64	10 mm)
50	68	12 mm
50	70	10 mm (VA)
50	72	10 mm
50	75	10 mm
50	80	12 mm
55	70	08 mm
55	72	10 mm (VA)
55	75	10 mm
55	75	12 mm
55	80	10 mm
60	75	08 mm
60	78	08 mm
60	78	10 mm
60	80	10 mm
60	80	12 mm
60	80	13 mm (VA)

Inside	Outside	Height
60	85	10 mm
60	90	12 mm
65	80	08 mm
65	80	10 mm
65	85	10 mm (VA)
70	90	08 mm
70	90	10 mm
70	90	12 mm
70	100	13 mm
75	90	10 mm
75	95	10 mm
80	100	10 mm (VA)
80	100	13 mm
85	110	13 mm (VA)
85	115	10 mm
85	120	12 mm
90	110	10 mm (VA)
90	110	13 mm
90	120	12 mm
95	110	10 mm

Inside	Outside	Height
95	120	13 mm
100	115	09 mm
100	120	10 mm
100	120	13 mm
105	130	10 mm
105	130	13 mm (VA)
110	130	13 mm
(120)	140	13 mm
(135)	150	10 mm
140	170	12 mm
140	170	15 mm
(150)	180	15 mm
(160)	200	15 mm
(200)	250	13 mm

( ) = on request, please note minimum order quantity
(VA) = also available with housing parts made of stainless steel

GASKETS
in Machine, Equipment and Pipeline Construction



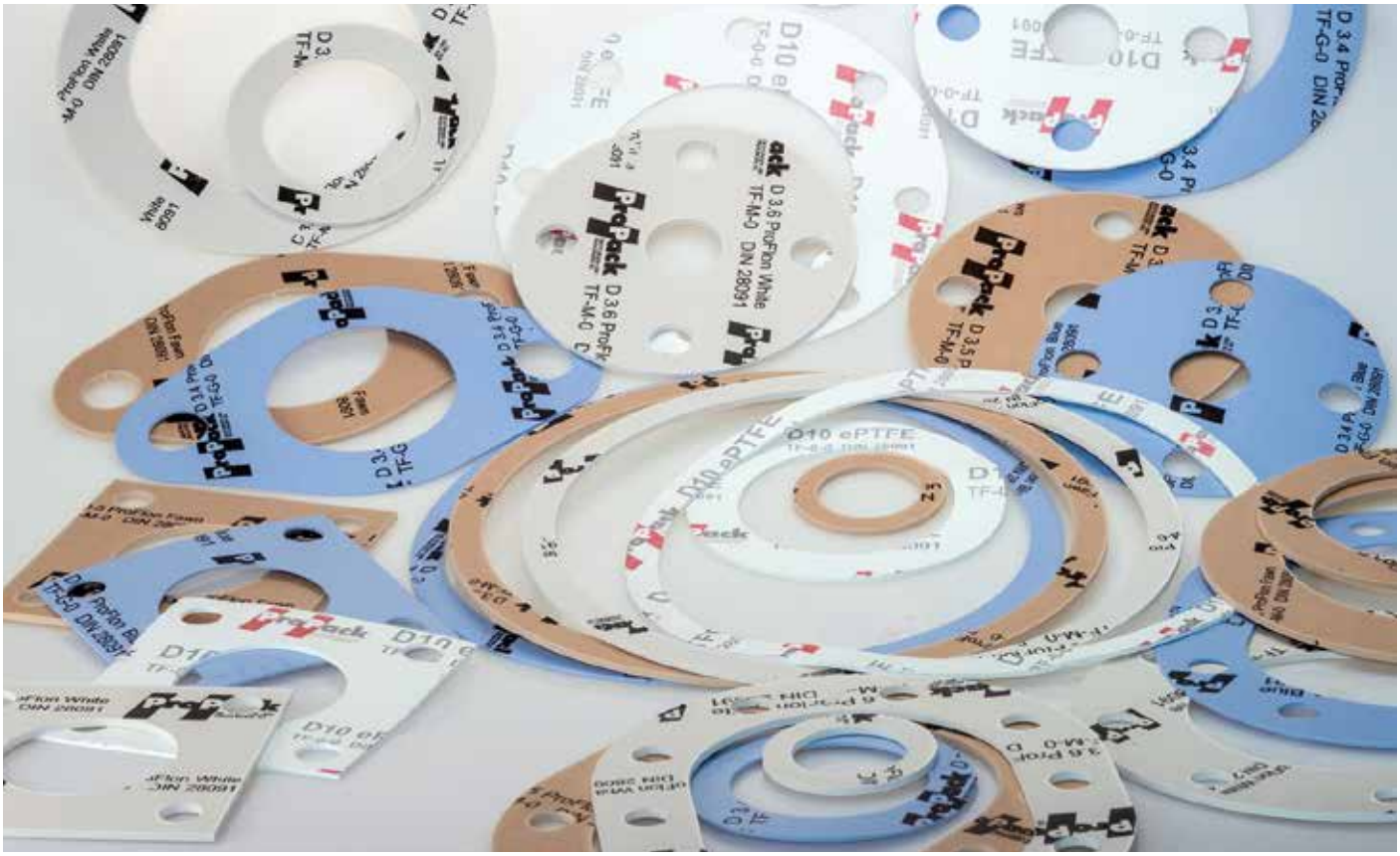
sPTFE and ePTFE Gaskets

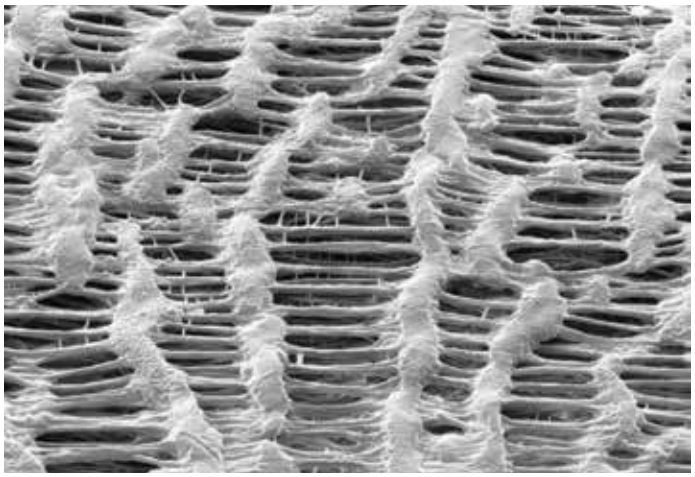
Designed for the long term

High variety of use, reliable and with consistant high quality.

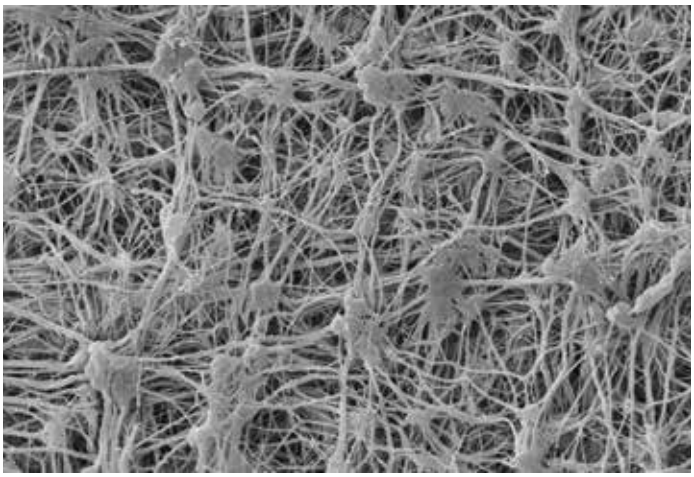
Tailored to your specific parameters and application.

Gaskets made from sPTFE and ePTFE with their excellent chemical resistance and high density characteristics can provide successful sealing in demanding and difficult services





Microscopic view
100 % pure PTFE (VDE-VDI 2480) in a **monoaxial** expanded Net-Knot structure



Microscopic view
100 % pure PTFE (VDE-VDI 2480) in a **biaxial** expanded Net-Knot structure

Gaskets from the spool

Our self-adhesive gaskets from the spool made of 100 % pure ePTFE are used for safe and cost-effective sealing.
This gasket tape is ideal for making gaskets of any shape, by you, on site. This eliminates the delivery time and expensive waste of die-cut gaskets.

D 1 Protex

ePTFE Gasket Tape

Characteristics

- Simple to install
- No ageing
- Excellent adaption, ideal to compensate uneven gland surfaces
- Physiologically safe in temperatures up to +260 °C
- Selection criteria: unevenness of gland should not be bigger than 1/2 of rest thickness

Operating range

p_{max} [bar]	Vakuum . . . 55
t °C	-240 . . . +270
pH	0 - 14

Pressure: Vacuum up to 55 bar (according to the operational and/or assembly conditions)
Temperature: Resistance of the ePTFE sealing material short term +310 °C.
After first temperature exertion the olts should be Re-tightened

Main application

- Pipe Columns
- Separation joints
- Mixer, · Pump Housing
- Machine Housing
- Glass- and Graphite-Devices
- Lined vessels, · Sight glasses
- Hand- and Manhole covers (Not TRD401)
- Ventilation and Air Condition Channels
- Steel and Plastic flanges
- Pipes and devices with highly aggressive chemicals
- Gearboxes

Suitable for

- Chemical industry
- Pharmaceutical industry
- Food industry
- General service

Resistant

- All media pH 0-14, e.g:
- acids, alkaline, solvents, paint, oil, grease, steam
- Excluded:
- molten and/or solved alkaline metals and elementary or gaseous fluoride at high temperature or under high pressure
- Ageing resistant

Material

- 100 % pure ePTFE in a stretched filament knotted fiber structure. This ensures that there is a high pressure resistance (restricted cold flow) and a good adaptation to the flange surface.

Approval

TÜV Prüfung acc. MUC-KSP-A066
BAM for oxygen 60 °C / 40 bar
DVGW Reg.-Nr.: DG-5127CL0032
TA-Luft: AMTEC 1.7 · 10-7 mbar · l/(s·m) @ 250 °C test pressure
Food:

- FDA21 CFR 177.1550 (PTFE)
- FDA21 CFR 170.105 (adhesive)
- EG 1935:2004 EU 10/2011

FDA

Dimensions

Order-No.	Width (mm)	Roll length	Recommended Flange width	Surface pressure/result. thickness in (mm)		
				10 N/mm²	20 N/mm²	30 N/mm²
D 1/1	1 x 1	25		0.15	0.10	0.08
D 1/3	3 x 1,5	25	< NW 100	0.40	0.35	0.30
D 1/5	5 x 2	25	< NW 300	0.80	0.60	0.50
D 1/7	7 x 2,5	25	< NW 800	1.00	0.80	0.70
D 1/10	10 x 3	25	< NW 1.500	1.20	0.90	0.80
D 1/12	12 x 4	10	< NW 1.500	1.45	1.15	0.95
D 1/14	14 x 5	10	> NW 1.500	1.60	1.20	1.00
D 1/17	17 x 6	10	In case of bigger unevenness double layer are recommended	2.10	1.50	1.40
D 1/20	20 x 7	10		2.40	1.80	1.40
D 1/25	25 x 5	5		1.60	1.20	1.00
D 1/25DD	25 x 8	5		2.74	2.06	1.60
D 1/28	28 x 5	5		1.60	1.20	1.00
D 1/40	40 x 5	5		1.60	1.20	1.00

Reference values: depending on effective width and surface conditions.
Gas tight above 20 N/mm2 surface pressure during operation conditions

D 1 Protex HD

Universal ePTFE Gasket Tape HD with higher density

Characteristics

- Very adaptive to surfaces
- Chemical resistance
- Simple to install
- Very high cross section sealability
- Wide area of applications
- Does not stick on flanges
- Easy to remove
- Universal sizes reduce stock keeping

Operating range

p_{max} [bar]	Vakuum . . . 55
t °C	-240 . . . +270
pH	0 - 14

Pressure: Vacuum up to 55 bar (according to the operational and/or assembly conditions)
Temperature: Resistance of the ePTFE sealing material short term +310 °C. After first temperature exertion the bolts should be Re-tightened.

Main application

- Pipe Columns
- Separation joints
- Machine Housing
- Glass- and Graphite-Devices
- Lined vessels
- Sight glasses
- Hand- and Manhole covers (Not TRD401)
- Ventilation and Air Condition Channels
- Steel and Plastic flanges
- Pipes and devices with highly aggressive chemicals
- Gearboxes

Suitable for

- Chemical industry
- Pharmaceutical industry
- Food industry
- General service

Material

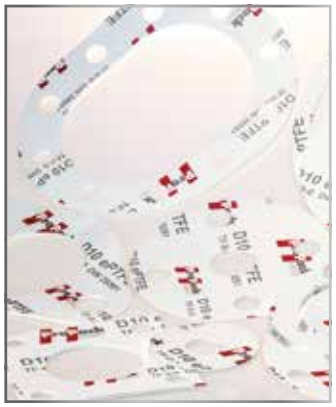
- 100 % expanded PTFE
- Chemical resistant against all products with the exception of molten Alcalimetal and elementary Fluor

Approval

- FDA 21 CFR 177.1550 (PTFE)
- FDA 21 CFR 170.105 (adhesive)
- EC 1935:2004 EU 10/2011

Form of delivery

Order-No.	Dimension Width x height (mm)	Spool length			Sealing surface Width
		10 m	25 m	50 m	
D1HD303	3 x 0,3		x	x	> 3 mm
D1HD307	3 x 0,7		x	x	> 3 mm
D1HD415	4 x 1,5		x	x	> 15 mm
D1HD425	4 x 2,5		x	x	< DN 500
D1HD645	6 x 4,5		x	x	< DN 1000
D1HD855	8 x 5,5		x	x	< DN 1500
D1HD1070	10 x 7,0	x	x		> DN 1500 or severely damaged sealing surfaces



D 10 ProFlansch

Formstable biaxially expanded ePTFE sheets or die cutted gaskets

Characteristics

- Excellent adaption
- High blow-out resistance
- No cold flow
- Chemically inert

Operating range

p_{max} [bar]	Vakuum . . . 200
t °C	-240 . . . +270
pH	0 - 14

Recommended application range:
vacuum up to 40 bar at -240 °C to +230 °C

Weitere Technische Parameter

Minimum Surface pressure:
VU (40 bar; 0,01) = 27 Mpa
Maximum Surface Pressure:
VO = 160 Mpa
Minimum surface pressure in operation: BU <5 Mpa

Main application

- Flanges
- Vessels
- Lids
- Joints
- Narrow flanges
- Bigger uneveness
- Tension sensitive components (e.g. sight glasses)

Suitable for

- Chemical industry
- Food industry
- Maintenance

Approval

- DIN 28090-2
- TA Luft 1,5 · 10-8 mbar · l/(s·m) @ 250 °C
- TÜV approval according to MUC-KSP-A066
- BAM for gaseous oxygen 60 °C / 40 bar and liquid oxygen
- FDA 21CFR 177.1550 (PTFE)

FDA

Form of delivery

Sheet dimension: 1,000 x 1,100 mm and 1,500 x 1,500 mm

Sheet gaskets thicknesses: 0.5 / 1.0 / 1.5 / 2.0 / 3.0 / 4,0 / 5,0 / 6,0 / 7,0 / 8,0 / 9,0 / 10 mm
As insertable gasket or diecut shaped gasket for example hand and manhole gasket in any kind of form upon request see page 77 for Style D4.3.

D 11 Probitex

Compression proof and form stable biaxially expanded Gasket Tape with adhesive backing

Characteristics

- No change in width at compression
- Excellent on slim or restricted flange area
- No ageing
- Excellent adaption to flange uneveness
- Physiologically safe in temperatures up to +260 °C
- Practical waste-free application

Operating range

p_{max} [bar]	Vakuum . . . 200
t °C	-200 . . . +280
pH	0 - 14
g/cm³	0.65

After first temperature exposure the bolts should be Re-tightened.
pH-Value chem. Resistance: Except molten or dissolved alkaline metals, elementary or dissolved fluorine under high pressure.

Main application

- Larger flanges and vessels
- Glaslined flanges
- Agitators
- Heat exchangers

Suitable for

- Chemical industry
- Pharmaceutical industry
- Food industry
- General service

Approval

- FDA21 CFR 177.1550 (PTFE), FDA21 CFR 170.105 (adhesive) EG 1935:2004 EU 10/2011
- TA Luft VDI 2440

Form of delivery

10 mtr / roll
Other length and dimension on request

Compression Values

thickness (mm)	Recommended for Steel Flanges width according DIN 2690 (NW)	Surface pressure/ resulting thickness in (mm)			
		10 N/mm²	20 N/mm²	30 N/mm²	40 N/mm²
2	≤ 300	0.94	0.76	0.70	0.66
3	≤ 800	1.57	1.14	1.05	0.99
4	≤ 800	1.88	1.52	1.40	1.32
5	≤ 800	2.35	1.90	1.75	1.65
6	≤ 1500	2.82	2.28	2.10	1.98
7	≤ 1500	3.29	2.66	2.45	2.31
8	≤ 1500	3.76	3.04	2.80	2.64
9	≤ 1500	4.23	3.42	3.15	2.97
10	> 1500	4.70	3.80	3.50	3.30

Available Dimensions D11:
(other dimensions on request)

width (mm)	thickness (mm)								
	2	3	4	5	6	7	8	9	10
10	x	x	x	x	x	x	x	x	x
15	x	x	x	x	x	x	x	x	x
20	x	x	x	x	x	x	x	x	x
25	x	x	x	x	x	x	x	x	x
30	x	x	x	x	x	x	x	x	x
35	x	x	x	x	x	x	x	x	x
40	x	x	x	x	x	x	x	x	x
45	x	x	x	x	x	x	x	x	x
50		x		x	x	x	x	x	x
55		x			x	x	x	x	x
60		x			x	x	x	x	x

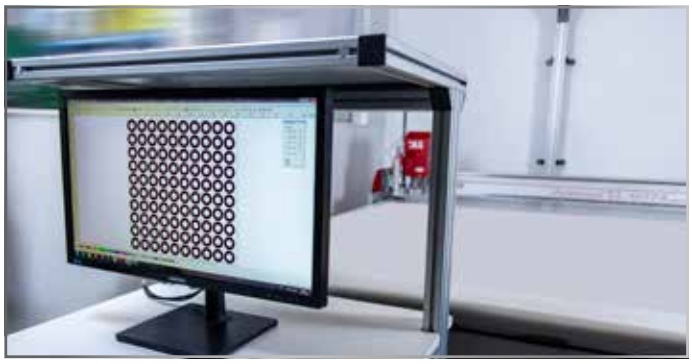
Gasket Sheets and confectioned gaskets for static applications

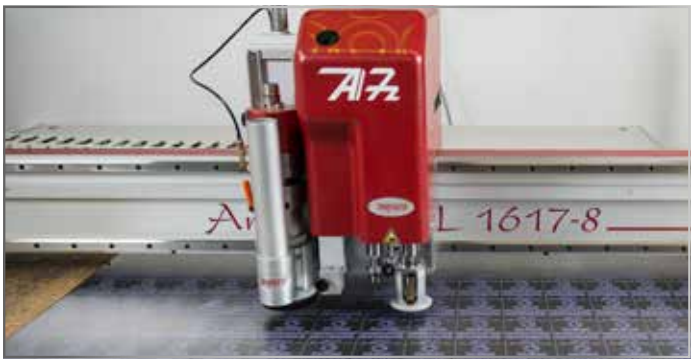
Pre-cut gaskets have a fast ROI by reducing down time, maintenance time and gasket cutting waste.

In our product range we have gasket sheets made of expanded graphite and PTFE with various reinforcements. For the right selection of the appropriate gaskets in your plant, you will receive application-related advice from us.

A free programmable Gasket Plotter allows to produce even complicated forms of gaskets very cost effective and in quick turn around without the costly and timely procurement of cutting tools. Pre-production prototypes can be provided for small and high quantities.

Besides programming the plotter to the desired gasket shape and dimension, also data transfer in a DXF format or similar is possible to safe time and programming.





Gasket sheets technical data

	Compressibility ASTM F36 %	Recovery ASTM F36 %	PQR EN13555	Pressure* max * bar	Temp (Material)* max * °C	Material	Q_{min} EN13555 (MPa)	Q_{Smin} EN13555 (MPa)	Q_{Smax} EN13555 (MPa)
D2.0 ALLROUND	11	60	0.83 @ 100 °C; QA=50MPa	100	200 (160 in steam)	Aramidfiber, NBR, Filler	27	10	220
D2.3 Carbon	9	60	--	100	300 (280 in steam)	Carbon, NBR, Filler	27	10	220
D3.4 BLUE	30	35	0.45 @ 150 °C; QA=30MPa	55 *4	260	sPTFE with Microglass	<15	<5	--
D3.5 FAWN	15	20	0.46 @ 160 °C; QA=30MPa	55 *4	260	sPTFE with SiO2	12	<10	--
D3.6 WHITE	7	40	0.60 @ 120 °C; QA=30MPa	40 *4	260	sPTFE with BaSO4	15	<10	--
D5.0 *3	45	13	--	60 (Steam)/ 100 (Liquid)	550	expanded Graphite	--	--	--
D5.1 *3	35	17	0.96 @ 300 °C; QA=50MPa	130 (Steam)/ 160 (Liquid)	550	expanded Graphite / tanged stainless steel foil AISI 316	55	45(2)	220
D5.2 *3	42	15	--	100 (Steam)/ 140 (Liquid)	550	expanded Graphite / Edelstahlfolie AISI 316	--	--	--
D5.3 HOCHDRUCK	35	20	--	250	550	expanded Graphite / mehrlagig Edelstahlglattblech AISI 316L	--	--	--
D5.4 *3	35	22	--	200	550	expanded Graphite / stretchmetal AISI 316L			
D5.4 SSTC	37	15	0.97 @ 200 °C; QA=50MPa	450	550	expanded Graphite with stretchmetal	20	5	200
D5.6 STANDARD	45	11	0.95 @ 150 °C; QA=50MPa	40	550	expandiertes Graphite with impregnation	59	58 (2)	120
D5.7 UNIVERSAL	40	12	0.96 @ 150 °C; QA=50MPa	100	550	expanded Graphite with tanged stainless steel foil AISI 316L	39	38	200
D5.8 ECONOMY	40	12	0.97 @ 150 °C; QA=50MPa	40	550	expanded graphite with stainless steel foil AISI 316L	55	48 (2)	200
D5.9 HOCHDRUCK	35	15	0.98 @ 150 °C; QA=50MPa	250	550	eexpanded graphite with multilayer stainless steel foil AISI 316L	30	18	200
D10 PROFLANSCH	55	13	0.94 @ 20 °C; QA=30MPa	40 *4	270	ePTFE, biaxial expanded	27	<10	160

*3 Technical data for 1.5 mm thickness

*4 Higher values also possible depending on installation

*The max values of pressure and temperature cannot be used at the same time

The provided Pressure and Temperature data is based on optimal installation condition and steady control of the flange connnection

Gasket properties following EN 13555 (2 mm thickness) Q_{min}@40 bar He, 0.01 mg/(ms) and Q_{Smin}@QA 40 Mpa He, L=0,01

(1) Q_{Smin} @ QA 40MPa,40bar He, L=0,01

(2) Q_{Smin} @ QA 60MPa,40bar He, L=0,01

Q_{Smax} @ RT

-- = no specification

D 2.0 Allround

General Service Aramid Fiber based Gasket with anorganic filler and NBR binder.

Characteristics

- Standard Gasket for plant wide use with good thermal and mechanical properties as well a wide chemical compatibility
- Do not use any surface treatment

Operating range

p_{max} [bar]	100
t °C	-50 . . . +250

Temperature: short term up to 300 °C

Main application

- Tube and pipe flanges
- Vessels
- Boilers
- Cylinders
- Joints
- Casings
- Lids

Suitable for

- All Industries

Approval

- DVGW
- KTW
- BAM
- TA Luft (VDI2440)
- WRAS

Form of delivery

Sheets 1500 x 1500 mm in thickness of 0.3/ 0.5/ 0.8/ 1.0/ 1.5/ 2.0/ 3.0/ 4.0 mm or cut gaskets according to drawing or EN and international Standards.

Special dimensions and further gasket material styles from recognised manufacturers on request.

D 2.3 Carbon

Universal Carbon Fiber based Gasket with NBR binder for higher pressure and temperature

Characteristics

- Good chemcial resistance in general and to alkaline products
- Graphite Nonstick coating on both sides assures quick and scaling free disassembling
- Do not use any surface treatment

Operating range

p_{max} [bar]	100
t °C	-50 . . . +300

Temperature: short term up to 400 °C

Main application

- Tube and pipe flanges
- Vessels
- Boilers
- Cylinders
- Joints
- Casings
- Lids

Suitable for

- All Industries

Approval

- DVGW
- KTW
- BAM

Form of delivery

Sheets 1500 x 1500 mm in thickness of 0.3/ 0.5/ 0.8/ 1.0/ 1.5/ 2.0/ 3.0/ 4.0 mm or cut gaskets according to drawing or EN and international Standards

D 3.4 ProFlon Blue

Microcellular structured PTFE filled with hollow glass microspheres

Characteristics

- High sealability even at low gasket stress
- Minimized cold flow
- Very good recovery
- High compressibility and adaptability even at slightly damaged flanges

Operating range

p_{max} [bar]	Vakuum . . . 55
t °C	-210 . . . +260
pH	0 - 14

Recommended application range:
vacuum up to 55 bar at -210 °C to +200 °C

Main application

- Steel-, Glass-, Ceramic-, glass lined or plastic flanges on pipework
- Vessel
- Container
- Reactors
- Universally on all tension sensitive equipment flanges

Suitable for

- Chemical industry
- Pharmaceutical industry
- Food industry

Approval

- DVGW
- TA Luft
- FDA
- EG 1935:2004, EU 10/2011

Variant

D3.0 Virginal PTFE
for minimum compressive stress

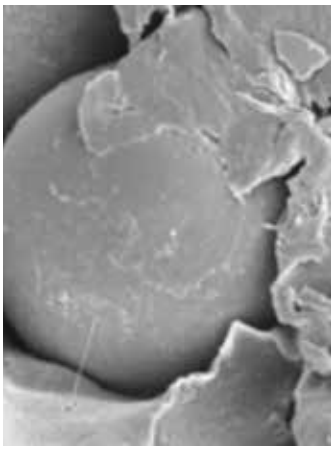
D 3.1 Modified PTFE
Reduced deformation under pressure, better resilience under varying pressure, reduced thermal expansion coefficient (approx. 50 %)

Article code / Thickness

D 3.4 BLUE 05 / 0,5 mm
D 3.4 BLUE 08 / 0,8 mm
D 3.4 BLUE 10 / 1,0 mm
D 3.4 BLUE 15 / 1,5 mm
D 3.4 BLUE 20 / 2,0 mm
D 3.4 BLUE 30 / 3,0 mm

Form of delivery

Gasket sheet size of 1,500 x 1,500 mm in thickness of 0.5/0.8/ 1.0/1.5/2.0/3.0 mm or cut gaskets according to drawing or EN and international Standards, special dimensions on request.



Microscopic view

D 3.5 ProFlon Fawn

Modified PTFE reinforced with special Silica filler

Characteristics

- Protected against cold flow
- Excellent recovery
- Very good in applications with varying temperatures
- Reduced leakage rates compared to other filled PTFE gaskets under the same gasket stress

Operating range

p_{max} [bar]	75
t °C	-210 . . . +260
pH	0 – 14

Recommended operating range: Vacuum up to 55 bar, from ambient -180 °C up to +230 °C

Main application

- Steel or other metal flanges on pipework
- Vessel
- Container
- Reactors in higher temperature applications

Suitable for

- Chemical and Petrochemical industry

Approval

- TA-Luft VDI 2440 and VDI 2290
- FDA

Article code / Thickness

D 3.5 FAWN 05 / 0,5 mm
D 3.5 FAWN 10 / 1,0 mm
D 3.5 FAWN 15 / 1,5 mm
D 3.5 FAWN 20 / 2,0 mm
D 3.5 FAWN 30 / 3,0 mm

Form of delivery

Gasket sheet size of 1,500 x 1,500 mm in thickness of 0.5 / 1.0 / 1.5 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards, special dimensions on request.

D 3.6 ProFlon White

100 % virgin PTFE, modified and filled with Barium sulfate

Characteristics

- Protected against cold flow
- Excellent recovery
- Excellent chemical resistance in caustic applications
- Reduced leakage rates compared to other filled PTFE gaskets under the same gasket stress

Operating range

p_{max} [bar]	75
t °C	-210 . . . +260
pH	0 – 14

Recommended application range vacuum up to 40 bar, at -100 °C to +200 °C.

Main application

- Steel-, Glass-, Ceramic-, glass lined or plastic flanges on pipework
- Vessel
- Container
- Reactors

Suitable for

- Chemical and Petrochemical industry

Approval

- TA-Luft VDI 2440 and VDI 2290
- FDA

Article code / Thickness

D 3.6 WHITE 08 / 0,8 mm
D 3.6 WHITE 10 / 1,0 mm
D 3.6 WHITE 15 / 1,5 mm
D 3.6 WHITE 20 / 2,0 mm
D 3.6 WHITE 30 / 3,0 mm

Form of delivery

Gasket sheet size of 1,500 x 1,500 mm in thickness of 0.8/1.0/1.5/2.0/3.0 mm or cut gaskets according to drawing or EN and international Standards, special dimensions on request.

D 5.0 ProGraph

Gasket Sheet of Expanded Graphite, both sides with impregnation

Characteristics

- Soft and extremely adaptable non reinforced graphite sheet with a purity of 98 %
- Special coating on both sides raises sealabilty
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use at cycling temperatures
- Excellent sealability even at low gasket stress

Operating range

p_{max} [bar]	40
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Sensitive Flange connections like sight glasses, glass- or glass lined flanges in all industries.

Suitable for

- In all industries

Approval

- BAM
- DVGW
- KTW

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 0.5 / 1.0 / 1.5 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards
Special dimensions on request.

D 5.1 ProGraph

Gasket Sheet from Expanded Graphite with tanged stainless steel reinforcement

Characteristics

- Graphite gasket reinforced with a 0.1 mm tanged 316 stainless steel insert and a purity of 98 %
- Practically no cold flow or creep under temperature
- Excellent in use at cycling temperatures
- High blow out safety
- Built in safety against assembly and operational problems

Operating range

p_{max} [bar]	100
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Robust graphite gasket applicable in all industries and as well approved to seal older equipment

Suitable for

- In all industries

Approval

- BAM
- DVGW
- KTW

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 0.5 / 1.0 / 1.5 / 2.0 /3.0 mm or cut gaskets according to drawing, or EN and international Standards.
Special dimensions on request.

D 5.2 ProGraph

High temperatur Gasket Sheet from Expanded Graphite with stainless steel reinforcement

Characteristics

- One layer of 0.05 mm 316 stainless steel carrier (3 mm thickness 2 layers) with graphite on both sides fixed by a special 10 µm thick adhesive coating
- Purity 98 %
- Practically no cold flow or creep under temperature
- Excellent in use at cycling temperatures
- Very good sealability even at low gasket stress

Operating range

p_{max} [bar]	40
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Suitable for sensitive flange connections
- Pump- and Valvehousing

Suitable for

- In all industries

Approval

- BAM
- DVGW
- KTW

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in der Dicke 0.5 / 1.0 / 1.5 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards. Special dimensions on request.

D 5.3 ProGraph

Gasket Sheet from Expanded Graphite with multilayer stainless steel reinforcement

Characteristics

- Premium graphite gasket, reinforced by 0.05 mm multilayer 316 stainless steel carriers in an adhesive free sandwich compound with the graphite layers
- Purity 98 %
- High blow out safety and mechanical strength
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use at cycling temperatures
- Reduced Emissions due to high sealability
- Built in safety against assembly and operational problems

Operating range

p_{max} [bar]	250
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Highly recognised as problem solving gasket material in all industries with higher pressures and temperatures and the demand on operation safety and sealability

Suitable for

- In all industries

Approval

- BAM
- DVGW
- FIRE SAFE API 6FB

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.5 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards. Special dimensions on request.

D 5.4

High Temperature Gasket of Expanded Flexible Graphite with Stretchmetal insert

Characteristics

- Expanded graphite sheet gasket with 316 stainless steel stretch metal reinforcement and a purity of 99 %
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use with cycling temperatures
- Blow out safe due to 3 dimensional reinforcement matrixes
- Optimized transfer of sealing stress
- Safe use even with small sealing width
- Minimized risk of separation known from multilayer reinforced gasket sheets

Operating range

p_{max} [bar]	200
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Universal use as problem solver in all industries when demanding higher operation safety and sealability especially in older plant equipment.

Suitable for

- All industries

Approval

- DVGW
- BAM
- TA Luft
- FIRE SAFE API 607 on request

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.6 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards.

Special dimensions and further gasket material styles of recognised manufacturers on request.

D 5.4 ProGraph SSTC

High Temperature Gasket of Expanded Flexible Graphite with Stretchmetal insert

Characteristics

- Expanded graphite sheet gasket with 316 stainless steel stretch metal reinforcement and a purity of 99 %
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use with cycling temperatures
- Blow out safe due to 3 dimensional reinforcement matrixes
- Optimized transfer of sealing stress
- Safe use even with small sealing width
- Minimized risk of separation known from multilayer reinforced gasket sheets

Operating range

p_{max} [bar]	200
t °C	-200 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Universal use as problem solver in all industries when demanding higher operation safety and sealability especially in older plant equipment.

Suitable for

- All industries

Approval

- DVGW
- BAM
- TA Luft
- FIRE SAFE API 607 on request

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.6 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards.
Special dimensions and further gasket material styles of recognised manufacturers on request.

D 5.6 ProGraph Standard

Gasket Sheet of Expanded Graphite, both sides with impregnation

Characteristics

- Soft and extremely adaptable non reinforced graphite sheet with a purity of 98 %
- Special coating on both sides raises sealabilty
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use at cycling temperatures
- Excellent sealability even at low gasket stress

Operating range

p_{max} [bar]	40
t °C	-250 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Sensitive Flange connections like sight glasses, glass- or glass lined flanges in all industries.

Suitable for

- In all industries

Approval

- BAM
- DVGW
- KTW

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.5 / 2.0 mm or cut gaskets according to drawing, or EN and international Standards
Special dimensions on request.

D 5.7 ProGraph Universal

Gasket Sheet from Expanded Graphite with tanged stainless steel reinforcement

Characteristics

- Graphite gasket reinforced with a 0.1 mm tanged 316 stainless steel insert and a purity of 98 %
- Practically no cold flow or creep under temperature
- Excellent in use at cycling temperatures
- High blow out safety
- Built in safety against assembly and operational problems

Operating range

p_{max} [bar]	100
t °C	-250 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Robust graphite gasket applicable in all industries and as well approved to seal older equipment.

Suitable for

- In all industries

Approval

- BAM
- DVGW
- FIRESAFE

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.5 / 2.0 /3.0 mm or cut gaskets according to drawing, or EN and international Standards.
Special dimensions on request.

D 5.8 ProGraph Economy

High temperatur Gasket Sheet from Expanded Graphite with stainless steel reinforcement

Characteristics

- One layer of 0.05 mm 316 stainless steel carrier (3 mm thickness 2 layers) with graphite on both sides fixed by a special 10 µm thick adhesive coating
- Purity 98 %
- Practically no cold flow or creep under temperature
- Excellent in use at cycling temperatures
- Very good sealability even at low gasket stress

Operating range

p_{max} [bar]	40
t °C	-250 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Suitable for sensitive flange connections
- Housings of pumps and fittings

Suitable for

- In all industries

Approval

- BAM
- DVGW

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in der Dicke 0.55 / 0.75 / 1.0 / 1.5 / 2.0 / 3.0 mm or cut gaskets according to drawing, or EN and international Standards.
Special dimensions on request.

D 5.9 ProGraph Hochdruck

Gasket Sheet from Expanded Graphite with multilayer stainless steel reinforcement

Characteristics

- Premium graphite gasket, reinforced by 0.05 mm multilayer 316 stainless steel carriers in an adhesive free sandwich compound with the graphite layers
- Purity 99.8 %
- High blow out safety and mechanical strength
- Practically no cold flow or creep under temperature
- Non hardening
- Excellent in use at cycling temperatures
- Reduced Emissions due to high sealability
- Built in safety against assembly and operational problems

Operating range

p_{max} [bar]	250
t °C	-250 . . . +550
pH	0 - 14

Temperature: in oxidizing atmosphere +450 °C

Main application

- Highly recognised as problem solving gasket material in all industries with higher pressures and temperatures and the demand on operation safety and sealability

Suitable for

- In all industries

Approval

- BAM
- DVGW
- TA Luft
- FIRE SAFE API 607

Form of delivery

Gasket sheet size of 1,000 x 1,000 mm in thickness of 1.0 / 1.5 / 2.0 / 3.0 / 4.0 mm or cut gaskets according to drawing, or EN and international Standards.
Special dimensions on request.

Fabricated gaskets

We offer fast and flexible production of ready-to-use gaskets for almost any application with our plotting system.
An extensive stock range of materials, a high material availability for serial production and fast production of spare parts and prototypes, characterize our range of services.

MANHOLE SEAL D 4.3 (oval)

Formstable and pressure resistant biaxially Expanded ePTFE Gasket

Characteristics

- No change of width during compression
- Non ageing, unlimited storability
- Very good adaption to an uneveness of a flange
- Physiologically non hazardous up to 260 °C
- Chemically inert
- Well suited for alternating temperatures
- High sealability
- Non hardening, non sticking to seal surface
- Seals also suitable for cold water pressure test

Operating range

t °C	-200 . . . +250
p [bar]	max 40
pH	0 - 14

Main application

- Hand, Head- and Manhole openings on steam boilers
- Tank Manholes in round and oval shapes

Suitable for

- Safety Gaskets for Steam Boilers and Vessels
- Pharmaceutical Industry
- Food Industry

Approval

- FDA Konformität
- Food Approval EC 1935:2004 in accordance with EU10/2011

FDA

Form of delivery

Standard dimensions (mm) inner diameter oval dimensions x seal width x height	
80 x 110 x 15 x 6	200 x 300 x 25 x 6
80 x 120 x 15 x 6	220 x 320 x 25 x 6
90 x 120 x 15 x 6	280 x 380 x 25 x 6
100 x 150 x 15 x 6	295 x 395 x 25 x 6
110 x 150 x 15 x 6	300 x 400 x 25 x 6
120 x 150 x 15 x 6	310 x 410 x 25 x 6
120 x 160 x 15 x 6	320 x 420 x 25 x 6
115 x 165 x 15 x 6	325 x 425 x 25 x 6
150 x 200 x 15 x 6	350 x 450 x 25 x 6

Spiral wound gaskets and Camprofile gaskets

Large Variety whether you are looking for cut -, spiral wound- or cam profile gaskets – you will find what you are looking for. We manufacture in a wide variety of materials and designs.

Spiral wound gaskets

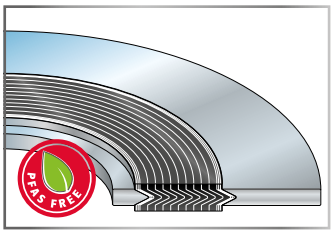
The Spiral Wound Gasket design has become a standard in most industries where higher pressures and temperatures are encountered. The gasket is manufactured using alternating windings of preformed V shaped stainless steel and a sealing material of either PTFE or graphite.

These gaskets are used due to the design in high pressure applications and under critical operating conditions. They are excellent when sealing flanges with higher temperature and pressure fluctuations and offer a high recovery.

Spiral wound gaskets can be supplied with an outer and/or inner support ring in order to improve their stability.

Our Camprofile gaskets

They offer a safe sealing of flanges at extreme operating conditions in respect of temperature up to 550°C and pressure up to 400 bar. They can be made of stainless steel with an expanded graphite sealing layer and with or without centering. Our Standard Product offering contains 3 profile types for cam profile gaskets.



D 6 ProFlex

Spiral wound gasket made of crimped metal tape with sealing wraps of non asbestos gasket material. Optional: inner and/or outer metal ring.

Characteristics

- For flange connections in high pressure pipe line construction and fittings
- Extremely low leakage with PTFE spiral filler. Helium leakproof 10 - 8 mbar l/(ms)
- High temperature resistance to 550 °C with graphite filled spiral

Operating range

p [bar]	400
t °C	-200 . . . +550
pH	0 – 14

Suitable for

- Power plants
- Petrochemical plants
- Chemical industry

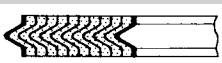
Main application

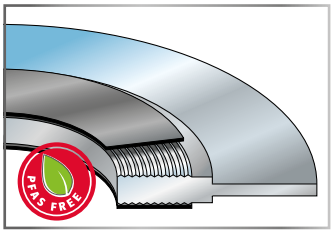
- High temperature and high pressure flanges
- Piping
- Pressure vessels
- Heat exchangers
- Fittings

Material

- Centering ring OD: Carbon Steel galvanized
- Spiral: 316L
- Centering ring ID: Carbon Steel galvanized
- Other material combinations on request

Product types

SF 11 | Spiral wound gasket without any center ring for flanges with tongue and groove connection	
SF 11 IR | Spiral wound gasket with inner center ring for raised or flat flanges	
SF 13 | Spiral wound gasket with outer center ring for flat flanges	
SF 13 IR | Spiral wound gasket with inner and outer center ring for flat flanges	



D 7 ProCor

D 7 ProCor Camprofile Gasket, profiled metal base covered with graphite- or PTFE layer, optional with or without center ring(s)

Characteristics

- For flange connections in high pressure piping and in fittings
- Extremely low leakage values with PTFE inlay. Helium leakproof 10 - 8 mbar l/(ms)
- High temperature resistance up to 550 °C with graphite inlay

Main application

- For all flanges inside the main power circuit
- High level of temperature and pressure resistance

Suitable for

- Power plants
- Petrochemical plants
- Chemical industry

Form of delivery

For Flanges according to DIN, PN 10-320 and DIN 2697:
ANSI flanges B 16.5 and MS-SP 44
Tongue/groove flanges according to DIN 2691 or ANSI B 16.21
Male/female flanges according to DIN 2692
Flanges following API Std. 605. Dimensions according to ANSI B 16.21

Sealing material	Temperature range [°C]	Surface pressure at 20 °C		Surface pressure at 300 °C[1]	
		min. [N/mm²]	max. [N/mm²]	min. [N/mm²]	max. [N/mm²]
PTFE	-200 . . . +260	20	500	30	450
Graphit	-200 . . . +500	20	500	30	450

[1] pay attention to the temperature limit of PTFE

Construction	
BA 1	
BA 2	
BA 3	

Maintenance & Tools

Professional, instrumental

A quality tool and a knowledge based handling when installing or maintaining a sealing component reduce equipment wear. This results in a higher service life.

We carry barrier water unit, lantern ring, thread seal tapes, packing cutters and extractors, with screw or helical heads and gasket cutting boards.

We supply high quality products and accessories tailored specifically to your equipment types.

PROCONTROL

Regulation and Monitoring System for Sealing Water

Characteristics

- Precise metering and constant pressure of sealing water (p = 1 bar above media pressure) - environmental protection and cost reduction in fact of reduced seal water consumption
- Flow and pressure monitoring - protects the aggregate from failing (inductive alarm system)
- Stable and compact construction guarantees safety and simple handling
- Corrosion and temperature resistant
- Displays are easy to read and clean
- With an inductive switch (option) an alarm system can be used

Technical parameters

- Flow range
- 0,5 bis 1,5 ltr/min
- 0,5 bis 3,0 ltr/min
- 1,0 bis 8,0 ltr/min
- 2,0 bis 15,0 ltr/min

- Temperatur: t = . . . +80 °C
- Pressure: p = 10 bar (Option 25 bar)

Main application

- Pumps with mechanical seals with flush connection API Plan 32 and Quench to Drain operation API 62
- Stuffing box packing with lantern rings

Suitable for

- All Industries

Accessories and options

- Pressure valve for creating barrier pressure
- Pressure Gauge
- Stand
- Inductive switch
- Hoses, connecting equipment
- Additional Back pressure valve

Sharp thread tap
W2S -- SPZ

Special Packing Extractor

With Power Sliding Sleeves for effortless pulling using a lever tool

Advantages

- Excellent spot drilling and extracting of old and hardened packings as well as blocked and difficult locations

Construction

These Packing Extractors have a flexible nontorsionshaft with a tightly bound screw tap nose.

Close up spiral tap
W2W -- SPZ

Versions

- Together with the Levertool (Artikelcode W2S08LEV or W2S10LEV and W2W10LEV or W2W12LEV) safe and easy removal of larger packing rings

Type	Helical Screw Head ∅	Flexible shaft length	Packing size
W2S08SPZ	8 mm	200 mm	> 10 mm
W2S10SPZ	10 mm	260 mm	> 14 mm
W2W10SPZ	10 mm	200 mm	> 12,7 mm
W2W12SPZ	12 mm	260 mm	> 16 mm

In use

W2S Sharp Screw Head

Packing Extractor with cross bar

Advantages

- Excellent spot drilling and extracting of old and hardened packings as well as blocked and difficult locations

Construction

These Packing Extractors have a flexible nontorsionshaft with a tightly bound screw tap nose.

Versions

Special version in other length is available.

Standard Versions

Type	Sharp Screw Head ∅	flexible shaft length	Packing size
W2S04	4 mm	100 mm	> 5 mm
W2S06	6 mm	160 mm	> 8 mm
W2S08	8 mm	200 mm	> 10 mm
W2S10	10 mm	260 mm	> 14 mm

View details

W2W Helical Screw Head

Packing Extractor with cross bar

Advantages

- Excellent spot drilling and extracting of brittle, soft packings as well as blocked and difficult locations

Construction

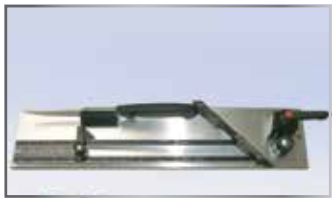
These Packing Extractors have a flexible nontorsionshaft with a tightly bound helical tap nose.

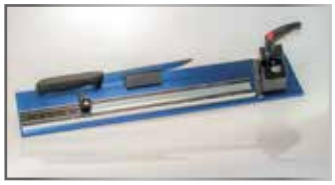
Versions

Special version in other length available.
Standard Versions:

Type	Helical Screw Head ∅	flexible shaft length	Packing size ab
W2W06	5,5 mm	100 mm	> 7 mm
W2W08	8 mm	160 mm	> 10 mm
W2W10	10 mm	200 mm	> 14 mm
W2W12	12 mm	260 mm	> 16 mm

View details





W5/PS Packing Cutter

Special tool for Stuffing Box Packing cutting. Compact and wear resistant tool made of aluminium.

Characteristics

- The device uses the packing dimension and the shaft diameter to determine the approximate cut length.
  After cutting and fitting the first ring, it may be necessary to adjust the length setting on the blank. This depends on the hardness of the packing.
  There should be a slight excess length, which builds up pressure at the cut ends when the packing is installed and places the ring firmly against the stuffing box wall.)
- Time saving
- Repeatable results
- Reduced waste
- Suitable as well for Trapez-Pack

Technical data

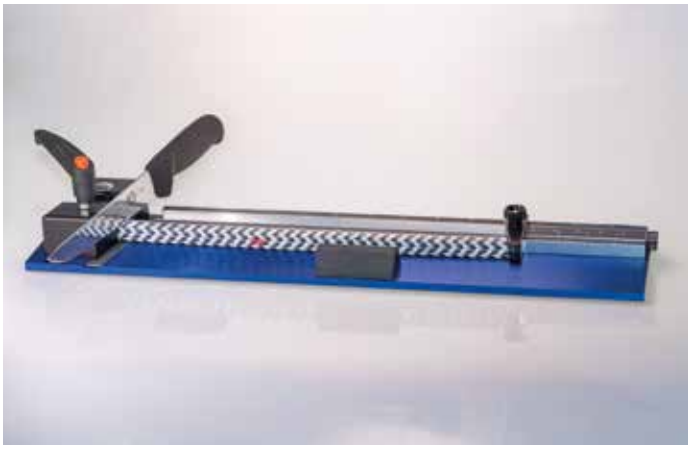
- For shaft diameter up to 80 mm with W5PS-SK and 110 mm with W5PS-BU
- With extension W5PS-V-SK to 200 mm and W5PS-V-BU to 250 mm shaft diameter
- Scale: in inches and mm
- Packing sizes: from 3 to 25 mm
- Spare parts available

Variants

45° skive cut type W5PS-SK
75° Butt cut type W5PS-BU

Accessories

- Extension W5PS-V-SK
- Extension W5PS-V-BU
- Spare knife



W5 PS / Clip HD

Robust hand packing cutter for safe cutting of 45° Skive-, 75° Butt- and 90° Straight cut.

Characteristics

- Quick change of cutting angle when producing a 75° Butt cut due to both sided marking on cutting support
- Easy handling due to precise angle cutting aligned to marking on cutting support
- Simple handling when cutting a 45° Skive cut by aligning the packing on the bracket of the cutting support
- Replacement blade available

W5FDKS Sheet Gasket Cutter

For Fast and Economical Instant Manufacturing of Sheet Gaskets

Characteristics

- Fast and flexible solution for a whole range of applications
- Easy and safe operation
- Seal cutting from 30 up to 1000 mm
- Suitable for various sheet thicknesses up to 9 mm
- Also small sized sheet pieces are processable
- Spare parts on request

Variant

- W5FDKS300 simple solution for easy and infrequent use for gaskets with a max outer diameter of 300 mm.

STAR AQUA

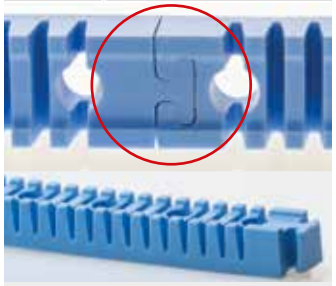
PTFE Lantern Ring

Characteristics

- Economical storage independent from shaft diameter, supply in 1,180 mm length
- Replacement for machined lantern rings
- Universal use, excellent chemical and thermal resistance
- Easy to remove with packing extractor
- No corrosion and wear of shafts, no canting during use
- No waste as length can be connected (see picture)

Operating range

t °C	-100 ... +250
pH	0 - 14



Main application

- Stuffing box packings locked e.g. 2L3 or flushed L4 with lantern ring

Suitable for

- All Industries

Approval

- FDA conformity

Form of delivery

1180 mm length
Special sizes on request

Installation

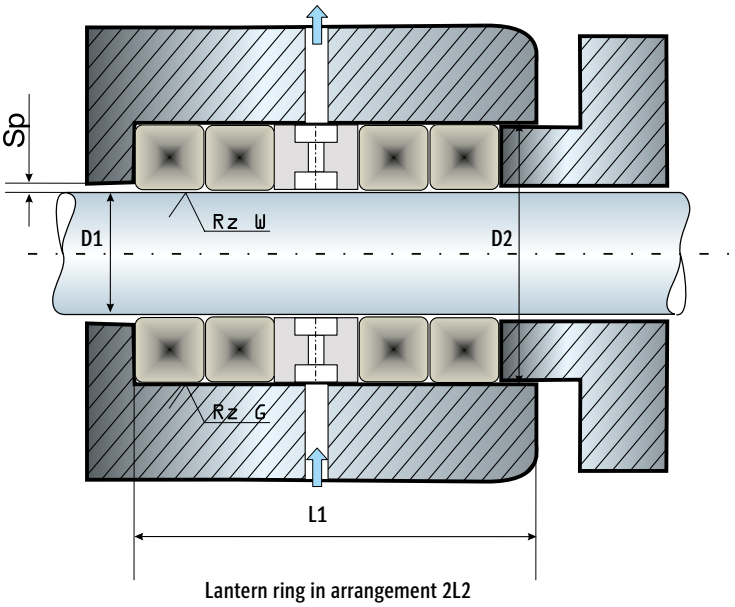
Packing cross-section is the height or nominal dimension of the STARAQUA. Cut to length as for a packing ring in a 75° butt cut with a sharp knife. Remaining parts of a cross-section can be connected (see picture).

Estimation of the cutting length:
Calculation of stuffing box cross-section (D2-D1)/2:
L = (shaft diameter + stuffing box cross section lantern ring) x 3.14

Packing dimension

The hight of the lantern ring depends on the size of packing.

Stuffing box X-Section [mm]	[inch]	Height x width [mm]	Height x width [inch]	Stuffing box X-Section [mm]	[inch]	Height x width [mm]	Height x width [inch]
8	5/16"	7.6 x 11.4	0.30 x 0.45	14	9/16"	13.5 x 19.2	0.53 x 0.75
	3/8"	9.0 x 13.2	0.35 x 0.52	15		14.2 x 19.2	0.56 x 0.75
	3/8" wide*	9.0 x 19	0.35 x 0.75	16	5/8"	15.2 x 20.6	0.60 x 0.81
10		9.4 x 13.2	0.37 x 0.52	16	5/8" wide*	15.2 x 31	0.60 x 1.25
	7/16"	10.5 x 14.3	0.41 x 0.56	18		17 x 22.1	0.67 x 0.87
	7/16" wide*	10.5 x 22	0.41 x 0.87	19	3/4"	18.1 x 22.1	0.71 x 0.87
12		11.1 x 15.6	0.44 x 0.61	19	3/4" wide*	18.1 x 38	0.71 x 1.5
	1/2"	12.1 x 17	0.48 x 0.67	20		19 x 23.8	0.75 x 0.94
	1/2" wide*	12.1 x 25.4	0.48 x 1.0	22	7/8"	20.8 x 25.2	0.81 x 1.00
13		12.6 x 17	0.50 x 0.67	25	1"	23.5 x 28.2	0.93 x 1.11



Lantern ring in arrangement 2L2

FITTING: The lantern ring must fit tightly against the outside diameter of the stuffing box. This results in a minimal gap towards the shaft. The interface must be closed.

HD W1Thread Sealing Tape

Special thread tape made from unsintered expanded PTFE (ePTFE)

Characteristics

- High density and strength properties
- HD Tape plies during the wrapping in the thread and forms a dense PTFE film, which does not harden and stays flexible
- Immediate after connection of the construction parts it is possible to turn them 45° back for alignment
- Chemically inert and does not react with steam, water, fuel, acids, gases or solvents
- Once applied the connection can be disassembled
- Fretting of the threads is practically impossible

Operating range

t °C	-240 . . . +260
p [bar]	Vakuum . . . 170
pH	0 - 14

Physical properties

Color: bright yellow
Thickness: 0.1 mm
Area weight: 125 g/m
Classification: GRp
Tension strength: 9 - 14 MPa
Nominal width: 10 < DN < 50

Main application

- For sealing all kind of thread connections as per ISO 7-1, classification GRp, with possibility of limited reverse rotation of conical/cylindrical (R/Rp) threaded connections
- Pipe connections in chemical industry, gas and water supply, hydraulics and pneumatics

Suitable for

- All Industries

Approval

- BAM for gaseous oxygen
- FDA conform as per FDA 21 CFR 177.1550

Form of delivery

1/2" tape: 12.7 mm wide and 12 mtr length per roll
1" tape: 25 x 0.2 mm wide and 20 mtr length per roll
1 order unit is 10 rolls

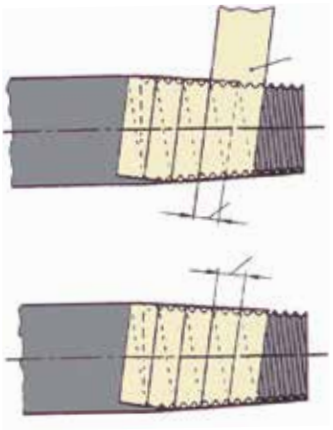
Material of construction

100 % virgin, unsintered PTFE
Homogenous fiber structure with high density.
Chemical inert with the exception of molten Alcalimetal and elementary Fluor

Assembly

Wrap PTFE tape clockwise, starting at the thread end, around the pipe thread. Coarse threads we recommend 50 % overlap (see picture right).

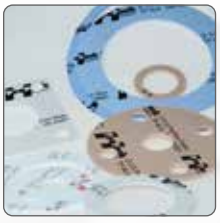
Stretch the tape so it plies in the form of the thread.
When finished tear of the tape and check that it stays in position.



Seals from ProPack in the food industry.

Certified reliability for static and dynamic connections.

EU& FDA COMPLIANT



sPTFE sheet gaskets for food and pharmaceuticals: FDA, DVGW, among others, TA-Luft certified.

Elastomercore packing S6SI SKS Blue

Flange gaskets as flexible material by the meter.

D4.3 Hand, head and manhole seals made of ePTFE.

D10, pressure-resistant and dimensionally stable gasket sheet made of biaxially oriented ePTFE.

Products for the food industry

Braiding type and packing materials are adapted to the respective product-specific requirements.

Our **FDA and EC 1935:2004 compliant Packing based on EU 10/2011 specifications** are: **Trapez-Pack® TP619** for pumps and agitators (page 27), **S6 SI, S6 PA** (page 48) and **A190X** for valves (page 29). Quite often solutions are requested, which are suitable for demanding applications through corner or running track reinforcement increased heat conductivity. Therefore non FDA conform products have been analysed on their suitability to seal machines of the food processing industry.
Compliant with the EU Standard 10/2011, our **TP30** (page 25) and **TP63** (page 26) Packings offer a substantial increase in wear resistance to the FDA compliant style.

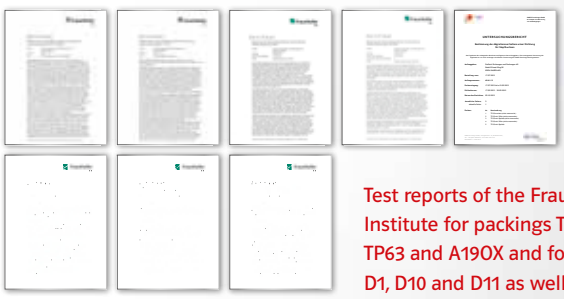
Gaskets made of 100 % pure ePTFE in a stretched filament knotted fiber structure. This ensures that there is a high pressure resistance (restricted cold flow) and a good adaptation to the flange surface.

Characteristics:
- Simple to install
- No aging of the ePTFE joint sealant
- Excellent adaption, ideal to compensate uneven gland surfaces
- Physiologically safe in temperatures up to +260 °C
- Selection criteria: unevenness of gland should not be bigger than 1/3 of seal thickness

Resistance:
- All media pH 0-14, e.g:
  acids, alkaline, solvents, paint, oil, grease, steam

Excluded:
- molten and/or solved alkaline metals
- elementary or gaseous fluoride at high temperature or under high pressure

- Ageing resistant



Test reports of the Fraunhofer Institute for packings TP619, S6SI, TP63 and A190X and for the gasgets D1, D10 and D11 as well as the report of Fabes Forschungs GmbH for the packing TP30 are available on request.

Packing selection criteria

The technical parameters in catalogs, such as pH, t (°C), p (bar) or v (m/s), are guideline values that mainly refer just to the materials in use . The practical application data of a packing made from these raw materials are usually much lower. Important practical application criteria are listed below to assist in the correct selection of a suitable packing type.

In **dynamic applications**, the shaft circumferential speed, product temperature and pressure add up to the considered total packing strain. Added to this is the quality of the shaft bearing and the condition of the shaft surface

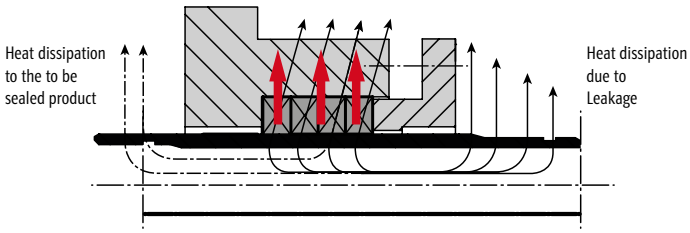
- A rough surface generates more frictional heat.
- A packing that seals a higher pressure is more compressed and creates more frictional heat.
- A fast rotating shaft creates more frictional heat.
- Lack of lubrication due to partial dry running creates more frictional heat

This in sum creates enormous demands on the thermal conductivity of the packing and is therefore a key factor in the selection.

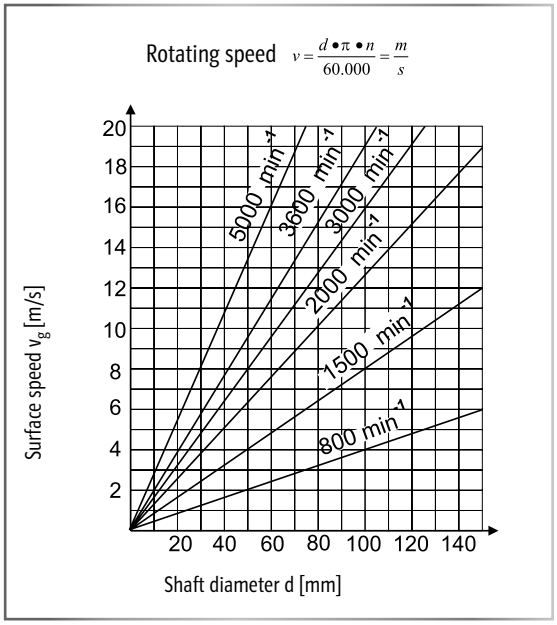
The generated frictional heat is dissipated on the one hand by leakage between packing and shaft running out of the stuffing box. Unfortunately, it will always be tried to keep this to a small amount.

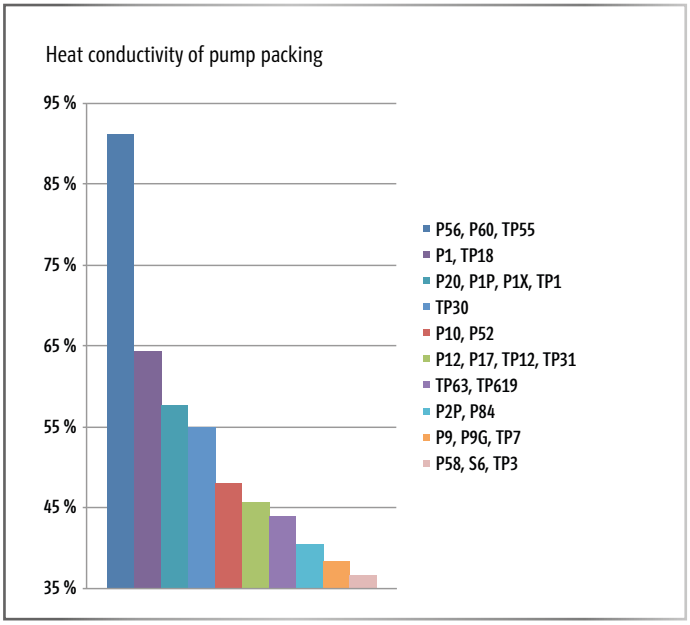
If the sealed product is colder than the created friction temperature between packing and shaft, heat can be dissipated via the shaft into the product.

The third path (drawn in red in the following picture) goes through the packing to the stuffing box housing and radiates the transferred heat from there to the surrounding area.



The heat dissipation to the housing depends on the packing material. *See diagram heat conductivity of pump packing*





An important parameter in achieving long service life is the surface hardness of the shaft material. Often simple stainless-steel sleeves are used with a hardness lower than HRC25. If crystallizing or abrasive products are sealed, the packing must be selected accordingly its wear resistance and requires a hardened sleeve. Consideration of the recommended shaft surface hardness per packing type *(See Surface Hardness Requirement diagram)* is important. In most cases, a compromise must be made between packing stability and shaft surface wear.

It is helpful to use the Trapez-Pack® types (from page 20), which leave a „soft footprint" on the shaft and provide a good sealing effect even at low gland follower pressure.

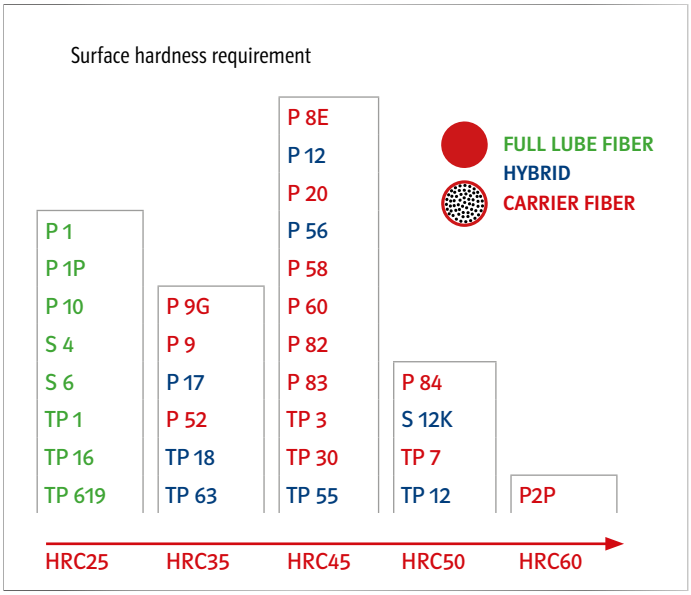
In **static applications**, the permissible product pressure depends primarily on the gap width of the stuffing box components. See packing space recommendations.
An Inconel matrix on the packing yarn produces extrusion-safe packing that can bridge gap widths.

A crucial factor is the thermal expansion behavior of packing. Graphite as a material is close to the expansion coefficient of the steel the valve is made of. PTFE, on the other hand, has an expansion coefficient 11 times higher. (*See diagram thermal expansion rate diagram.)*
When a valve is exposed to temperature, a PTFE packing will expand heavily and try to escape and extrude through the gaps of the stuffing box. On cooling, this process is not reversible, and the packing will leak.

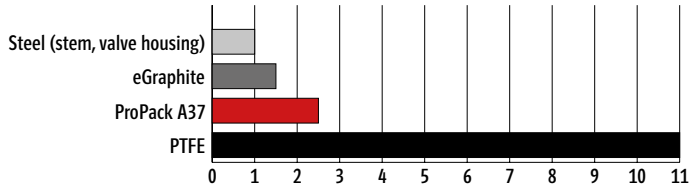
An often neglected factor in valve packing selection is the friction coefficient of the packing.
(*See diagram adjusting force of various packing styles.)*

This becomes especially important when the valve has frequent actuation such as a control valve. PTFE as a coating provides excellent low friction values. The packing must remain adjustable if abrasion or consolidation makes this necessary. Expanded, flexible graphite is a preferred material here, either as a pure graphite foil ring or as a hybrid with other materials.

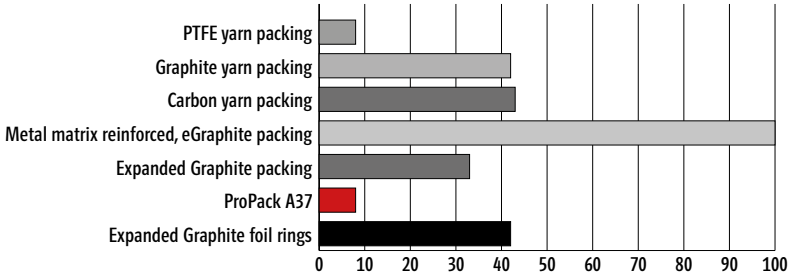
In applications with temperatures >300°C, the consolidation due to volume loss plays a significant role. If the need to compensate for volume loss by re-setting the gland follower is ignored, blow-out of the packing may result, leading to uncontrollable leakage. (*See diagram weight loss after exposure to temperature.*)
Low volume loss packings made of high-quality expanded graphite, with high purity content, are preferred at higher temperatures.



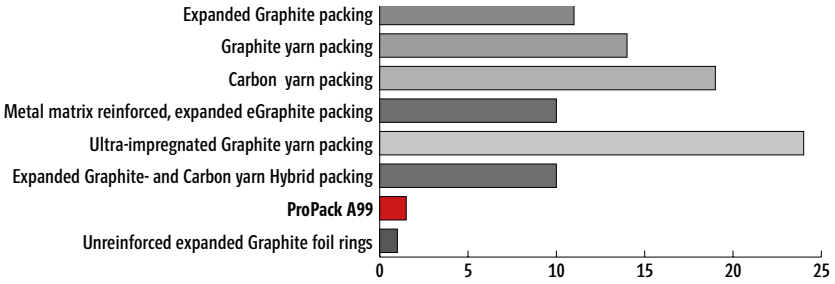
Thermal expansion rate



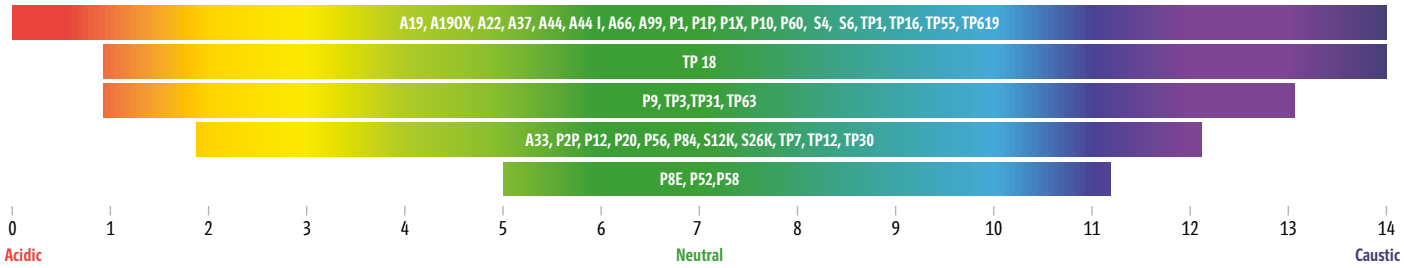
The adjusting force of various packing styles in % relation



Weight loss in % after the exposure to temperature of 600 °C in stuffingbox



Chemical resistance of packing expressed in pH value 0 - 14



Assembly and cutting

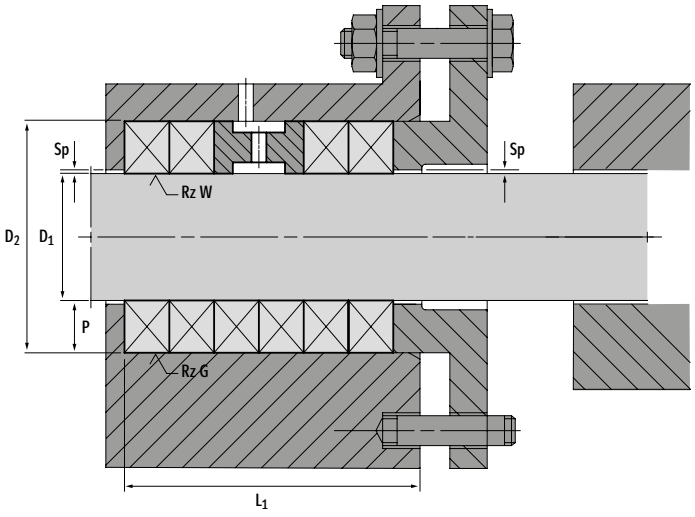
1. Preparation

Remove all old packing rings from the stuffing box. Mark the rings immediately and individually as you pull them out: Example with 1 cut for the first ring, 2 cuts for the second ring, etc. *(See picture.)*
This way you will know the position of each ring from the previous installation in the stuffing box and can figure out what caused the failure.
Failures may be for example: Extrusion, burning, wear marks, shrinkage, uneven compression.

2. Cleaning

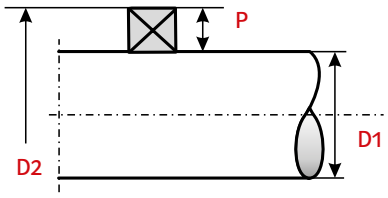
Clean the stuffing box thoroughly and remove all debris. Check the surfaces for damage. Use a mirror or a simple boroscope. If the shaft is coated, check for chipping. Also check the stuffing box base to see if washout or erosion has increased the gap widths. If you are using a flush port, make sure it is working and clean water is coming out.

3. Inspection of Packing chamber

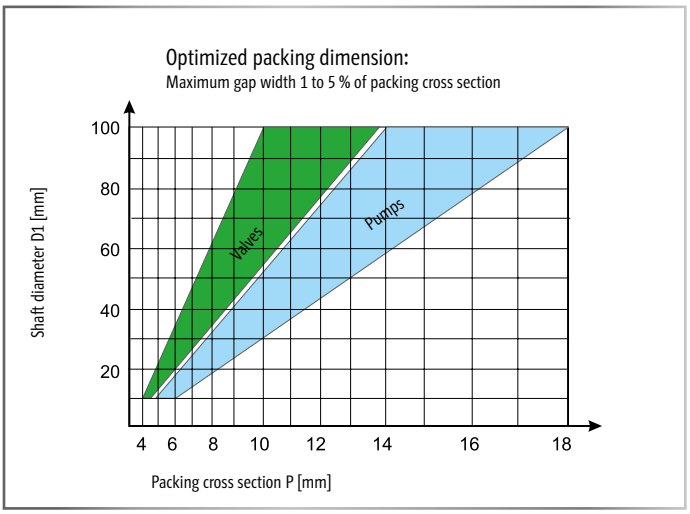


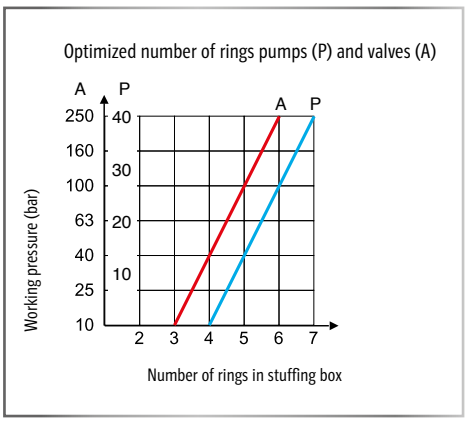
Standard stuffing box:
D_1 = Shaft / sleeve diameter
D_2 = Housing bore diameter
P = Packing dimension
Sp = Gap width
L_1 = Stuffing box depth
Roughness depth shaft Rz W = 0.6 µm valve / 2 µm agitator / 5 µm pump
Roughness housing Rz G = 6 µm valve / 16 µm pump and agitator

Measure the depth of the stuffing box L1, the bore of the stuffing box (D2) and the shaft diameter (D1). Calculate the packing cross-section (P). Do not trust that the previously used packing had the correct dimension. For example, it could be that a metric / inch pairing has taken place and the packing: stuffing box X-Section does not match.



Calculation of X-Section	
P =	(D2-D1)/2



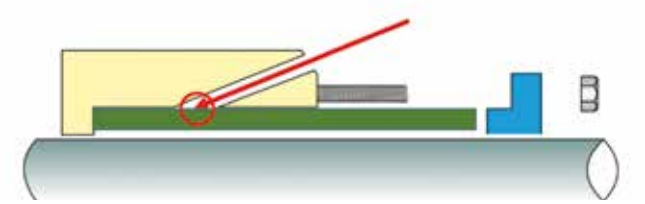


As a next step divide the depth of the stuffing box (L1) by the determined packing cross-section and compare whether the number of uninstalled rings (incl. lantern ring, if present) matches the calculated result.

4. Lantern ring / Flush- or Barrier Ring

If you do not use a lantern ring, continue with point 5.
To determine the position of the lantern ring in the stuffing box, insert a cardboard strip (shown in green) into the stuffing box until it touches the bottom. Run the strip directly along the stuffing box wall next to the flush port. Mark the stuffingbox face on the strip. Now insert a pointed object (shown in red) centrally through the flush port from the outside until you hit the cardboard and mark it.

Pull out the strip and check (considering the number of rings under the marking) the position of the lantern ring in relation to the connection port. If the lantern ring is not at the connection, correct this by inserting, for example, a 3 mm - flat gasket D3.5 or D3.6 (see page 71) at the bottom of the stuffing box

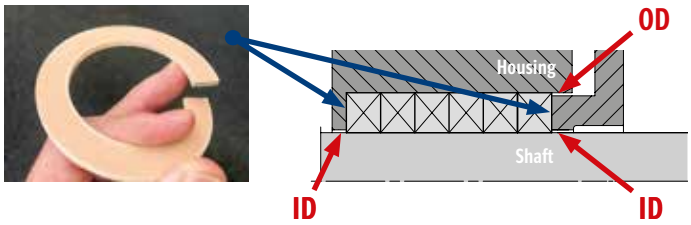


5. Inspecting gap widths

Check the size of the gaps between the stuffing box and the shaft or stem and, if you can, also the gap width at the bottom of the stuffing box.

To avoid gap extrusion, the gap width (Sp) between shaft, housing or gland should not exceed 1% of the packing cross-section (P) for piston pumps, 2% for valves and 5% for pumps or agitators.

For larger gap widths than those mentioned above, we recommend using bullrings of suitable material, e.g., PROFLON D3.5 or D3.6 (page 71) in 3 mm as top and bottom ring in the stuffing box to protect the packing from extrusion into the gaps.



6. Cutting

Use the packing in the way it is spooled. Do not opposite the packing prebend of the spool. When performing a butt cut you must accept to recut a short piece of packing to bring it back to the prebend orientation. Marks on the OD (outside diameter) of the packing like a red arrow, a red "H" or a name print, will help you to allocate the right side of the packing facing into the direction to the stuffing box bore.

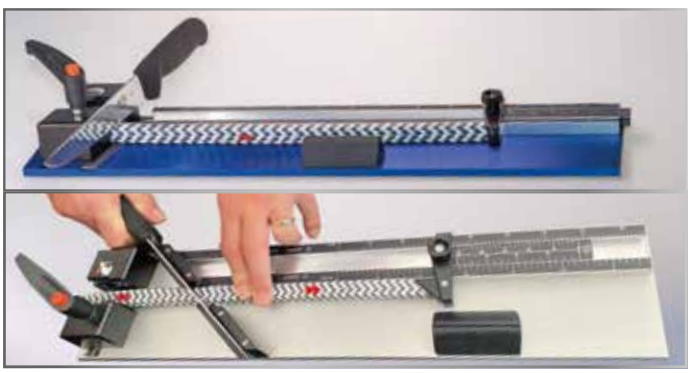
Use a sharp knife to cut the packing with one cut if possible (avoid „sawing" the packing to prevent fraying). Use a suitable cutting board to ensure a proper angle.

- Never use old rings as a master to cut new ones.
- Always cut only one ring to start with. If a shaft sleeve is not available and you use the calculation method below or a packing cutter, install the ring and check for fit in the stuffing box and correct closing of the cuts. Adjust the length if necessary.
- Never cut all the rings you need at once; the rings could be incorrect. The calculation methods and packing cutting boards on the market have only an average length value for all the different packing types and your rings may not fit properly.
- For continuous, reliable results and clean cutting angles, use a packing cutter as shown rigth side (details on page 83). Adjusted to the correct installation length, it continuously delivers good results.

Unroll packing correctly

Right

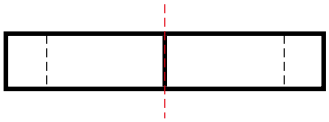
Wrong



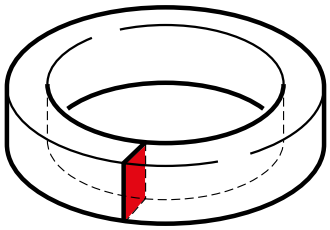
Cutting of Standard Packing

Successful installation of stuffing box packing requires a combination of basic mechanical knowledge and the following instructions.

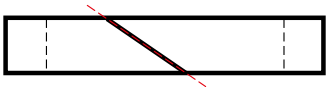
Pumpa and MIxers (Rotary)



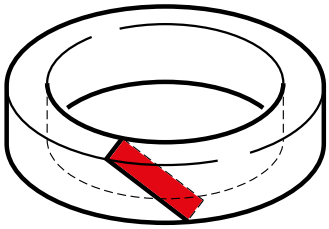
A butt cut is recommended, with approx. 75° degree.
Apply adding factor „x" in % of middle line circumference.

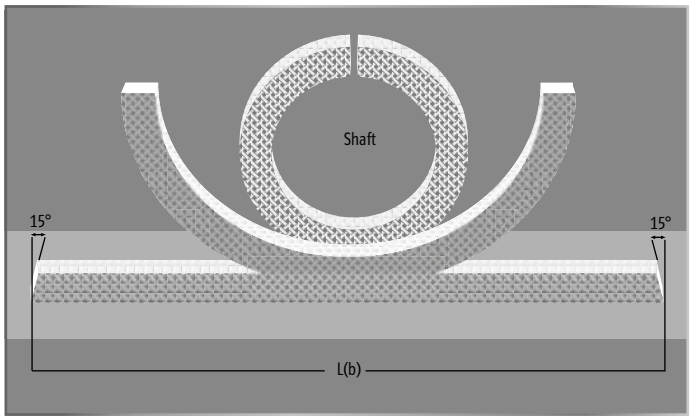


Valves (Static) & Plunger Pumps

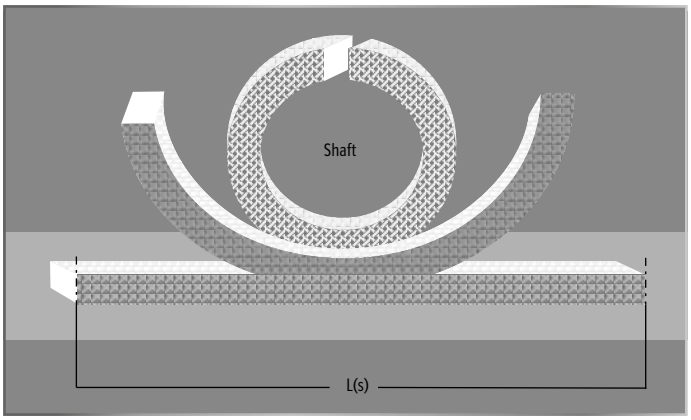


A skive cut with approx. 45° degree is recommended.
Apply adding factor „y" in % of the centerline circumference.

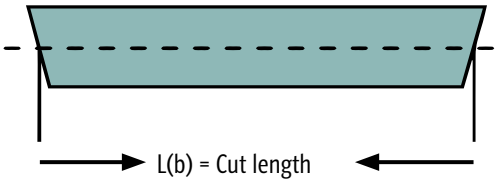


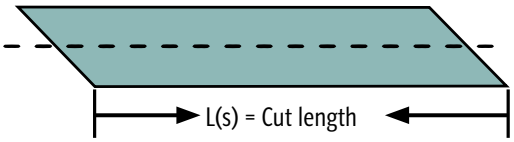


Butt cut



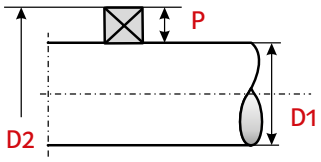
Skive cut





An addition of 2-8% extra length compensates for shrinkage of the packing under temperature.

Add factor



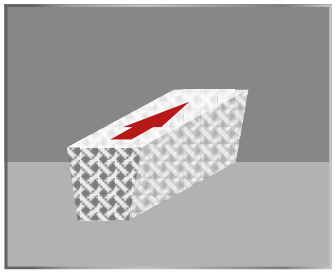
Calculation of butt cut length	
L(b) =	(D1+P) • 3,141 • x [mm]
P =	(D2-D1)/2
x =	Adding factor = 1,02 up to 1,08

Shaft diameter D1	Add
up to 50 mm / 2"	6-8 %
51 up to 100 mm / 2" up to 4"	4-6 %
101 up to 200 mm / 4" up to 8"	3-5 %
201 mm / 8" plus	2-4 %

Calculation of skive cut length	
L(s) =	(D1+P) • 3,141 • y [mm]
P =	(D2-D1)/2
y =	Adding factor = 1,02

Shaft diameter D1	Add
up to 50 mm / 2"	2 %
51 up to 100 mm / 2" up to 4"	2 %
101 up to 200 mm / 4" up to 8"	2 %
201 mm / 8" plus	2 %

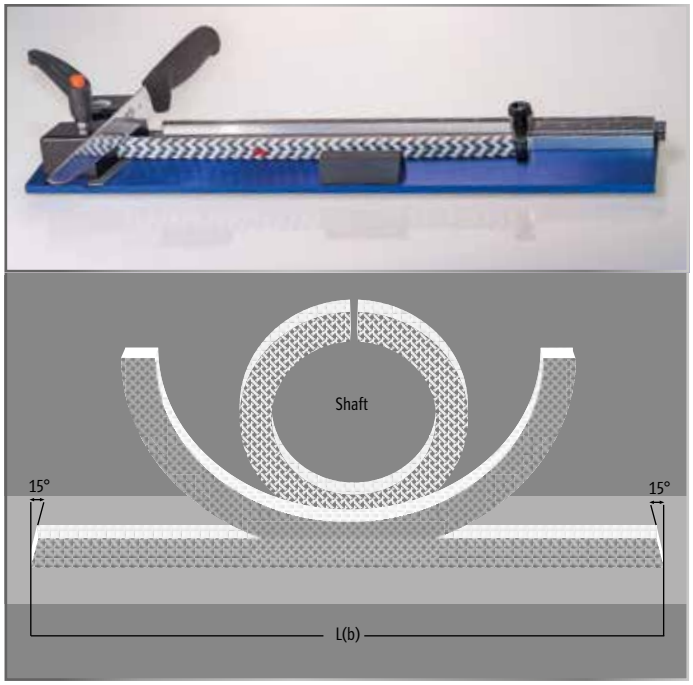
Cutting of Trapez Packing



Installation

- The rings must be installed always with the red arrow marked side to the housing
- Arrow marking in direction of shaft rotation

Butt cut 75° for rotating shafts



First Cut

- Put the packing on the cutter base with the red arrow marking oriented to the operator.
- Cut the end of the packing as shown in fig. 1

Finish cut

- Turn the packing 180° on its own axis, printed side is facing away from user
- Adjust the exact cutting length L(b)
- Align the first cut now against the left stop and using the right hand support to align the knife in the right angle as shown in fig. 2

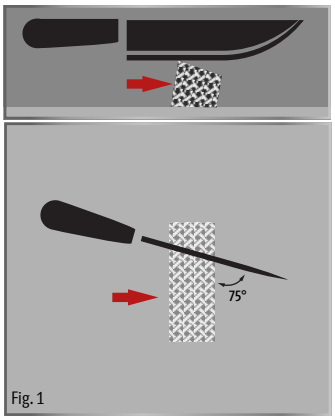


Fig. 1

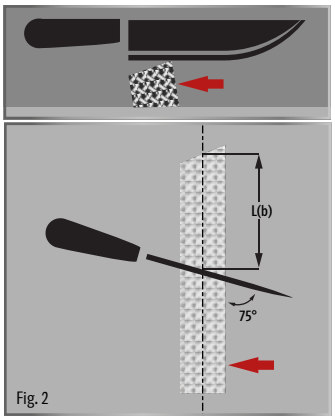
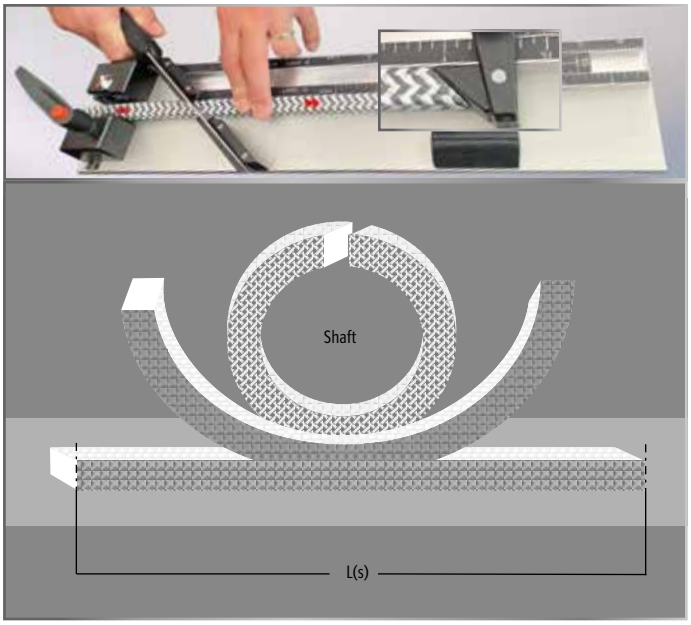


Fig. 2

Diagonal (Skive) cut 45° for valves and piston pumps



First Cut

- Put the packing on the cutter base with the red arrow mark facing up
- Cut the end of the packing in the right angle shown in fig. 3

Finish cut

- Adjust the exact cutting length L(s)
- Cut along the alignment bar shown in left picture

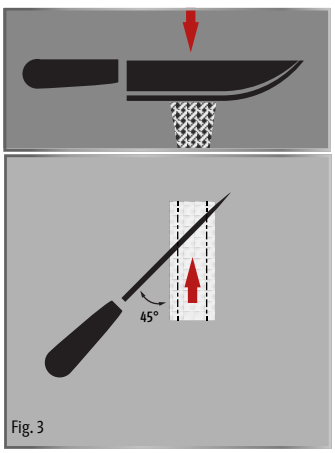


Fig. 3

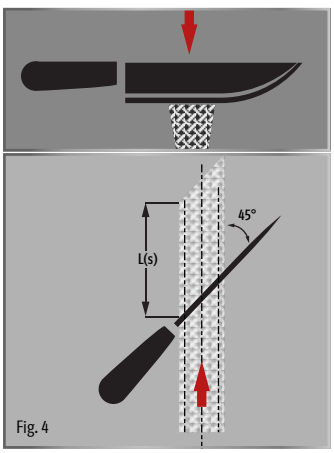


Fig. 4

Installation, start-up and operation of packing

The correct installation of the packing determines to a substantial extent the achievable service life of the application.

1. Correct compression of the packing

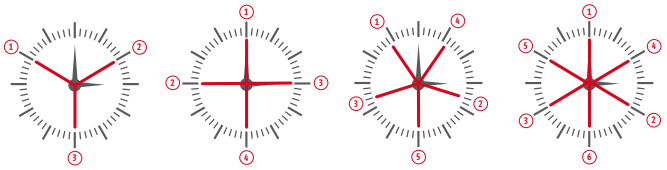
Compress each ring individually in the stuffing box using the gland follower and a suitable spacer tool. At least the two lowest rings or the rings in front of a lantern ring should be seated properly in this procedure.

Do not try to compress all the rings at the same time with the gland follower. Due to the friction on the stuffing box bore, on the sleeve and inside the packing it will cause the lower rings to be insufficiently compressed and the gland-side rings to be over compressed.

If the cross-section of a packing is larger than the gap between the shaft and the stuffing box wall, do not hit the packing with a hammer to flatten it, because this will damage the fibers. Take a round piece and roll this evenly on the packing until it fits. Better yet, use the calibration device in the W5PS-BU or W5PS-SK packing cutter (see page 83).

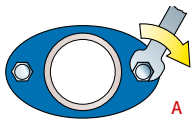
2. Positioning of the rings

Place the packing cuts individually and with the cut ends first in the stuffing box. Depending on the number of rings, arrange the cuts symmetrically distributed around the circumference (see graph underneath) so that there is no continuous leakage path. Tighten the gland nuts evenly.

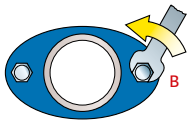


① Interface first ring to stuffing box bottom

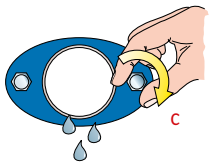
Installation of pump packings: Gland packing pressure should be applied evenly and alternately to the gland bolts. This ensures the gland follower does not tilt to one side. You should make sure that the rings have consolidated and, most importantly, are fully sealing against the stuffing box throat before starting up. (Step A). The packing stack will take some time to settle, and re-tightening may be necessary after a few minutes. If no further consolidation can be detected, the next step is performed.



Then loosen the nuts (Step B)

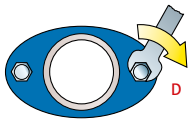


to lower the tension in the area next to the gland follower and then retighten them finger tight only (Step C).



Check where possible if the shaft can be rotated by hand.

If a flushing connection is used, the water supply must now be turned on. Start the pump and let it run for 20 minutes before making further adjustments. When tightening the gland nuts, tighten them only 1/6 turn at a time and only every 5 to 10 minutes until the desired leakage has been achieved (Step D).



As a guide value, a leakage of 5 ml / min per 25 mm shaft diameter is recommended for safe standard operation. This quantity can be reduced depending on the mode of operation or, for example, can be higher in the case of high roughness of the sleeve, shaft runout and high thermal load on the packing.

Counting the leakage volume in drops is a common method.
In this case the considered leakage volume depends strongly on the viscosity character of the sealed product.

Installation
Gasket sheets

Never - overtighten the gland nuts too quickly.
If the gland follower is tightened too far and to fast, the fluid film between the packing and the shaft will be disturbed and the packing life will be minimized.

Never - loosen the gland nuts under pressure!
The product pressure would cause the packing rings to lift off at the stuffing box base and uncontrollable leakage would occur. The forces on the gland follower would never re-seat the packing rings firmly against the stuffing box throat when re-tightened, rather the packing will overheat due to this compression near the gland. Likewise, the correct position of the lantern ring is thus affected, and the flow of flushing water may be interrupted.

Once the pump is stopped and restarted later, it is important to ensure that the lantern nuts are still finger tight when restarting. If the nuts have became loose due to cooling of the packing rings and you do not retighten them, the packing stack can loosen from the stuffing box base and lift off, which usually results in uncontrollable leakage.

If there is too much tension (gland nuts tightened more than finger tight) when starting up again, the necessary leakage cannot get between the packing and the shaft, and the packing is damaged by overheating. This can happen partially on the running surface. This causes a high leakage, usually after evaporation of the leakage film, or also can lead to a complete hardening of the packing, whereby it can no longer be adjusted and must be replaced.

Installation of valve packing: Packing for stem sealing should be compressed in the first installation step with the maximum possible force in order to minimize subsequent consolidation. However, it should be taken care not to damage either the gland bolts and screws or the gland itself. Precompress the packing at product pressures up to 50 bar with 2 times (for gaseous products with 5 times) the product pressure and a minimum of 5 N/mm² (for gaseous products 10 N/mm²). For pressures above 50 bar with 1.5 times (gaseous products with 2 times) the product pressure. Installations according to VDI 2440 / TA Luft or ISO 15848 may require a compression of up to 70 N/mm².

Apply the required compression with the valve spindle in the closed position. Move the spindle to the open position and back to the closed position of the valve. Check that the required compression is still applied. If the packing has consolidated, repeat the steps a few more times until the required packing pressure remains constant.
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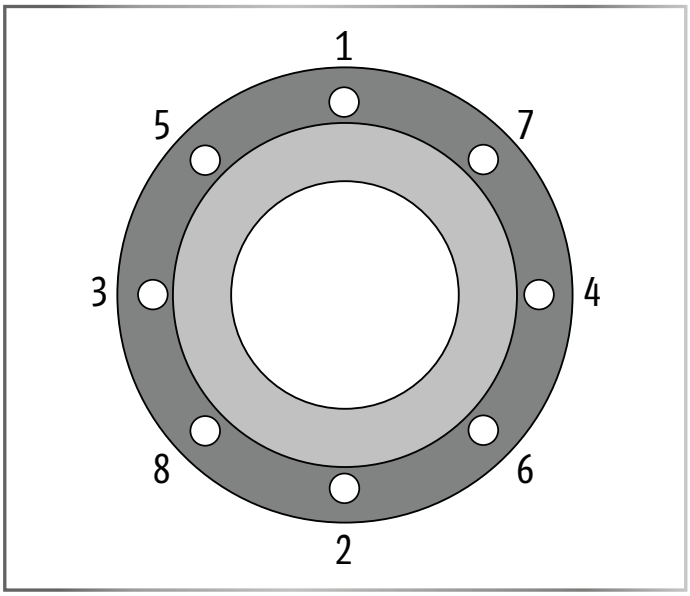


Please note during installation:

- Clean sealing surface completely. Remove any dirt, corrosion, grease or remainders from old sealing materials.
- Position the gasket centric to the flange face.
- Take extra care on vertical assemblies. First hand-tighten, then tighten in at least 4 progressive torque sequences, crosswise (see diagram on above) with approx. 25 %, 50 %, 75 % and 100 % of the recommended surface pressure.
- Always use a torque wrench!
- Before commissioning the system, we recommend checking the Torque and Compression again.
- Please always observe the guidelines for correct gasket installation according to the current state of the art.
- Observe the flange manufacturer's instructions and recommended tightening torques for the sealing system (flange, bolt, gasket).

Installation instruction ePTFE Gasket Tape

The following must be observed during assembly:

1. Clean sealing surface
2. Remove cover strip from adhesive strip
3. Place gasket on flange
4. Overlap ends in front of bolt or clamping element by 1 cm
5. Cut off the rest of the seal

Fig. 1

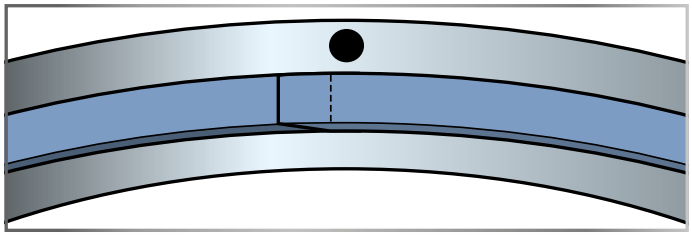


Fig. 2

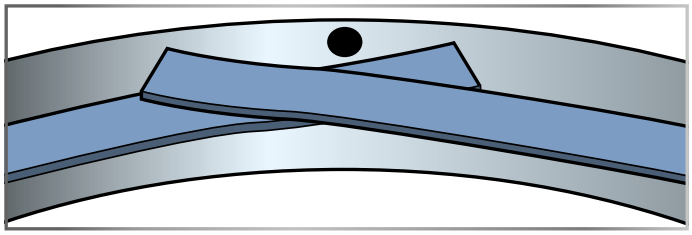


Fig. 3

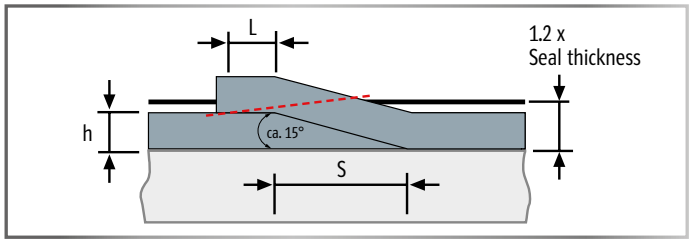


Fig. 4

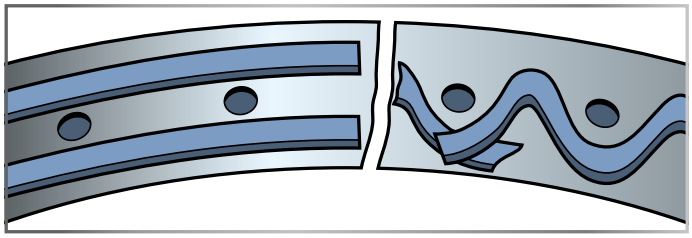
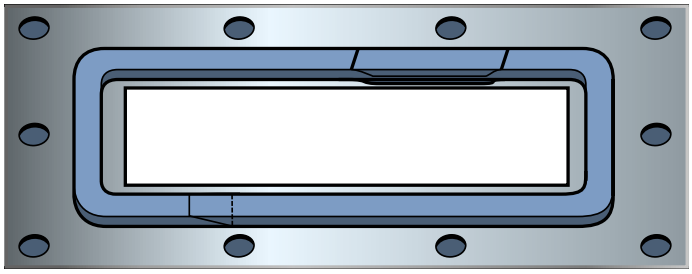


Fig. 5



Special Assembly

- Skive cut for tension sensitive components and for D1 HD from 10 mm and D11 Probitex,
  skive length (S) = 2 x gasket width
- Wavelike installation along and inside the pitch circle or an additional supporting layer outside the bolt pitch circle prevents tipping of flanges.
- Bedding or double layer in case of larger unevenness

Clean sealing surfaces completely.
Remove all impurities and residues of old seals.

For D1 HD sealing tapes >10 mm and D11 Probitex, skive one end of the gasket tape (Fig. 1 and 3).

Fig. 2
NOTE: This type of end connection is only suitable for D1 Protex and D1 HD with a sealing width of 3 mm and thicknesses of 0.3 mm and 0.7 mm.

Remove some masking paper from the adhesive backing and stick the seal on the pressure side, close to the bolt circle, starting close to a bolt hole.

Fig. 3
Remove only as much adhesive backing paper as can be bonded in one step! Place the seal at the end lengthwise over the shank and cut to length after the corresponding overlap and cut off the excess (as in Fig. 3). Use a sharp knife to cut a bevel to the shank with a length (S) of 2 times the gasket width, leaving a sharp edge towards the flange.

Select overlap length (L) approx. 2-3 times gasket thickness (h). Allow material overlap to taper with + 20% height allowance (h x 1.2) when cutting (Fig. 3).

Tighten bolts first hand-tight, then evenly crosswise in at least 4 steps until the recommended torque is reached. *(See page 95)*

To check and ensure permanent sealing performance, tighten bolts again at the end of the assembly process.

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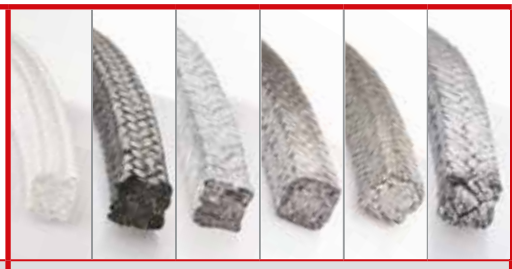
Technical parameters and product compatibility




	Valve packing						Pump packing								
Type	A19 / A190X	A33 / A22	A37	A44 / A44I	A66	A99	P1 / P1P / P1X	P2P	P8 E	P9/P9 Gold	P10	P12	P20	P52	P56
Materials of Construction	PTFE / PTFE	Carbon / Graphite	exp. Graphite Inconel / PTFE	exp. Graphite / Inconel verstärkt	exp. Graphite / Inconel Matrix	exp. Graphite / Inconel Matrix	ePTFE / Graphite	P-Aramid / PTFE	Ramie / PTFE	Novoloid/ PTFE, Polyimid/ PTFE	PTFE / Graphite	ePTFE / Graphite / Aramid	Carbon / PTFE	Synth. / PTFE / Graphite	Carbon / PTFE /exp. Graphite
Run-In Lubricant	-	-	-	-	-	-	Silicon	PPS	Paraffin	PPS/Silicon	Paraffin	Silicon	PPS	Paraffin	-
Density [g/cm³]	1.60 / 1.85	1.10 / 1.05	1.30	1.20 / 1.20	1.15	1.35	1.55 / 1.53 / 1.60	1.25	1.35	1.35 / 1.38	1.65	1.50	1.48	1.35	1.10
Pressure Rotating [bar]	-	-	-	20	-	-	25	25	15	20	25	25	30	20	25
Pressure Static [bar]	500	300	300	300	500	500	150	100	100	100	150	150	100	150	100
Pressure Reciprocating [bar]	250	-	-	-	-	-	250	100	100	60	250	250	100	150	100
Speed Rotating [m/s]	2	15 / 20	-	20	-	-	25 / 20	20	12	15	20	20	25	20	30
Speed Reciprocating [m/s]	1.5	-	-	-	-	-	2	2	1.5	2	2	2	2	2	2
pH	0-14	2-12/1-14	0-14	0-14	0-14	0-14	0-14	2-12	4-11	1-13/0-12	0-14	2-12	2-12	5-11	2-12
T min [°C]	-200	-40	-200	-200	-200	-200	-100	-50	-50	-50	-50	-100	-50	-50	-50
T max [°C]	+280	+550* / +650*	+300	+550** (400[1])	+650* (400[1])	+650* (450[1])	+280	+280	+140	+280	+280	+280	+300	+180	+280
Product compatibility															
Water	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Sewage	●	○	○	○	○	○	●	●	●		●	●	●	●	●
Hot Water	●	●	●	●	●	●	●	○		○	●	○	●	●	●
Steam [<280 °C]	○	●	●	●	●	●	○				○		○	○	○
Steam [<550 °C]		○ / ●		●** / ●	●	●									
Abrassive Products								●	●	○ / ●		●	●	○	●
Food, Pharmaceutical **FDA**	- / ● **FDA**														
Oxygen **BAM**	- / ● **BAM**	- / ● **BAM**	● **BAM**		● **BAM**	● **BAM**									
Diluted Acids	●	●	●	●	●	●	●	○		●	●	●	●		●
Concentrated Acids	●	○	○	○	○	○	●			○ / ●	●				
Diluted Alkaline, Salt Solutions	●	●	●	●	●	●	●	○	○	●	●	●	●	○	●
Concentrated Alkaline	●	○ / ●	○	○	○	○	●			○	●		○	○	○
Heat Transfer Oil	○	○	●	○	○	○	●	○		○	●	○	○	○	○
Lubricants, Grease	●	○	●	○	○	○	●	○	○	●	●	○	○	○	○
Solvent, Hydrocarbons **API**	●	○	●	○	○	● **API**	○				○		○	○	○
Adhesive, Bitumen	○						○	○			○	●	●	○	○
PFAS Free						●									
Paint (Silicon oil free)	● / ●	○	○	○	○	○		●	●	○ / -	○		○	○	○





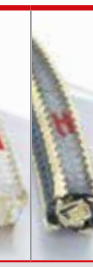












		Pump packing trapezoidal										Special packing				
P58	**P60**	**TP1**	**TP3**	**TP7**	**TP16**	**TP18**	**TP30**	**TP31**	**TP55**	**TP63**	**TP619**	**S4**	**S6 / S6 SI**	**S12K / TP12**	**S26K**	**S43K**
Synth. / PTFE	exp. Graphite / Carbon	ePTFE / Graphite	M-Aramid / PTFE	P-Aramid / PTFE	PTFE / ePTFE / Graphit	Graphite / ePTFE / Graphite	Carbon / PTFE	M-Aramid ePTFE / Graphite	exp. Graphite / Carbon	M-Aramid / ePTFE	PTFE / ePTFE heat conductive	ePTFE / Graphite	PTFE	ePTFE / Graphite / Aramid Aramid	PTFE / Aramid	ePTFE / Graphite / Aramid Aramid
Paraffin	-	Silicon	Silicon	Paraffin	Silicon	Silicon	Paraffin	Silicon	-	Silicon	Silicon	-	Para. / Silicon	Silicon	Para. / Silicon	Paraffin
1.35	1.00	1.55	1.40	1.23	1,65	1.55	1.50	1.55	1.08	1.55	1.75	1.35	1.70 / 1.90	1.55 / 1.50	1.45	1.35
20	20	25	25	25	25	25	30	25	25	20	20	30	15	25	25	-
150	300	100	100	100	250	150	100	150	300	100	100	500	100	250	250	500
150	65	250	100	100	250	250	100	150	100	100	100	800	100	500	500	1500
20	30	25	20	20	20	25	25	20	30	20	20	8	10	20	20	-
2	3	2	2	2	2	2	2	2	3	2	2	3	1.5	3	2	3
5-11	0-14	0-14	1-13	2-12	0-14	1-14	2-12	1-13	0-14	1-13	1-14	0-14	0-14	2-12	2-12	2-12
-50	-200	-100	-100	-50	-100	-100	-50	-100	-200	-100	-100	-200	-50 / -100	-100	-50 / -100	-50
+140	+550* (400[1])	+280	+280	+250	+280	+280	+300	+280	+550* (400[1])	+280	+280	+280	+280	+280	+280	+280
●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
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							●			●	● FDA		- / ● FDA			
									● BAM			● BAM				
	●	●	●	○	●	●	●	●	●	●	●	●	●	●	●	●
	○	●	○		●	●		○	○	○	○	●	●			
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	○	●			●	●	○	○	○		●	●	●			
	○	●	○	○	○	●	●	○	○	○	○	●	●	○	○	
○	○	●	○	○	●	●	●	○	○	○	●	●	●	○	○	○
	●	○	○		○	○	○	○	●	○	○	●	●			
○		○	○	●	○	●	●	○		○		○	○	● / ●	○	○
	●															
●	○			●			○		○			○	● / -			○

Not all max. values can be used at the same time.

● = recommended ○ = resistant (*) in steam (**) in steam in combination with bullrings made of style A33, A66 and A99 (1) in oxidizing atmosphere

● **BAM** – approval for oxygen ● **API** = API 622 and API 589 certification ● **FDA** = FDA conformity and food approvals EG 1935:2004, EU 10/2011

Conversion Chart: Meter / Weight

1 kg Packing in the following crossection has approx. meter:

		Size / Crossection (mm / inch)																			
		1/8"		3/16"		1/4"		5/16"	3/8"		7/16"		1/2"	9/16"		5/8"		3/4"		7/8"	1"
Density		3.2	4	5	6	6.35	7	8	9.5	10	11	12	12.7	14	15	16	18	19	20	22	25
1.00	P60	98	63	40.0	27.8	24.8	20.4	15.6	11.1	10.0	8.3	6.9	6.2	5.1	4.44	3.91	3.09	2.77	2.50	2.07	1.60
1.05	A22	93	60	38.1	26.5	23.6	19.4	14.9	10.6	9.5	7.9	6.6	5.9	4.86	4.23	3.72	2.94	2.64	2.38	1.97	1.52
1.10	A33,P56,TP55	89	57	36.4	25.3	22.5	18.6	14.2	10.1	9.1	7.5	6.3	5.6	4.64	4.04	3.55	2.81	2.52	2.27	1.88	1.45
1.15	A66	85	54	34.8	24.2	21.6	17.7	13.6	9.6	8.7	7.2	6.0	5.4	4.44	3.86	3.40	2.68	2.41	2.17	1.80	1.39
1.20	A44,A44I	81	52	33.3	23.1	20.7	17.0	13.0	9.2	8.3	6.9	5.8	5.2	4.25	3.70	3.26	2.57	2.31	2.08	1.72	1.33
1.25	P2P,P7,TP7	78	50	32.0	22.2	19.8	16.3	12.5	8.9	8.0	6.6	5.6	5.0	4.08	3.56	3.13	2.47	2.22	2.00	1.65	1.28
1.30	A37	75	48	30.8	21.4	19.1	15.7	12.0	8.5	7.7	6.4	5.3	4.77	3.92	3.42	3.00	2.37	2.13	1.92	1.59	1.23
1.35	A99, P8E, P9,P52,P58, S4, S43K	72	46	29.6	20.6	18.4	15.1	11.6	8.2	7.4	6.1	5.1	4.59	3.78	3.29	2.89	2.29	2.05	1.85	1.53	1.19
1.40	P9G, TP3	70	45	28.6	19.8	17.7	14.6	11.2	7.9	7.1	5.9	5.0	4.43	3.64	3.17	2.79	2.20	1.98	1.79	1.48	1.14
1.45	P83, S26K	67	43	27.6	19.2	17.1	14.1	10.8	7.6	6.9	5.7	4.79	4.28	3.52	3.07	2.69	2.13	1.91	1.72	1.42	1.10
1.50	P12, P20, P82, P84, TP12, TP30	65	42	26.7	18.5	16.5	13.6	10.4	7.4	6.7	5.5	4.63	4.13	3.40	2.96	2.60	2.06	1.85	1.67	1.38	1.07
1.55	P1, P1P, S12K, TP1, TP18, TP31,TP63	63	40	25.8	17.9	16.0	13.2	10.1	7.1	6.5	5.3	4.48	4.00	3.29	2.87	2.52	1.99	1.79	1.61	1.33	1.03
1.60	A19, P1X	61	39	25.0	17.4	15.5	12.8	9.8	6.9	6.3	5.2	4.34	3.88	3.19	2.78	2.44	1.93	1.73	1.56	1.29	1.00
1.65	P10, TP16	59	38	24.2	16.8	15.0	12.4	9.5	6.7	6.1	5.0	4.21	3.76	3.09	2.69	2.37	1.87	1.68	1.52	1.25	0.97
1.70	S6	57	37	23.5	16.3	14.6	12.0	9.2	6.5	5.9	4.9	4.08	3.65	3.00	2.61	2.30	1.82	1.63	1.47	1.22	0.94
1.75	TP619	56	36	22.9	15.9	14.2	11.7	8.9	6.3	5.7	4.7	3.97	3.54	2.92	2.54	2.23	1.76	1.58	1.43	1.18	0.91
1.85	A190X	53	34	21.6	15.0	13.4	11.0	8.4	6.0	5.4	4.5	3.75	3.35	2.76	2.40	2.11	1.67	1.50	1.35	1.12	0.86
1.90	S6SI	51	33	21.1	14.6	13.1	10.7	8.2	5.8	5.3	4.3	3.65	3.26	2.69	2.34	2.06	1.62	1.46	1.32	1.09	0.84

10 Meter Packing of the following crossection have a weight of approx. kg:

		Size / Crossection (mm / inch)																			
		1/8"		3/16"		1/4"		5/16"	3/8"		7/16"		1/2"	9/16"		5/8"		3/4"		7/8"	1"
Density		3.2	4	5	6	6.35	7	8	9.5	10	11	12	12.7	14	15	16	18	19	20	22	25
1.00	P60	0.10	0.16	0.25	0.36	0.40	0.49	0.64	0.90	1.00	1.21	1.44	1.61	1.96	2.25	2.56	3.24	3.61	4.00	4.84	6.25
1.05	A22	0.11	0.17	0.26	0.38	0.42	0.51	0.67	0.95	1.05	1.27	1.51	1.69	2.06	2.36	2.69	3.40	3.79	4.20	5.08	6.56
1.10	A33,P56,TP55	0.11	0.18	0.28	0.40	0.44	0.54	0.70	0.99	1.10	1.33	1.58	1.77	2.16	2.48	2.82	3.56	3.97	4.40	5.32	6.88
1.15	A66	0.12	0.18	0.29	0.41	0.46	0.56	0.74	1.04	1.15	1.39	1.66	1.85	2.25	2.59	2.94	3.73	4.15	4.60	5.57	7.19
1.20	A44,A44I	0.12	0.19	0.30	0.43	0.48	0.59	0.77	1.08	1.20	1.45	1.73	1.94	2.35	2.70	3.07	3.89	4.33	4.80	5.81	7.50
1.25	P2P,P7,TP7	0.13	0.20	0.31	0.45	0.50	0.61	0.80	1.13	1.25	1.51	1.80	2.02	2.45	2.81	3.20	4.05	4.51	5.00	6.05	7.81
1.30	A37	0.13	0.21	0.33	0.47	0.52	0.64	0.83	1.17	1.30	1.57	1.87	2.10	2.55	2.93	3.33	4.21	4.69	5.20	6.29	8.13
1.35	A99, P8E, P9,P52,P58, S4, S43K	0.14	0.22	0.34	0.49	0.54	0.66	0.86	1.22	1.35	1.63	1.94	2.18	2.65	3.04	3.46	4.37	4.87	5.40	6.53	8.44
1.40	P9G, TP3	0.14	0.22	0.35	0.50	0.56	0.69	0.90	1.26	1.40	1.69	2.02	2.26	2.74	3.15	3.58	4.54	5.05	5.60	6.78	8.75
1.45	P83, S26K	0.15	0.23	0.36	0.52	0.58	0.71	0.93	1.31	1.45	1.75	2.09	2.34	2.84	3.26	3.71	4.70	5.23	5.80	7.02	9.06
1.50	P12, P20, P82, P84, TP12, TP30	0.15	0.24	0.38	0.54	0.60	0.74	0.96	1.35	1.50	1.82	2.16	2.42	2.94	3.38	3.84	4.86	5.42	6.00	7.26	9.38
1.55	P1, P1P, S12K, TP1, TP18, TP31,TP63	0.16	0.25	0.39	0.56	0.62	0.76	0.99	1.40	1.55	1.88	2.23	2.50	3.04	3.49	3.97	5.02	5.60	6.20	7.50	9.69
1.60	A19, P1X	0.16	0.26	0.40	0.58	0.65	0.78	1.02	1.44	1.60	1.94	2.30	2.58	3.14	3.60	4.10	5.18	5.78	6.40	7.74	10.00
1.65	P10, TP16	0.17	0.26	0.41	0.59	0.67	0.81	1.06	1.49	1.65	2.00	2.38	2.66	3.23	3.71	4.22	5.35	5.96	6.60	7.99	10.31
1.70	S6	0.17	0.27	0.43	0.61	0.69	0.83	1.09	1.53	1.70	2.06	2.45	2.74	3.33	3.83	4.35	5.51	6.14	6.80	8.23	10.63
1.75	TP619	0.18	0.28	0.44	0.63	0.71	0.86	1.12	1.58	1.75	2.12	2.52	2.82	3.43	3.94	4.48	5.67	6.32	7.00	8.47	10.94
1.85	A190X	0.19	0.30	0.46	0.67	0.75	0.91	1.18	1.67	1.85	2.24	2.66	2.98	3.63	4.16	4.74	5.99	6.68	7.40	8.95	11.56
1.90	S6SI	0.19	0.30	0.48	0.68	0.77	0.93	1.22	1.71	1.90	2.30	2.74	3.06	3.72	4.28	4.86	6.16	6.86	7.60	9.20	11.88

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ProPack
DICHTUNGEN UND PACKUNGEN AG

Rudolf-Diesel-Ring 28
D-82054 Sauerlach

Phone ++49 (0) 8104 6640 0
Fax ++49 (0) 8104 6640 44
e-Mail propack@propack.ag
Internet www.propack.ag