

Compression Packing

Klinger has a comprehensive range of compression packing's which are suitable for centrifugal or reciprocating pumps and valves.

Klinger's range includes patented specialised compression packing and concepts which assist our customers to meet, and in most cases exceed the stringent fugitive emission targets set by various environmental bodies such as the EPA and customers themselves. Klinger's large braiding facilities produce packing in square, round or rectangular profiles, with or without specialised cores in various materials such as rubber and steel.

Certain grades of materials can be produced in sections up to 130mm square.

Klinger styles of braiding are Klingerlock, Plaited, Braid over Braid and Braid over core.

Klinger are also the sole appointed distributor for the Asia Pacific region for the SealRyt Corporation of the USA and for Robco Inc of Canada for Australia and New Zealand as well as certain designated Asian countries.

Klinger are able to provide:

- A reliable and effective range of compression packing's that have universal application throughout industry
- Utilising the most modern production techniques and materials
- To give the user predictable life expectancy
- Provide a complete range of packing to replace traditional products.
- To aid in the correct selection of the most appropriate packing for any given application
- To provide the user with the full technical support from full installation documentation through chemical compatibility and past application success
- To reduce inventory and stock holding costs through product rationalisation.

For Ceramic based packing Styles 123, 123S and 123G consult Klinger. Suitable for use up to 1260 °C.

- A full range of packing extractors with replaceable tips is also available.

Note: Packing's should not be subjected to the maximums of temperature, pressure and speed simultaneously. For further advice contact Klinger.

Style K10



Material:

Acrylic yarn and PTFE

Application:

Water, mild acids and alkalis, mild slurries.

Service Capabilities

Temperature Degree C	-100 to 260
pH capability	2 – 12
Max rotary Pressure	30 bar
Max static Pressure	100 bar
Max rotary Speed	10 m/sec
Max reciprocating pressure	20 bar
Max reciprocating speed	2 m/sec

Style K11



Material:

Acrylic yarn and graphite dispersion

Application:

Water, mild acids and alkalis, mild slurries. Suitable where the use of a non contaminating packing is not important.

Service Capabilities

Temperature Degree C	-100 to 300
pH capability	4 – 10
Max rotary Pressure	40 bar
Max static Pressure	100 bar
Max rotary Speed	15 m/sec
Max reciprocating pressure	25 bar
Max reciprocating speed	2 m/sec

Style K13DL



Material:

Flax yarn and Doulon Lubricant

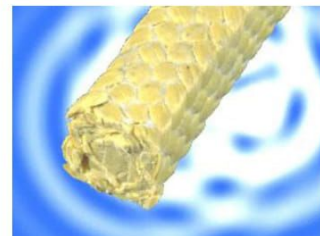
Application:

Water, mild acids and alkalis, slimes and slurries, stern tubes. Resistant to water rot especially salt water.

Service Capabilities

Temperature Degree C	0 to 90
pH capability	4 – 9
Max rotary Pressure	20 bar
Max static Pressure	70 bar
Max rotary Speed	15 m/sec
Max reciprocating pressure	30 bar
Max reciprocating speed	4 m/sec

Style K25



Material:

Aramid yarn and PTFE lubrication

Application:

Suitable for a wide range of chemicals and heavy slurry applications. Excellent as a bull ring material and in combination with other fibres. Ensure that the packing is well lubricated if used in moderate and high speed pumps due to its hard wearing properties.

Service Capabilities

Temperature Degree C	-100 to 260
pH capability	2 – 12
Max rotary Pressure	30 bar
Max static Pressure	200 bar
Max rotary Speed	15 m/sec
Max reciprocating pressure	100 bar
Max reciprocating speed	2 m/sec

Compression Packing

Style K54F



Material:

Virgin PTFE Yarn

Application:

Can be used in virtually all media including strong acids and alkalis. Also suitable for use on Oxygen valve applications.

Water and food compatible.

Service Capabilities

Temperature Degree C	-240 to 260
pH capability	0 – 14
Max rotary Pressure	20 bar
Max static Pressure	200 bar
Max rotary Speed	3 m/sec
Max reciprocating pressure	100 bar
Max reciprocating speed	2 m/sec

Style K54S



Material:

PTFE Yarn and lubricants

Application:

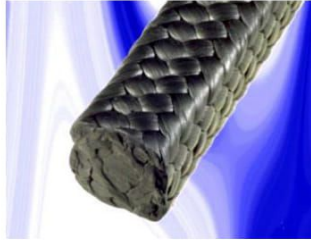
Can be used in virtually all media including strong acids and alkalis. Suitable for use in potable water and food applications.

Most glands packed with this packing requires little adjustment after the initial installation.

Service Capabilities

Temperature Degree C	-240 to 260
pH capability	0 – 14
Max rotary Pressure	20 bar
Max static Pressure	200 bar
Max rotary Speed	5 m/sec

Style K55



Material:

Graphite encapsulated PTFE yarn

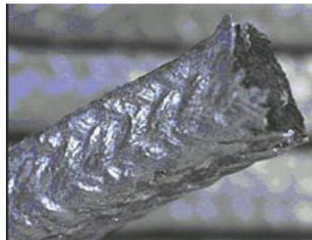
Application:

Can be used in virtually all media including strong acids and alkalis. K55 has very good heat dissipating properties and is easy on sleeves and shafts. Very good in mild slurries and on feed pumps

Service Capabilities

Temperature Degree C	-200 to 280
pH capability	0 – 14
Max rotary Pressure	30 bar
Max static Pressure	200 bar
Max rotary Speed	20 m/sec
Max reciprocating pressure	100 bar
Max reciprocating speed	3 m/sec

Style 390



Material:

High purity graphite yarns densely impregnated with micron size graphite

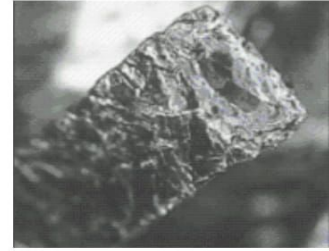
Application:

Highly chemical resistant and heat conductive. A very anti frictional packing effective on a wide variety of services. Permits operation at minimal leakage. Non hardening.

Service Capabilities

Temperature Degree C	-196 to 400
In saturated steam Deg C	650
pH capability	1 – 14
Max rotary Pressure	35 bar
Max static Pressure	170 bar
Max rotary Speed	25 m/sec

Style 396



Material:

A dense flexible graphite with carbon/graphite yarns to resist extrusion

Application:

Operates successfully on pumps and valves. Very conformable packing and can be run drip free in certain applications. Excellent on feed water, caustic and condensate pumps.

Service Capabilities

Temperature Degree C	-196 to 454
In saturated steam Deg C	650
pH capability	0 – 14
Max rotary Pressure	35 bar
Max static Pressure	175 bar
Max rotary Speed	22 m/sec

Style 396C



Material:

A patented inner graphite core internally sprung with helical braided inconel wire, over braided with carbon inserted exfoliated graphite foil.

Application:

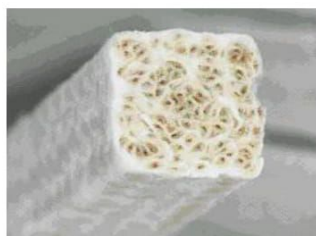
Excellent on pumps and valves especially caustic applications. Meets the requirements of API 589, 607 and 622. Klinger's Fugitive Emission packing.

Service Capabilities

Temperature Degree C	-196 to 454
In saturated steam Deg C	650
pH capability	0 – 14
Max rotary Pressure	56 bar
Max static Pressure	345 bar
Max rotary Speed	22 m/sec

Compression Packing

Style 2000



Material:

Phenylene/Fibre X impregnated with PTFE dispersion.

Application:

An excellent replacement for asbestos PTFE packing. It is much stronger, more chemically resistant and much easier on shafts. A clean packing for acids and alkalis and any application needing non contamination of products. Excellent on slurries..

Service Capabilities

Temperature Degree C	232
pH capability	1 – 14
Max rotary Pressure	30 bar
Max static Pressure	100 bar
Max rotary Speed	11 m/sec
Max reciprocating pressure	35 bar
Max reciprocating speed	2 m/sec

Style 2001



Material:

Fibre X monofilament impregnated with PTFE dispersion.

Application:

A medium soft strong packing, chemically resistant and easy on shafts. A clean packing for acids and alkalis and non contamination of products. Ideally suited to the Pulp & Paper industry.

Service Capabilities

Temperature Degree C	232
pH capability	1 – 14
Max rotary Pressure	30 bar
Max static Pressure	100 bar
Max rotary Speed	11 m/sec

Style K3222 / K3222W



Material:

Exfoliated graphite ribbon packing

Application:

K3222 is a cost effective general purpose packing for use in non abrasive applications on pumps and valves within all industries.

It is also available in a wire reinforced version designated **K3222W** for high pressure valve applications. Not suitable for pumps.

Service Capabilities

Temperature Degree C	-200 to 430
In saturated steam Deg C	650
pH capability	0 – 14
Max rotary Pressure K3222	20 bar
Max static Pressure K3222	100 bar
(For use up to 280 bar for K3222 consult Klinger)	
Max static Pressure K3222W	300 bar
Max rotary Speed K3222	20 m/sec

Style K4307



Material:

Flax fibre with PTFE/mineral lubricants.

Application:

Water, mild acids and alkalis, slimes and slurries, stern tubes. Resistant to water rot

Service Capabilities

Temperature Degree C	0 to 120
pH capability	4 – 9
Max rotary Pressure	20 bar
Max static Pressure	70 bar
Max rotary Speed	10 m/sec
Max reciprocating pressure	20 bar
Max reciprocating speed	3 m/sec

Style K4313



Material:

A hybrid packing that combines Aramid fibre and Expanded graphite PTFE.

Application:

Suitable for a wide range of chemicals and heavy slurry applications pumps. Reduced shaft wear to pure aramid packing.

Should a non contaminating packing be required use K4311 which has virgin PTFE yarns instead of graphite/PTFE.

Consult Klinger

Service Capabilities

Temperature Degree C	-100 to 280
pH capability	2 – 12
Max rotary Pressure	25 bar
Max static Pressure	250 bar
Max rotary Speed	20 m/sec
Max reciprocating pressure	150 bar
Max reciprocating speed	2 m/sec

Style K4322



Material:

PTFE yarn with graphite lubricant

Application:

Can be used in virtually all media including strong acids and alkalis. Long lasting performance in pumps and valves.

Service Capabilities

Temperature Degree C	-200 to 280
pH capability	0 – 14
Max rotary Pressure	25 bar
Max static Pressure	300 bar
Max rotary Speed	22 m/sec
Max reciprocating pressure	230 bar
Max reciprocating speed	2 m/sec

Compression Packing

Style K4333



Material:

Polyimide fibre with PTFE lubricant

Application:

Suitable for water, oils, hydrocarbons, mild acids and alkalis. A good slurry packing in the Pulp and Paper and Sugar Industries.

Service Capabilities

Temperature Degree C	-80 to 260
pH capability	1 – 12
Max rotary Pressure	35 bar
Max static Pressure	200 bar
Max rotary Speed	15 m/sec
Max reciprocating pressure	100 bar
Max reciprocating speed	2 m/sec

Style 7413



Material:

Manufactured from 7 different textiles utilizing core to outside surface technology. Super dense

Application:

Unique packing designed for use on heavy slurries, slow moving, large and small shaft applications being affected by eccentric shaft movement. An excellent packing for the pulp and paper industry.

Service Capabilities

Temperature Degree C	287
pH capability	1 – 14
Max rotary Pressure	*120 bar
*subject to speed. Consult Klinger	
Max static Pressure	345 bar
Max rotary Speed	6 m/sec
Max reciprocating pressure	241 bar
Max reciprocating speed	2 m/sec

Style K35 Tape



Material:

Exfoliated graphite riffled tape

Application:

Virtually resistant to all media with the exception of strong oxidisers. Can be fitted directly into the valve stuffing box and compressed to create a packing suitable for high temperature and pressure applications. Can be supplied plain or with adhesive backing

Service Capabilities

Temperature Degree C	-200 to 450
pH capability	0 – 14
Density :	1.0g/cm ³
Purity	>98%

Sizes available

6mm x 0.5mm x 12 metres
10mm x 0.5mm x 12 metres
12mm x 0.5mm x 12 metres
15mm x 0.5mm x 12 metres
20mm x 0.5mm x 12 metres
25mm x 0.5mm x 12metres

Style K35 Die formed rings



Material:

Manufactured from exfoliated graphite tape.

Application:

Virtually resistant to all media with the exception of strong oxidisers. We are able to manufacture most sizes, section or density of ring to suit the customers requirements. For pressure seals refer to other products section of catalogue.

Pack-RYT

Patent #: 6834862



The Pack-RYT system is a unique stuffing box sealing arrangement that for the first time incorporates a bearing and flush channel system together. The advantages of this system are numerous and are listed below for easy reference

Shaft Stabilization

Equipment sealing reliability is derived directly from stabilizing shafts. The Pack Ryt sealing system brings shafts into concentricity and keeps them there, significantly increasing sealing reliability. Return on investment improvements with Pack Ryt sealing systems are realized with both difficult to seal and everyday sealing applications. Examples of equipment types which present shaft movement that benefit from Pack Ryt sealing technology include: Agitators - overhung shaft design Vertical Pumps - Long shaft, little support Split Case Horizontals - Middle shaft sag Large, Slow equipment - Run-out, spiralling leakage as well as any equipment not running at its best efficiency point.

Use of the Pack Ryt sealing system guarantees a substantial reduction of flush water used. Due to very close clearances between bearing and sleeve, water entry to the process is severely throttled. This throttling is inherent and automatic.

Water Conservation

Pack Ryt's do not require flow meters to reduce flow.

Energy Conservation

The Pack Ryt system draws the same or less amps than a single mechanical seal on the same or identical pump.

Level Gauge Glasses and Piston Valves

Borosilicate Gauge Glasses



Circular Sight Glasses

moulded - ground - polished - thermally pre-stressed

Diameter [mm]:
from 31.75 up to 200

Thickness [mm]:
from 12.7 up to 20

Range of Working Pressure [bar]:
Up to 175 bar

Range of Operating Temperature:
from -273°C up to 356°C

Chemical Resistance:

Alkali resistance: Class 2 (tested to ISO 675)

Water resistance: Class 1 (tested to ISO 719)

Acid resistance: Class 1 (tested to ISO 12116)

Gasket set and micas available for application in high-pressure steam gauges Gauge glasses, which are operated at steam pressures above 35 bar or with media causing rapid wear of glass, have to be protected with a mica shield

Reflex and Transparent Glasses

Manufacturing according to following standards:

OENORM M 7354, DIN 70810,
JIS B 8211, OMV-Spez. H2009,
MIL-G-16356 D, Esso Eng. Spec. 123,
S.O.D. Spec. 123 and BS 3463

Packing:

KLINGER gauge glasses are packed in individual cardboard boxes, including a KLINGER sealing gasket and cushion gasket, forming a complete unit for installation

Length [mm]:
from 115 (I) up to 340 (IX)

Range of Operating Pressure [bar]:
Up to 400

Operating Temperature:

Up to 430°C

Chemical Resistance:

Alkali resistance: Class 2 (tested to ISO 675)

Water resistance: Class 1 (tested to ISO 719)

Acid resistance: Class 1 (tested to ISO 12116)

Reflex Glasses

Types A, B and H

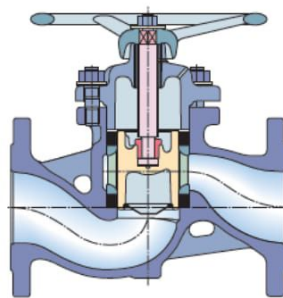
The medium facing side is provided with moulded grooves

Transparent Glasses

Types A, B, H and TA28

The surfaces on both sides are finely ground and polished to ensure optimal transparency

KLINGER KVN



The Piston Valves for a General Field of Applications

Nominal Sizes:

DN 10 – 200 (NPS 1/2" – 8")

Pressure Range:

PN 6, PN 16, PN 40 and PN 63
Class 150, Class 300 and CWP 900

Temperature Range:

from -196°C up to 400°C

Materials of Body:

Cast iron, spheroidal iron, carbon steel and stainless steel

Connections:

Flanges acc. to EN 1092-1 and EN1092-2,

ANSI 150/300

Female Screwed Ends acc. to ISO 228-1 and NPT-thread ANSI B 2.1

Socket welding ends acc. to EN 12 760 and butt welding ends acc. to EN 12627

Accessory:

Actuators (electro mechanical, pneumatic), heating jacket, etc.

Special Types:

- Piston valve for Fire-Safe application
- Piston valve for TA-Luft (clean air regulation) and EPA application
- Piston valve for heat transfer media
- Piston valve for liquid gas
- Piston valve for steam
- Regulating piston valve DN 10 – 50 with regulation piston (KVRKN)
- Regulating piston valve DN 65 – 200 with regulation lantern bush (KVRLN)

Certificates and Approvals:

- Fire safety according to API 6FA
- Type approval acc. to VdTÜV 1065
- Type approval for tankers (RID/ADR+TRT)
- Release for oxygen service
- Conforms to TA-Luft requirements

Other Fluid Instrumentation Products

Tubular Gauge Glass

Diameter: - 1/2", 5/8" and 3/4"

Length: - Maximum 2000 mm

Compliant to BS3463

Sight Flow Indicators

Connections :- Flanged 1/2" to 4"

ANSI 150# and 300#

Threaded and socket weld up to 2"

Materials:- Carbon Steel and Stainless Steel

Sleeve Packed Cocks

Connections :- Threaded and socket

weld 1/4" to 3/4"

Materials:- Carbon Steel and Stainless Steel

Safety Spray Shields and Flange Protectors

Safety Spray Shields are designed to prevent a catastrophe by temporarily containing hazardous leaks and sprays. Leaks can occur on piping systems conveying chemicals, high temperature fluids, and steam, which can harm workers, nearby equipment, and the environment. Leaks of flammables, such as fuel or oil, can create fire and explosion hazards.

- Safety Spray Shields help meet regulatory standards set by agencies such as OSHA, EPA, MSHA, SOLAS, ABS, and DNV, and are now required by some insurance companies.

- Constructed of durable fabrics that are chemical, UV, and weather resistant, our Shields are available in Teflon®, Polypropylene, PVC, and Polyethylene. Solid styles contain a pH indicating patch which signals a leak by immediately changing colour towards red if acidic or towards green if an alkali. The patch is replaceable which allows reuse of the shield.

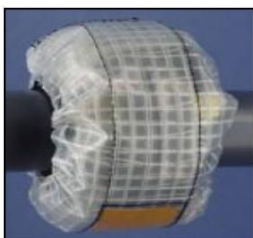
- Our Shields are ready to install quickly and simply by one person with the equipped hook and loop fasteners and draw cord.

- We offer Shields for all sizes and ratings, both standard, non-standard, and metric(DN).

- We are able to provide problem solving solutions by designing and manufacturing customs for special sizes and applications. Available in the same fabrics and styles as Flange Shields

FLANGE SHIELDS

Polyethylene



- Transparent, reinforced polyethylene fabric.
- Multi-layered construction.
- Tough poly thread and draw cord.
- Maximum operating temperature of 76°C

Polypropylene



- Solid woven polypropylene fabric.
- Multi-layered construction.
- Insert in centre provides 4th protective layer.
- Polypropylene thread and draw cord.
- Maximum operating temperature of 93°C

Vinyl



- Reinforced polyvinyl chloride fabric.
- Multi-layered construction.
- Tough poly thread and draw cord.
- Standard colour is safety orange. Yellow and other colours available upon request.
- Maximum operating temperature of 76°C

Standard Teflon®



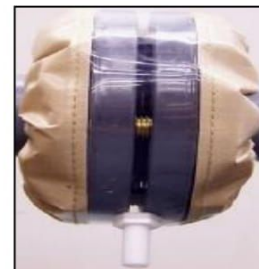
- Teflon® coated glass cloth.
- Reinforced, multi-layered construction.
- Teflon® coated fibre glass or Nomex® thread and draw cord.
- Fire resistant.
- Maximum operating temperature of 232°C

Premium Teflon®



- Maximum Teflon® content fabric for extreme service and long life.
- Multi-layered construction.
- Teflon® coated fibre glass or Nomex® thread and draw cord.
- Fire and tear resistant.
- Max operating temperature of 232°C

Clear Teflon®



- Clear Teflon® centre strip allows for complete visual inspection.
- Sides constructed of Premium Teflon® coated glass cloth.
- Teflon® coated fibre glass or Nomex® thread and draw cord.
- Fire and tear resistant.
- Teflon® drain nipple optional.
- Max operating temperature 204°C

EXPANSION JOINT SHIELDS



- Available in same fabrics and styles as Flange Shields.
- Clear Teflon is recommended for viewing of bellows.
- Allows for lateral movement, while maintaining fit and Protection.

- Available for all styles and types of Rubber, Stainless, and Teflon bellowed expansion joints, regardless of manufacturer.
- Recommended by most manufacturers of expansion joints.

VALVE SHIELDS



- Available in same fabrics and styles as Flange Shields.
- Allows for operation of valve handle or hand wheel.
- Bonnet Shields allow for travel and opening and closing of gate or globe valve.
- Manufactured to fit all styles and types of valves:
- Ball, Check, Butterfly, Gate, Plug Diaphragm, Control, Globe.

I & E COVERS



- Designed to fit instrumentation, electronics, controls, expensive and delicate equipment.
- Increases life and protects from corrosive environments.
- Clear Styles allow for viewing of positioner and actuator.
- Custom fit, regardless of length and size.

STAINLESS STEEL

- Available in two styles

Style 1 Band Type



- 316 stainless steel construction.
- Layers of stainless netting absorb and dissipate pressurized spray.
- No tools required, installs quickly via adjustable quick latch.
- No sharp edges.
- Excellent for high temperature and pressure.
- Recommended for steam, flammables, and fire protection.
- Max temperature 1093°C, max pressure 3000 psi.

Style 2



- Slotted overlapped edges prevent lateral spray out.
- Spacer rods raise shield off flange to dissipate pressure.
- Excellent for high temperature and pressure.
- Recommended for steam, flammables, and fire protection.
- Max temperature 1093°C, max pressure 3000 psi.

Flange Band Protectors



- Designed to cover flanges to protect flange faces, stud bolts, and gaskets from corrosion.
- Keeps out moisture, chemicals, salt water, acid rain, etc.
- Keeps out foreign matter, which is critical on systems that are cathodically protected.
- Available in 316 stainless steel and Kydex plastic.
- 316 stainless steel worm gear clamp.
- 316 stainless steel injection fitting
- Gasket liner of closed cell neoprene, maximum operating temperature of 82°C.
- Optional EPDM rubber gasket liner, maximum operating temperature of 132°C.
- Safety relief valve optional, bleeds at 5 psi.
- Available for all size flanges.
- Optional liner of Teflon® or silicone for chemical and high temperature applications.
- Custom engineered designs available per application.

Nut and Bolt Caps

- Designed to protect hex nuts and stud bolt ends from corrosion, thus allowing easy unbolting.
- Eliminates need of a torch for nut removal.
- Keeps out moisture, chemicals, salt spray, and paint build up.
- Moulded from UV, chemical, and weather resistant polyethylene plastic.
- Simple and easy to install.
- Economical and reusable.
- Constant temperature of 77°C.
- Standard & custom sizes available.



Advancing the Science of Sealing™

Engineered Gasketing Products



Garlock
SEALING TECHNOLOGIES®

an EnPro Industries company

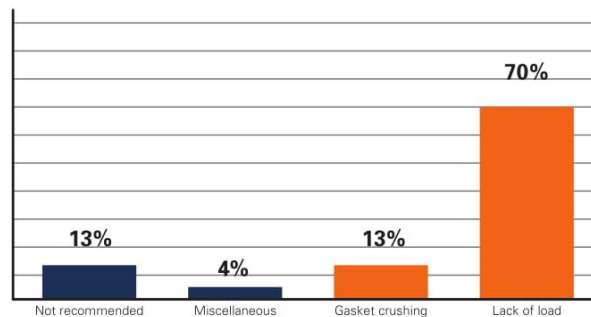
Garlock GYLON EPIX™

The perfect solution for imperfect flanges

GASKETING MISCONCEPTION

In a world where we are bombarded with the belief that “more is better” sealing science contradicts that theory with facts that show “thinner is better” when it comes to gaskets, as they provide improved load retention, pressure resistance and sealability. Yet thicker gaskets have their place for uneven, worn or damaged sealing surfaces. So how does a person make the right choice? What if there was a product that could do both?

WHY GASKETS FAIL



83% of gasket failures are due to installation errors

Introducing GYLON EPIX™

THERE IS A BETTER WAY

GYLON EPIX™ is a family of gaskets that effectively seals a broader range of applications and is more forgiving during the installation process.

GYLON EPIX™ allows the end user to save valuable turn-around time, reduce re-work, and lower costs, helping them to finish ahead of schedule and under budget.

INVENTORY SIMPLIFICATION

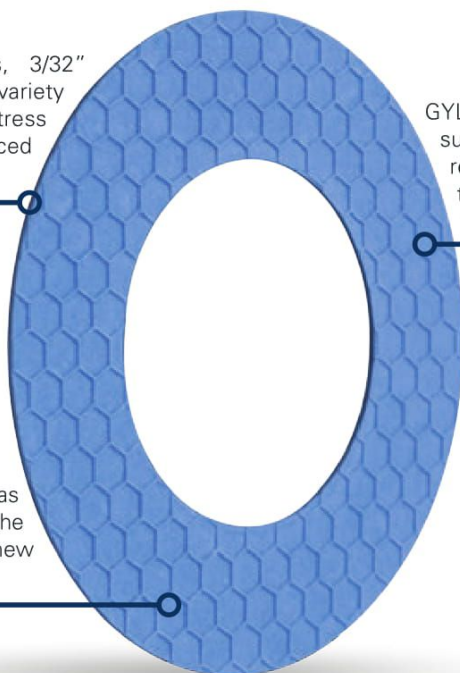
Offered in one universal thickness, 3/32" (2.4mm), eliminating the need to stock a variety of material thicknesses with different stress requirements. This translates to reduced inventory and better sheet utilization.

IMPROVED LOAD RETENTION

GYLON EPIX™ features a hexagonal surface profile that provides the torque retention and blowout resistance of a thin gasket and the conformability of a thicker gasket.

TRUSTED MATERIALS

Made from the same PTFE material as standard GYLON® products it eliminates the need for most customers to qualify the new GYLON EPIX™ products.



Garlock GYLON EPIX™

The perfect solution for imperfect flanges

GYLON EPIX™ is a newly developed family of PTFE gaskets. It is manufactured using a patented, profiled surface based on our proven Fawn, Off-White, and Blue GYLON® to create highly conformable materials for optimum sealing performance.

The innovative GYLON EPIX™, provides superior functional performance by combining the traditional attributes of GYLON® with an innovative surface design. It offers a broader range of applications than traditional PTFE gaskets used in worn and pitted flanges. In addition, GYLON EPIX™ delivers the sealing and load retention properties of $\frac{1}{16}$ " and the conformability of $\frac{1}{8}$ ". The hexagonal profile provides improved compressibility and recovery. The profiled surface reduces the contact area during initial compression to concentrate the compressive force of the flange for improved sealability.

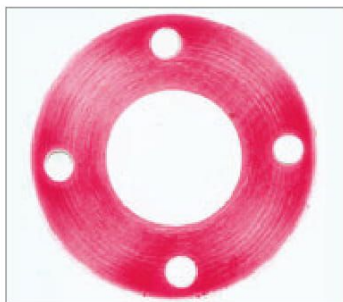
Designed for increased compressibility, GYLON EPIX™ improves performance in misaligned flanges. The consolidation of two thicknesses to one reduces the need to inventory multiple thicknesses. Garlock is dedicated to providing real sealing solutions that meet real world sealing needs. With an improved design, color-coded materials and a single thickness, GYLON EPIX™ makes sealing easier.

GYLON EPIX™ has been awarded in excess of 15 patents.

FEATURES AND BENEFITS

- » One thickness does the job of two.
- » Seal performance and load retention equal of $\frac{1}{16}$ ".
- » Compressibility and forgiveness/conformability of $\frac{1}{8}$ ".
- » Patented hexagonal profile creates superb sealing and ability to conform to imperfect flange surfaces.
- » Same materials as traditional GYLON®.

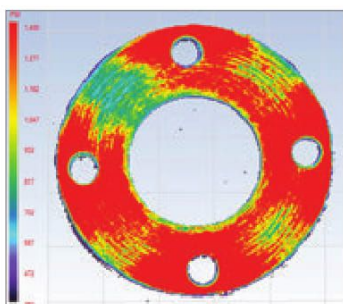
THE GYLON EPIX™ DIFFERENCE



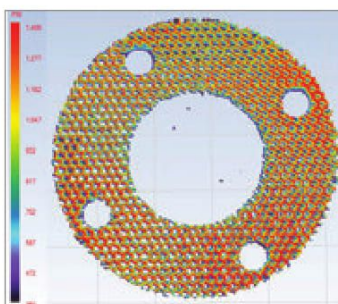
Traditional GYLON®



GYLON EPIX™



Traditional GYLON®



GYLON EPIX™

GYLON EPIX™ and a traditional full face gasket were installed in a 3"-150# flat face flange at 120 ft.lbs. with pressure sensitive film. The film revealed that the traditional material saw heavier loading-near and around the bolts, and lighter loading at the points furthest from the bolts. The GYLON EPIX™ was able to distribute the load more evenly and prevent the low loading phenomenon.

The pressure sensitive film was then analyzed with special software that translate the various shades of red into a full color spectrum that provides a better visualization of the stresses that were developed on each of the gaskets. Again, while the traditional gasket saw areas of lower stress (green and blue areas), the hexagonal pattern in the GYLON EPIX™ concentrated and distributed the stress more evenly across the entire gasket.

Garlock GYLON EPIX™

Gasket Simplification

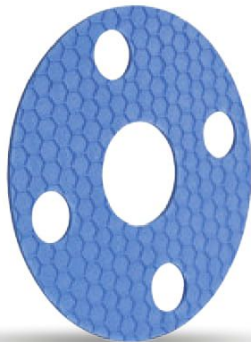


GYLON EPIX™ STYLE 3500 EPX

GYLON EPIX™ Style 3500 EPX is a high performance, silica filled PTFE sheet material designed for use with strong acids, solvents, hydrocarbons, and other aggressive media. Style 3500 EPX withstands a wide range of chemicals for extended service in a wide variety of applications.

APPLICATIONS

- » Strong Acids
- » Solvents
- » Hydrocarbons
- » Water
- » Steam
- » Chlorine
- » Cryogenics



GYLON EPIX™ STYLE 3504 EPX

GYLON EPIX™ Style 3504 EPX is a high performance, aluminosilicate microsphere filled PTFE sheet material designed for use in moderate concentrations of acids, and caustics, as well as hydrocarbons, refrigerants, and more.

APPLICATIONS

- » Moderate concentrations of acids and some caustics
- » Hydrocarbons
- » Solvents
- » Water
- » Refrigerants
- » Cryogenics
- » Hydrogen peroxide



GYLON EPIX™ STYLE 3510 EPX

GYLON EPIX™ Style 3510 EPX is a high performance, barium sulfate filled PTFE gasketing material. Style 3510 EPX is designed for use where initiating and maintaining an extremely tight seal is critical; these applications include: strong caustics and moderate acids, chlorine, gases, water, steam, hydrocarbons and cryogenics.

APPLICATIONS

- » Strong caustics
- » Moderate acids
- » Chlorine
- » Gases
- » Monomers
- » Steam
- » Hydrocarbons
- » Cryogenics & aluminum fluoride

TECHNICAL DATA

GENERAL SEALING CHARACTERISTICS

	Style 3500 EPX	Style 3504 EPX	Style 3510 EPX
MATERIAL PROPERTIES			
Color	Fawn	Blue	Off-White
Composition	PTFE w/ silica	PTFE w/ aluminosilicate	PTFE w/ barium sulfate
Temperature range			
Minimum:	-450°F (-268°C)	-450°F (-268°C)	-450°F (-268°C)
Ideal Operating Limit:	400°F (204°C)	400°F (204°C)	400°F (204°C)
Maximum:	See Pressure/Temperature Ratings graph		
Pressure			
Ideal Operating Limit:	750 psig (52 bar)	750 psig (52 bar)	750 psig (52 bar)
Maximum:	See Pressure/Temperature Ratings graph		
TYPICAL PHYSICAL PROPERTIES			
Load Retention (DIN 52913)	50%	50%	50%
Compressibility (ASTM F 36)	47%	52%	43%
Recovery (ASTM F 36)	17%	25%	18%
Tensile strength (ASTM D 1708)	2,000 psi (13.8 N/mm ²)	2,000 psi (13.8 N/mm ²)	2,000 psi (13.8 N/mm ²)
DESIGN & PERFORMANCE VALUES			
Design Factors (ASTM F3149)			
"m" factor:	2.5	2.5	2.5
"y" factor:	2,000 psi (13.8 MPa)	2,000 psi (13.8 MPa)	2,000 psi (13.8 MPa)
Gasket constants (ASTM ROTT)			
Gb:	174 psi	76 psi	248 psi
a:	0.424	0.508	0.368
Gs:	2.03 psi	13.6 psi	0.939 psi
Hot Blowout (ASTM HOBT2)			
Rating at 435 psig:	530°F (277°C)	432°F (222°C)	475°F (246°C)
SEALING CHARACTERISTICS			
Sealability (ASTM F 37 B) Fuel A:*			
Internal pressure = 9.8 psig (0.7 bar) Gasket load = 1000 psi (6.9 MPa)	0.2 ml/hr.	0.2 ml/hr.	0.2 ml/hr.
Sealability (ASTM F 37 B) Nitrogen*			
Internal pressure = 30 psig (2 bar) Gasket load = 3000 psi (20.7 MPa)	0.25 ml/hr.	0.15 ml/hr.	0.2 ml/hr.
Gas permeability (DIN 3535/6) mg/m-sec	<0.0005	<0.0005	<0.0005
Gas permeability (DIN 3535/4) cc/min	<0.006	<0.006	<0.006

*0.2" ID x 1.20" OD test gasket size

AVAILABLE SIZES

	Style 3500 EPX	Style 3504 EPX	Style 3510 EPX
Thickness - inch (mm)	3/32" (2.4mm)	3/32" (2.4mm)	3/32" (2.4mm)
Tolerance - inch (mm)	+/- 0.008 (0.2mm)	+/- 0.008 (0.2mm)	+/- 0.008 (0.2mm)
Sheet Sizes - inch (m)	60" x 60" (1.5m x 1.5m)	60" x 60" (1.5m x 1.5m)	60" x 60" (1.5m x 1.5m)

GYLON® Styles 3500 to 3510

Benefits

Tighter seal

- Improved performance over conventional PTFE
- Reduced product loss and emissions

Reduced creep relaxation

- Unique manufacturing process minimizes cold flow problems typical of skived and expanded PTFE sheets
- Excellent bolt torque retention

Chemical resistance

- Withstands a wide range of chemicals for extended service life in a wide variety of applications

Cost savings

- Cuts operational costs through reduced:
 - Fluid loss
 - Energy consumption
 - Maintenance costs
 - Inventory costs
 - Waste

Largest sheet sizes*

- Offers some of the largest sheet sizes in the industry
- Improved material utilization reduces waste

Branding and color coding

- Easy identification of superior GYLON® products
- Reduces misapplication and use of unauthorized, inferior substitutes

* 60" x 60" (1524 mm x 1524 mm), 70" x 70" (1778 mm x 1778 mm), 60" x 90" (1524 mm x 2286 mm)

Media

GYLON® 3500: Strong acids (except hydrofluoric), solvents, hydrocarbons, water, steam, chlorine, and cryogenics. Conforms to FDA regulations. (For oxygen service, specify "Style 3502 for oxygen service.")

GYLON® 3504: Moderate concentrations of acids and some caustics, hydrocarbons, solvents, water, refrigerants, and cryogenics. Conforms to FDA regulations. (For oxygen service, specify "Style 3505 for oxygen service.")

GYLON® 3510: Strong caustics, moderate acids, chlorine, gases, water, steam, hydrocarbons, and cryogenics. Conforms to FDA regulations. (For oxygen service, specify "Style 3503 for oxygen service.")

Thermally Bonded GYLON®

Benefits

Effective seal

- Patented bonding process produces large gaskets without dovetailed joints that permit leakage
- GYLON® material provides the excellent chemical resistance of PTFE without creep relaxation and cold flow problems

Versatile

- Ideal for corrosive applications with extra-large flanges
- Styles 3500, 3504, 3510, HP 3560, HP 3561, 3565, and 3594 can all be welded using this process

Style 3535 Joint Sealant Benefits

Chemical resistance

- Pure PTFE is chemically inert, withstands a wide range of chemicals
- Conforms to FDA regulations

Easy to install

- Continuous length on spools is easily cut and formed
- Strong adhesive backing aids installation on narrow or hard-to-reach Flanges
- Available in widths from 1/8" to 1"

Typical Physical Properties

Sealability	(ASTM F37B) ¹	ml/hr	0.1
Gas Permeability	(DIN 3535 Part 4) ²	cc/min.	0.05
Temperature	-450°F (-268°C) to 500°F (260°C)		
Pressure	800 psig max.		

Notes:

¹ ASTM F37B Sealability, milliliters/hour (1/4" thick) ASTM Fuel A (isooctane):
Gasket load: 3,000 psi (20.7 N/mm²), Internal pressure: 30 psig (2 bar)

² DIN 3535 Part 4 Gas Permeability, cc/min. (1/4" thick) Nitrogen:
Internal pressure: 580 psig (40 bar), Gasket load: 4,640 psi (32 N/mm²)

GYLON® Style 3545



Benefits

Tighter seal

- Highly compressible PTFE outer layers seal under low bolt load—suitable for many flat face and glass-lined flanges*
- Compressible layers conform to surface irregularities, especially on warped, pitted or scratched flanges
- Rigid PTFE core reduces cold flow and creep normally associated with conventional PTFE gaskets

Excellent chemical compatibility

- Pure PTFE withstands a wide range of chemicals

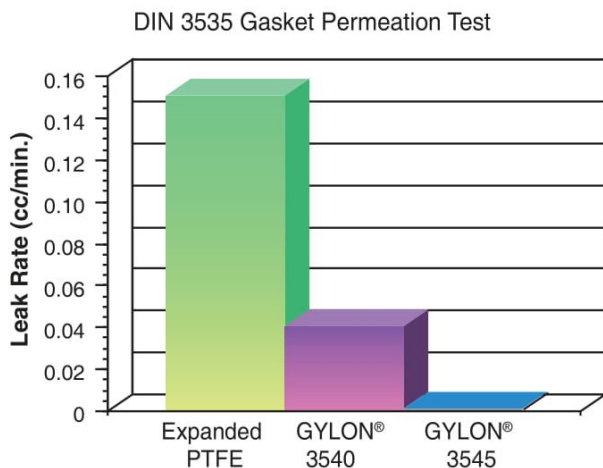
Easy to cut and install

- Soft PTFE can be cut easily from larger sheets, reducing inventory costs and expensive downtime
- Rigid PTFE core facilitates installation, especially on large diameter flanges and hard-to-reach areas

GYLON® Style 3540

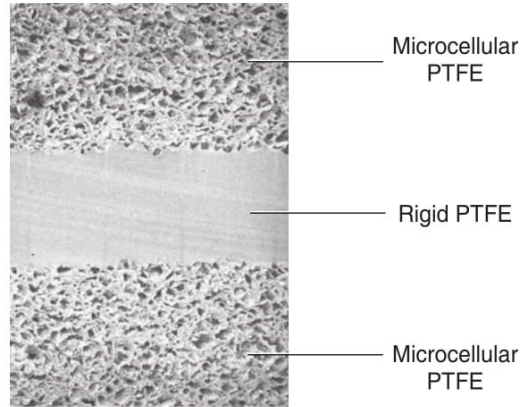
- Pure microcellular PTFE
- Similar to Style 3545, but without rigid core
- Ideal for wavy, warped, pitted, or scratched flanges, and for many types of flat face* flanges

Test Results



Note the dramatically reduced leakage of GYLON® 3540 and 3545. Average of three tests, using 580 psig nitrogen with 4,640 psi gasket load according to DIN 3535 requirements. All samples 1/16" (1.6 mm) thick.

Configuration

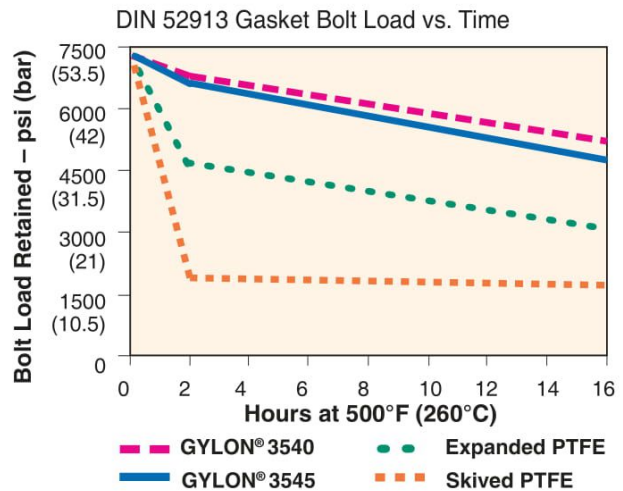


Cross-sectional view under electron microscope
All layers manufactured using proprietary GYLON® process—thermally fused layers, without the use of adhesives

Media

GYLON® 3540: Strong caustics, strong acids, hydrocarbons and chlorine, cryogenics. Conforms to FDA regulations.

GYLON® 3545: Strong caustics, strong acids, hydrocarbons, chlorine and cryogenics and glass-lined equipment. Conforms to FDA regulations.



High bolt load retention of GYLON® 3540 and 3545, especially at high temperatures, indicates gasket is less likely to incur gross leakage (blowout).

* For flat face flanges, a minimum compressive stress of 1,500 psi (10.3 N/mm²) is recommended on the contacted gasket area for 150 psig (1.0 N/mm²) liquid service. Consult with the flange manufacturer to confirm that adequate compressive stress is available.

GYLON® Gasketing

Typical Physical Properties*

GYLON® Styles	3500	3504	3510	3522	3540	3545
Color	Fawn GYLON®	Blue GYLON®	Off-white GYLON®	GYLON® Diaphragm	White GYLON®	White GYLON®
Composition	PTFE with silica	PTFE with glass microspheres	PTFE with barium sulfate	PTFE	Microcellular PTFE	Microcellular PTFE
Temperature ¹ Minimum	-450°F (-268°C)	-450°F (-268°C)	-450°F (-268°C)	+500°F (+260°C)	-450°F (-268°C)	-450°F (-268°C)
Cont. max.	+500°F (+260°C)	+500°F (+260°C)	+500°F (+260°C)		+500°F (+260°C)	+500°F (+260°C)
Pressure, psig	1,200	800	1,200	Consult Engineering	1,200	1,200
Cont. max. ¹ (bar)	(83)	(55)	(83)		(83)	(83)
P x T, max. ¹ 1/32", 1/16" (0.8 mm, 1.6 mm)	350,000 (12,000)	350,000 (12,000)	350,000 (12,000)	—	350,000 (12,000)	350,000 (12,000)
psig x °F 1/8" (bar x °C) (3.2 mm)	250,000 (8,600)	250,000 (8,600)	250,000 (8,600)		250,000 (8,600)	250,000 (8,600)
Sealability						
ASTM Fuel A ml/hr (ASTM F37B) ³	0.22	0.12	0.04	—	0.25	0.15
Gas Permeability cc/min. (DIN 3535 Part 4) ⁴	< 0.015	< 0.015	< 0.015	—	< 0.015	< 0.015
Creep Relaxation % (ASTM F38)	18	40	11	35	10	15
Compressibility Range (ASTM F36) %	7-12	25-45	4-10	20-25	70-85	60-70
Recovery % (ASTM F36)	>40	>30	>40	>50	>8	>15
Tensile Strength psi (ASTM D1708) (N/mm ²)	2,000 (14)	2,000 (14)	2,000 (14)	5,000 (34)	—	—
Flammability	Will not support flame					
Bacterial Growth	Will not support					

Notes:

- Based on ANSI RF flanges at our preferred torque. When approaching maximum pressure, temperature or 50% of maximum P x T, consult Khong Lieng. For Styles HP 3560 and HP 3561, consult Khong Lieng if approaching maximum temperature, or 50% of maximum pressure or P x T.
- For 3565, HP 3560 and HP 3561, 1/16" thickness only; for 3535, 1/4" thickness only.
- ASTM F37B Sealability, milliliters/hour (1/32" thick)
ASTM Fuel A (isooctane):
Gasket load = 1,000 psi (7 N/mm²),
Internal pressure = 9.8 psig (0.7 bar)
- DIN 3535 Part 4 Gas Permeability, cc/min. (1/16" thick)
Nitrogen: Internal pressure = 580 psig (40 bar),
Gasket load = 4,640 psi (32 N/mm²)

This is a general guide and should not be the sole means of selecting or rejecting this material. ASTM test results in accordance with ASTM F-104; properties based on 1/32" (0.8mm) sheet thickness, except Style 3565, based on 1/16" (1.6mm).

* Values do not constitute specification limits

WARNING:

Properties/applications shown throughout this brochure are typical. Your specific application should not be undertaken without independent study and evaluation for suitability. For specific application recommendations consult Khong Lieng. Failure to select the proper sealing products could result in property damage and/or serious personal injury.

Performance data published in this brochure has been developed from field testing, customer field reports and/or in-house testing.

While the utmost care has been used in compiling this brochure, we assume no responsibility for errors. Specifications subject to change without notice. This edition cancels all the previous issues. Subject to change without notice.

GARLOCK is a registered trademark for packings, seals, gaskets, and other products of Garlock.

	HP 3560	HP 3561	3565	3594
	Fawn inserted GYLON®	Off-white inserted GYLON®	ENVELON® GYLON®	Green Gen2™ GYLON®
	GYLON® with perforated 316LSS insert	GYLON® with perforated 316LSS insert	PTFE with glass	PTFE with glass filler
	— — +500°F (+260°C)	— — +500°F (+260°C)	-450°F (-268°C) +500°F (+260°C)	-450°F (-268°C) +500°F (+260°C)
	2,500 (172)	2,500 (172)	1,200 (83)	800 (55)
	700,000 (25,000) 450,000 (15,000)	700,000 (25,000) 450,000 (15,000)	350,000 (12,000) 250,000 (8,600)	350,000 (12,000) 250,000 (8,600)
	0.2 ²	0.1 ²	0.33 ²	0.50
	< 0.015 ²	< 0.015 ²	< 0.015 ²	< 0.015
	20 ²	20 ²	35 ²	30
	4-9 ² >45 ²	3-7 ² >50 ²	35-50 ² >35 ²	10-20 >45
	5,000 ² (34)	5,000 ² (34)	1,800 ² (13)	2,000 (14)
	Will not support flame			
	Will not support			



Test Data



Before

Compression at 2,000 psi (14 N/mm²)
for 1 hour at 500°F (260°C)

After

◀ Note the uneven cold flow
shown by conventional PTFE.



NON-ASBESTOS Gasket



NIPPON VALQUA INDUSTRIES, LTD.

VALQUA No. MF300/GF300/SF300

These gaskets have excellent chemical resistance, heat resistance, are easy to handle and do not harden easily because these gaskets use PTFE as binders. The gaskets do not contain any rubber, and retightening is possible since deterioration with age and hardening does not occur.



BRIGHTHYPER™

VALQUA No.
MF300

With using special methods and materials, these non asbestos sheet gaskets have enhanced brightness level and chemical resistance. These are applicable for both acid and alkali, and have long-term stability for high temperature like GF300 and SF300.

Suitable fluids	Water, seawater, hot water, steam, air, aqueous solution of strong alkaline salt, oils, alcohol, aliphatic solvent and its vapor, air, and general gases
Unsuitable fluids	Polymerizable monomer
Applications	Joint sections of cover flanges and nozzles and the like for pipe flanges, valve bonnets, towers & tanks, ovens, pressure vessels and heat exchangers used in various factories including power stations, oil refineries, steel plants and shipyards
Dimensions	〈Width × Length〉 (mm) 1270 × 1270 (t1.5、t3.0) 〈Color type〉 white 〈Print color〉 no-printed



■ Design data ■

▼Recommended tightening stress

Tightening stress is defined as the pressure required under standard conditions without consideration to the opening force due to internal fluid.

Fluid	Recommended tightening stress (MPa)
Liquid	25.5
Gas	35.0

▼Available ranges

Temperature and pressure classifications show individual service limits.

Temperature (°C)	Pressure (MPa)
-200~300	3.5

▼m,y values

The m, y values for Compressed Fiber Sheets defined in Appendix G of JIS B 8265 can be applied to the m, y values of High Performance Non-Asbestos Sheets.

Thickness (mm)	Gasket factor "m"	Minimum design seating stress "y" (N/mm ²)
3.0	2.00	11.0
1.5	2.75	25.5
1.0	3.50	44.8

Features

- ▶ Free from hardening deterioration and aging due to heat.
- ▶ Retightening is possible as no hardening occurs.
- ▶ Applicable to a wider variety of fluids compared to other Compressed Fiber Sheet.
- ▶ No sticking to flanges.



BLACKHYPER™

VALQUA No.
GF300

The use of flexible resin binders results in improved properties against brittleness and damages compared to expanded graphite sheet gaskets.

Unsuitable fluids

Oxidizing acids and substances susceptible to burn such as oxygen, polymerizable monomer, strong alkali, gas susceptible to burn and toxic gas

Applications

Joint sections of cover flanges and nozzles and the like for pipe flanges, valve bonnets, towers & tanks, ovens, pressure vessels and heat exchangers used in various factories including power stations, oil refineries, steel plants and shipyards

Dimensions

〈Width × Length〉 (mm)
1270 × 1270 (t1.0, t1.5)
1500 × 1500 (t2.0, t3.0)

〈Color type〉 black

〈Print color〉 black



WHITEHYPER™

VALQUA No.
SF300

WHITEHYPER™ can provide the same performance as GF300 and because it has no black material it is good for using when white lines are preferable and has a wide range of other applications.

Unsuitable fluids

Polymerizable monomer, strong alkali, and toxic gas

Applications

ConnectionJoint sections of cover flanges and nozzles and the like for pipe flanges, and valve bonnets, of cover flanges and nozzles in towers & tanks, ovens, pressure vessels and heat exchangers used in various factories including power stations, oil refineries, iron workssteel plants, and shipyards

Dimensions

〈Width × Length〉 (mm)
1000 × 1000 (t1.5)
1270 × 1270 (t2.0, t3.0)

〈Color type〉 off-white

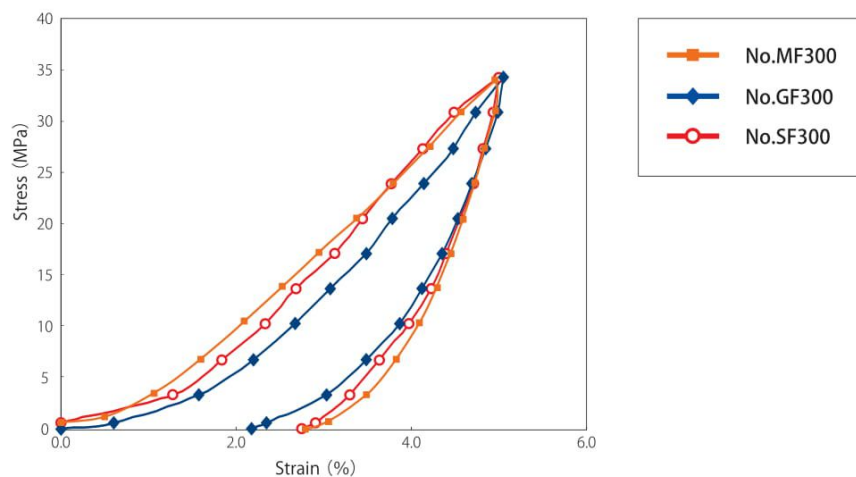
〈Print color〉 green



Conforms to the Food Sanitation Act and standards for food and additives

Stress strain characteristics of High Performance Non-Asbestos Sheet

(Dimension of test piece: JIS 10K 25A t=1.5mm)



VALQUA No. 6502 / 6500 / 6500AC / 6503 / 6503AC

Compressed Non-Asbestos Fiber Sheets are rolled and vulcanized sheet type gasket materials, in which special rubber binders and a small amount of filler material are mixed with organic and inorganic fibers.



BLACK SUPER™

VALQUA No.
6502

Calendered gasket material made of selected synthetic organic, inorganic fibers and carbon fiber bonded with special rubber binder using the minimum required amount of organic fiber. It has a wide range of other applications.

Unsuitable fluids	Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas
Applications	Joint areas of steam lines, pipe flanges, valve bonnets and other equipment used in oil refineries and chemical industries
Dimensions	〈Width × Length〉 (mm) 1270 × 1270, 1270 × 3810, 2540 × 3810, 3048 × 3810 〈Thickness〉 (mm) 0.5, 0.8, 1.0, 1.5, 2.0, 3.0 〈Color type〉 gray 〈Print color〉 black



Compressed Non-Asbestos Fiber Sheet for general use

VALQUA No.
6500

These are suitable to be used as Non-asbestos gaskets for pipe flanges and equipment in various industries. The adaptability of these sheets for water apparatus has been confirmed based on JIS S 3200-7.

Unsuitable fluids	Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas
Applications	Pipe flanges, valve bonnets and other equipment used in various industries including oil refineries, chemical industries and ship-yards
Dimensions	〈Width × Length〉 (mm) 1270 × 1270, 1270 × 3810, 2540 × 3810, 3048 × 3810 〈Thickness〉 (mm) 0.4, 0.5, 0.8, 1.0, 1.5, 2.0, 3.0 〈Color type〉 blue 〈Print color〉 black



Anti-corrosion Compressed Non-Asbestos Fiber Sheet

VALQUA No.
6500AC

With reduced amounts of leachable chloride, these Compressed Fiber Sheets have corrosion suppression effect when stainless steel flanges are used for water or water solutions. Surface finishing reduces sticking to the flange.

Unsuitable fluids	Strong acid, strong alkali, and various solvents, inflammable gas, gas susceptible to burn and toxic gas
Applications	Stainless steel pipe flanges, valve bonnets and other equipment used in various industries requiring corrosion resistance.
Dimensions	〈Width × Length〉 (mm) 1270 × 1270, 1270 × 3810, 2540 × 3810 〈Thickness〉 (mm) 1.0, 1.5, 2.0, 3.0 〈Color type〉 blue 〈Print color〉 orange