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NON-AS™ PRODUCTS

"VALQUA" is a compounded word coming from VALUE and QUALITY which is the symbol and motto of the company.

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VALQUA NON-ASBESTOS PRODUCTS

Because of their well-balanced characteristics, asbestos fibers have long been used in various fields as representative inorganic fibers.

In recent years, however, enhanced regulations from the labor health view point are demanding quick replacement with non-asbestos fibers.

In response to such requirements, NIPPON VALQUA INDUSTRIES, LTD. (VALQUA), as an integrated seal manufacturer, has been engaged in the development of highly reliable Non-AS™ Sealing Products that can be used in place of conventional asbestos products.

Now, we have the pleasure of presenting the line-up of asbestos-alternative products that have recently been developed.

Non-AS™: For all asbestos-free products.
VALQUATIGHT™: For the spiral-wound gaskets having a selected asbestos tape for the winding material.
CLEANTIGHT™: For the spiral-wound gaskets having a selected asbestos-free inorganic tape for the winding material.
BLACKTIGHT™: For the spiral-wound gaskets having a selected flexible graphite tape for the winding material.
WHITETIGHT™: For the spiral-wound gaskets having a selected PTFE tape for the winding material.
VALFLON™: For all fluorocarbon resin products.

Cautions regarding the use of VALFLON™
(Fluoro carbon Resin Products)

- These products are not specifically designed and manufactured for use in medical apparatus to be implanted in human bodies or to be in contact with humors or living organisms. So, when planning to use them for such applications, please contact us for consultation.
- When they are to be heated up to 200°C or over, be sure to provide sufficient air discharge and ventilation in order to prevent inhalation of dissolved gases.
- These products shall never be burnt, but shall be disposed of in accordance with the Law for Disposal and Cleaning of Wastes.

INDEX

GASKET

GLAND PACKING

VALQUATEX (Textile products)

Related Products (Tools)

Table Indicating Types and Typical Characteristics of Non-Asbestos Gaskets

Type		Asbestos product (VALQUA No.)	Non-Asbestos product (VALQUA No.)	Product name	Available range[1] Temperature(°C)		Available range[1] Pressure (MPa)	Description	Major application	page
Non-metallic Gasket	Rubber Sheet Gasket		2010	Nitrile Rubber Sheet Gasket	−30～120		0.5	Gasket made by punching rubber sheet.	Pipe flanges, equipment	32
			2010	Chloroprene Rubber Sheet Gasket	−30～120		0.5			
			2010	Ethylene Propylene Rubber Sheet Gasket	−40～150		0.5			
			4010	Fluoro Rubber Sheet Gasket	−15～200		0.5			
			5010	Silicone Rubber Sheet Gasket	−60～200		0.5			
	Synthetic Rubber O-ring		640	Synthetic Rubber O-ring	Depending on material used		30.0	Molded gasket having O-shaped cross section made of various rubber materials. Available pressures may differ depending on groove designs.	Equipment	–
			4640	Fluoro Rubber O-ring	−15～200		30.0			
			5640	Silicone Rubber O-ring	−60～200		30.0			
	Synthetic Rubber Sheet Gasket		2060	Horizontal U-shaped Synthetic Rubber Gasket	Depending on material used		6.0	Self-strained sealing type gasket provided with a reinforcing ring, made by molding synthetic rubber to have a horizontal U-shaped cross section.	Equipment	–
	Rubber Gasket with cloth		16	Rubber Sheet Gasket with cloth	Depending on material used		1.0	Rubber sheet gasket reinforced with fabric, made of NBR, CR and NR. Means are required against infiltration leakage.	Pipe flanges	–
	Graphite Compounded Non-Asbestos Sheet	1500 1500AC 1501 1501AC 930,etc.	GF300	BLACK HYPER™	−200～300		3.5	Unlike conventional Compressed Fiber sheet, these are based on new-concept, composed of graphite and PTFE without using rubber binders.	Pipe flanges, equipment	5
	Compressed Fiber Sheet		6502	Compressed Non-Asbestos Fiber Sheet for high performance general use	−50～214[2]		3.0	Compressed Non-Asbestos Fiber Sheet for general use, with enhanced heat resistance.		7
			6500	Compressed Non-Asbestos Fiber Sheet for general use	−50～183[2]		3.0	Compressed Non-Asbestos Fiber Sheet for general use		
			6500-AC	Anti-corrosion type Compressed Non-Asbestos Fiber Sheet	−50～183[2]		3.0	Anti-corrosion Type Compressed Non-Asbestos Fiber Sheet		
			6503	White Compressed Non-Asbestos Fiber Sheet for high performance general use	−50～214[2]		3.0	White Compressed Non-Asbestos Fiber Sheet for general use		8
			GE200	Graphite Compounded Compressed Non-Asbestos Fiber Sheet	−50～214[2]		3.0	Graphite Compounded moderate price Compressed Fiber sheet having rubber binders, with restricted field of applications.		
			8590TN	NONASUPER™	−200～450		JIS10K	Non-Asbestos Gasket for alternative use of Compressed Fiber sheet.	Pipe flanges, equipment	12
	Fluorocarbon Resin Gasket		7010	VALFLON™ Pure PTFE Gasket	−50～100		0.5	Fabricated PTFE gasket (in principle, for grooved flanges).	Pipe flanges, equipment	14
			7010-EX	New VALFLON™ Pure PTFE Gasket	−50～150		1.0	Fabricated New VALFLON™ gasket.		
			7020	VALQUALON™ Gasket	−200～200		4.0	Low creep type Fluorocarbon Resin Gasket reinforced with special filler material.		
			7026	Black VALQUALON™ Gasket	−200～200		4.0			
			7GP66	VALFLON™ Soft Sheet Gasket	−240～260		2.0	Flexible and highly strong PTFE Sheet Gasket		
	Fluorocarbon Resin Envelope Gasket	7030 Series	N7030(N) Series	Non-Asbestos VALFLON™ Envelope Gasket	−100～150		1.5	Fluorocarbon Resin Gasket using Compressed Non-asbestos Fiber sheet in the core.	Pipe flanges, equipment	17
			N7030(S) Series	Non-Asbestos VALFLON™ Envelope Gasket	−100～200		2.0	Fluorocarbon Resin Gasket using Compressed Non-asbestos Fiber sheet and special felt in the core.		
			N7030(H) Series	Non-Asbestos VALFLON™ Envelope Gasket (high temperature type)	−100～260		3.0	Fluorocarbon Resin Gasket for high temperature use, using VALQUAFOIL™ (expanded graphite) sheet and special felt in the core.		
	Fluorocarbon Resin String Type Gasket		7GS66A	Cord Seal™ <Soft>	−240～260		5.0	String type sealing material made by modifying PTFE to have a marsh mallow shape.	Equipment	20
	Expanded Graphite Sheet Gasket		VF-30	VALQUAFOIL™ Sheet Gasket	−240～400		2.0	Fabricated expanded graphite gasket.	Pipe flanges, equipment	21
			VF-35E	VALQUAFOIL™ Sheet Gasket with thin metallic sheet	−240～400		5.0	Fabricated expanded graphite gasket (foil inserted).		
			VFT-30	VALQUAFOIL™ Sheet Gasket (PTFE-laminated)	−240～300		2.0	Fabricated expanded graphite gasket (PTFE laminated VF-30).		
			VFT-35E	VALQUAFOIL™ Sheet Gasket with thin metallic sheet (PTFE-laminated)	−240～300		5.0	Fabricated expanded graphite gasket (PTFE laminated VF-35E).		
	Rubber Coated Fabric Gasket	214	N214	VALQUATEX Gasket (rubber coated fabric)	400		0.1	Rubber coated glass fiber fabric processed into a specified flat shape.	Manholes, ducts	32
		314	N314	VALQUATEX Gasket (rubber coated ceramic fabric with metallic wire)	800		0.1	Rubber coated ceramic fiber fabric with metallic wire processed into a specified flat shape.		
Semi-Metallic Gasket	Spiral Wound Gasket	590 Series	8590 Series	CLEANTIGHT™	−200～500		30.0	Spiral wound gasket using non-asbestos inorganic paper as filler.	Pipe flanges, equipment	24
			8590L Series	Lined CLEANTIGHT™	−200～600		30.0	Gasket with expanded graphite tape wound into the intermediate section of Cleantight winding.		
			6590 Series	BLACKTIGHT™	−270～450		30.0	Spiral wound gasket using expanded graphite tape as filler.		25
			7590 Series	WHITETIGHT™	−260～300		20.0	Spiral wound gasket using PTFE tape as filler.		
	Metal Jacketed Gasket	510 Series	N510 Series	Non-Asbestos Corrugated Metal Jacketed Gasket	Depending on material used		7.0	Corrugated metal jacketed gasket using non-asbestos heat resisting sheet in the core.	Pipe flanges, equipment	26
		520 Series	N520 Series	Non-Asbestos Flat Metal Jacketed Gasket	Depending on material used		7.0	Flat metal jacketed gasket using non-asbestos heat resisting sheet in the core.	Pipe flanges, equipment	
Metallic Gasket	Metal Flat Gasket		560 Series	Metal Flat Gasket	Depending on material used		14.0	Fabricated metal gasket.	Pipe flanges, equipment	28
	Serrated Gasket		540 Series	Serrated Gasket	Depending on material used		14.0	Concentrical grooved metal gasket.	Pipe flanges, equipment	
	Ring Joint Gasket		550 Series	Ring Joint Gasket	Depending on material used		45.0	Ring Joint Gasket/Used for ring joint seat flanges. Two cross sections available: oval type and octagonal type.	Pipe flanges, equipment	29
	Metal O-ring		3640	Metal Hollow O-ring (basic design)	Depending on material used		7.0	Metal O-ring made by processing thin metallic tube into a specified shape.	Pipe flanges, equipment	30
			3641	Metal Hollow O-ring (Balanced type)	Depending on material used		300.0	For high pressure use, provided with a balancing hole.		
			3645	Trypack™	−270～250		7.0	Metal C-ring with coil springs (coil springs coated with thin metallic sheet).		31
			3645LS	Trypack™ (low tightening stress type)	−270～250		7.0	Possible to seal with lower tightening stress than 3645.		

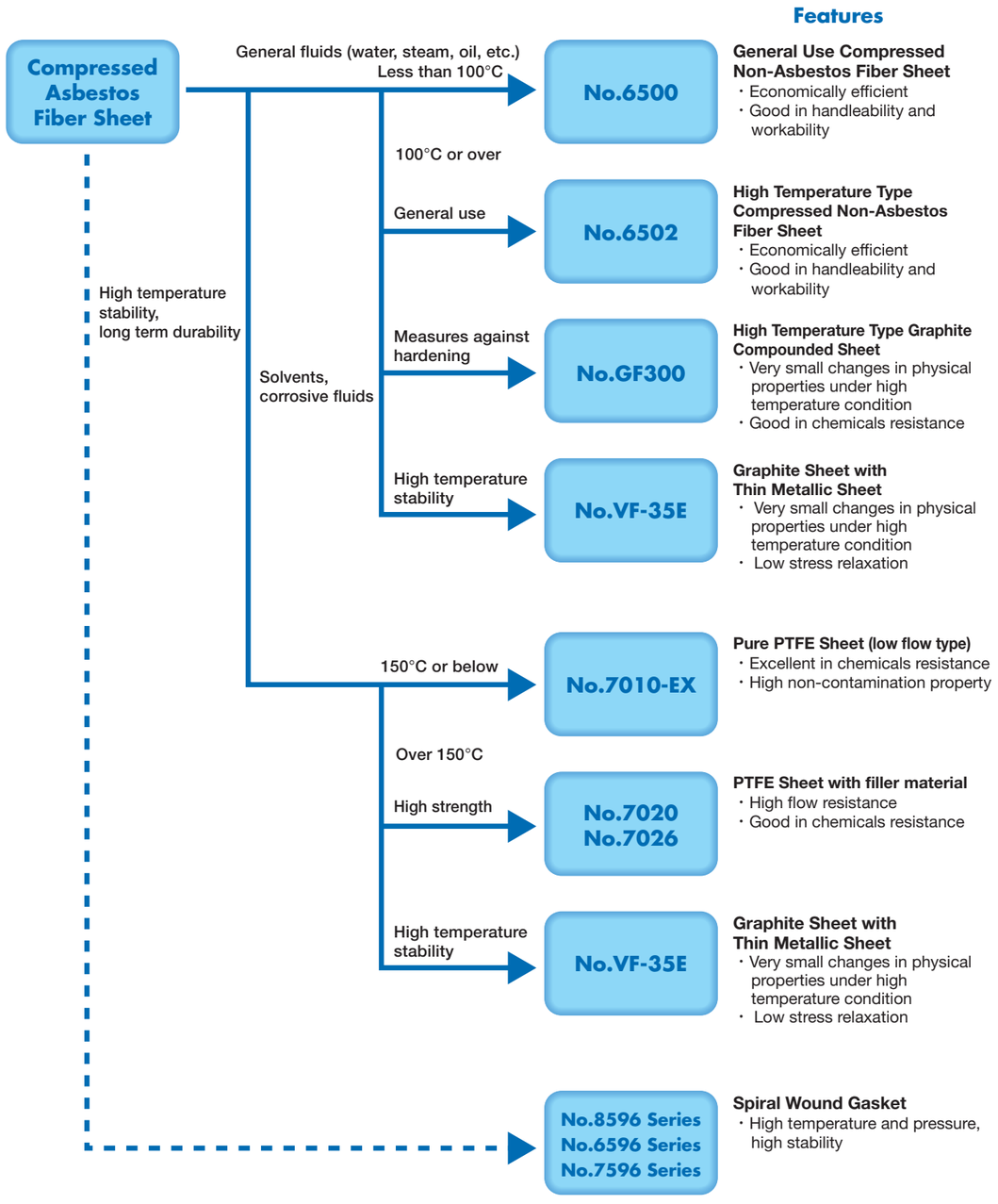
Note (1) Since Available Ranges define only the maximum permissible ranges of temperature and pressure under ideal conditions, any special applications are not covered.
(2) For applications subject to temperatures 100°C or higher, refer to "Notes" on page 9.

Flowchart Indicating Selection of Non-Asbestos Alternatives for Asbestos Products

Non-Asbestos Alternatives for Compressed Asbestos Fiber Sheet/Asbestos Spiral Wound Gaskets

Flowchart for Alternatives for Compressed Asbestos Fiber Sheet

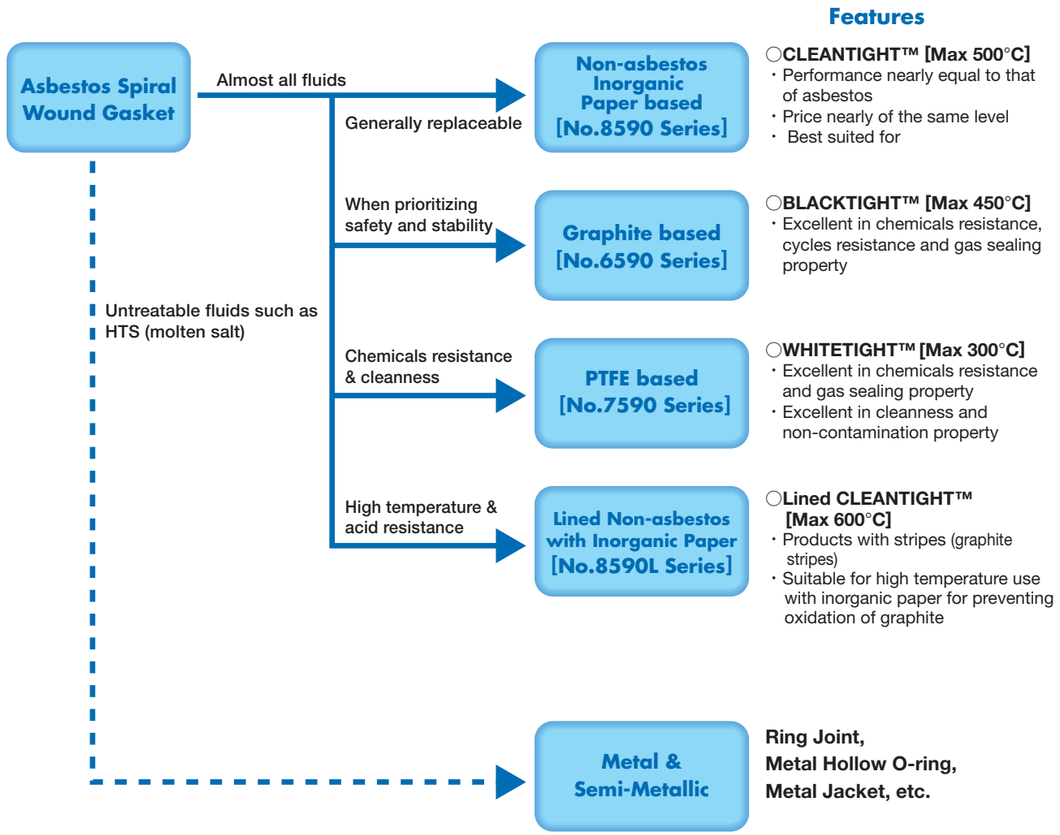
For further details including available ranges, refer to respective pages of this catalogue.



Note: Since this flowchart provides only rough standards, please contact us for final selection.

Flowchart for Alternatives for Asbestos Spiral Wound Gaskets

For further details including available ranges, refer to respective pages of this catalogue.

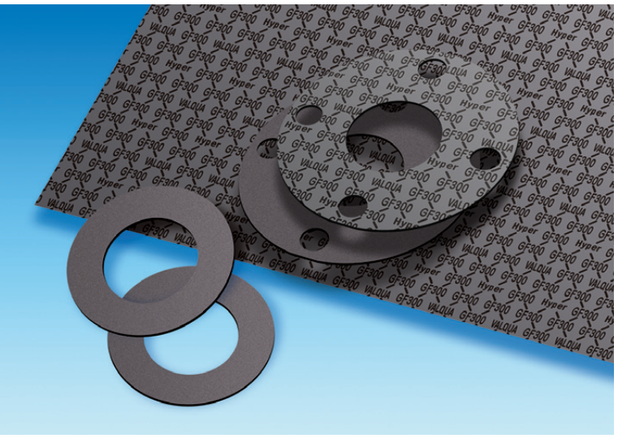


Note: Since this flowchart provides only rough standards, please contact us for final selection.

BLACK HYPER™

VALQUA No.GF300

BLACK HYPER is the ultimate form of sheet gaskets.
Mainly composed of graphite, silica and using PTFE as binders, GF300 is an all-purpose sheet gasket series that is excellent in chemicals resistance and finds various fields of applications subject to wide ranges of temperatures.
Thus, BLACK HYPER is suitable for wide fields of applications as non-asbestos alternatives for Compressed Asbestos Fiber Sheet.



Features

- Free from hardening deterioration and aging due to heat
- No hardening effect allows retightening.
- Applicable to wider variety of fluids compared to other Compressed Fiber Sheet.

New Concept Non-Asbestos Sheet

VALQUA No.
GF300

Being entirely free from rubber, no heat deterioration occurs, thus, GF300 can be used for high temperature applications (heat resisting at 300°C).
The use of flexible resin binders results in improved properties against brittleness and flaw compared to expanded graphite sheet gaskets.

Applicable fluids

Water, seawater, hot water, steam, air, acids (excluding oxidizing acids such as hot, concentrated sulfuric acid and nitric acid), weak alkalis, saline water solution, oils, alcohol, aliphatic solvent and its vapor, as well as liquefied gases

Inapplicable fluids

Oxidizing acids and substances susceptible to burn such as oxygen

Applications

Connections of 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 works, and shipyards

Dimensions

〈Width × length〉(mm)
1270×1270(t 1.0, t 1.5)
1500×1500(t 2.0, t 3.0)
〈Thickness〉1.0, 1.5, 2.0. 3.0 mm
〈Color tone〉Black (print color: black)

■ Design data ■

▼Recommended tightening stress

Tightening stress is defined as a pressure required under standard condition without considering an opening force due to internal fluid.

Fluid	Recommended tightening stress (MPa)
Liquid	25.5
Gas	35

▼m, y values

As for the m, y values of Compressed Non-Asbestos Fiber Sheet, the values for asbestos joint sheets defined in the Appendix 3 to JIS B 8265 can be applied.

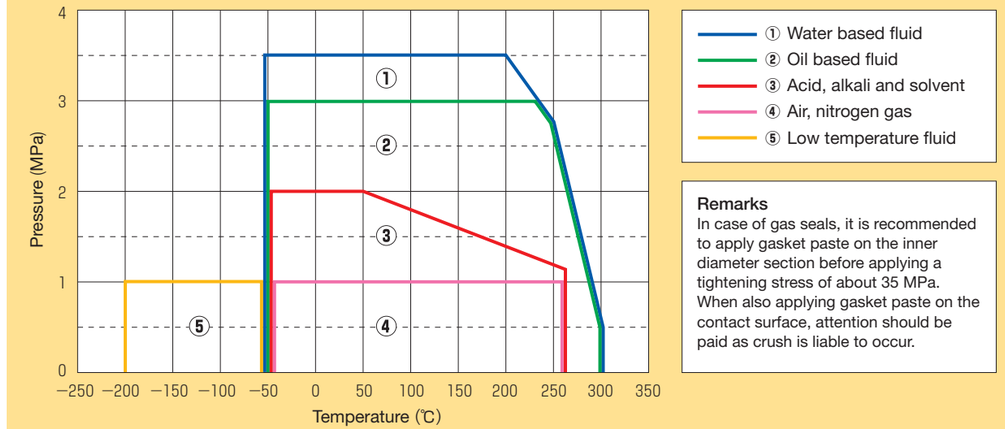
Thickness (mm)	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
3.0 (3.2)	2.00	10.98
1.5 (1.6)	2.75	25.50
1.0 (0.8)	3.50	44.82

▼Available ranges

Temperature and pressure classifications show individual service limit. Maximum pressure varies depending on fluid classification and temperature.

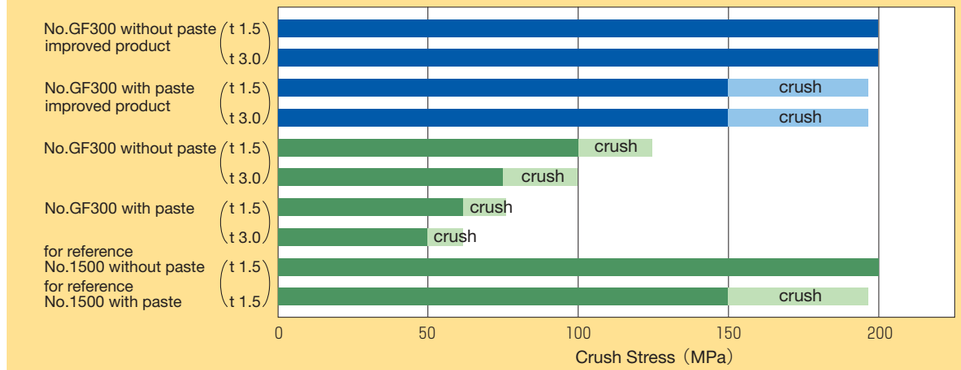
VALQUA No.	Temperature (°C)	Pressure (MPa)
GF300	−200～300	3.5

■ Fluid-wise available ranges ■

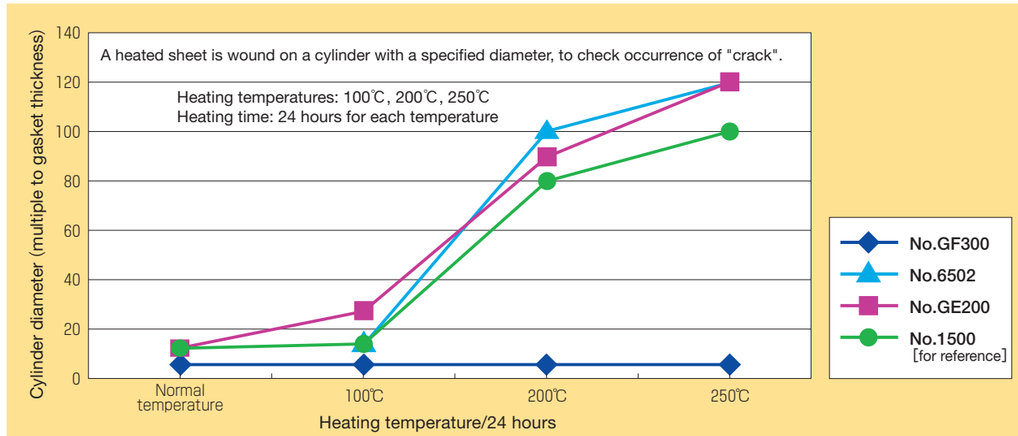


Remarks
In case of gas seals, it is recommended to apply gasket paste on the inner diameter section before applying a tightening stress of about 35 MPa.
When also applying gasket paste on the contact surface, attention should be paid as crush is liable to occur.

■ Crush strength comparison ■



■ Comparison of high temperature hardening properties ■

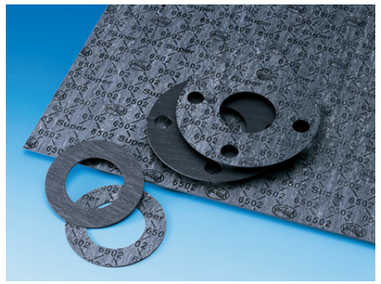


Compressed Non-Asbestos Fiber Sheet

VALQUA No.6502/6500/6500AC/6503/GE200

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

Compressed Non-Asbestos Fiber Sheet Applicable to Wider Fields of Applications



BLACK SUPER VALQUA No. 6502

Compressed Non-Asbestos Fiber Sheet with minimum amount required of organic fiber, while special rubber binder having superior heat resistance is compounded to artificial inorganic and carbon fibers also having excellent heat resistance.

Applicable fluids: Air, water, seawater, hot water, steam, general oils, weak acid, weak alkali, alcohol, as well as various gases

Inapplicable fluids: Strong oxidizing acid, strong alkali, and various solvents

Applications: Junctions 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 tone〉 Grey (print color: black)

General Use Compressed Non-Asbestos Fiber Sheet

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 as water apparatus according to JIS S 3200-7 has been confirmed.

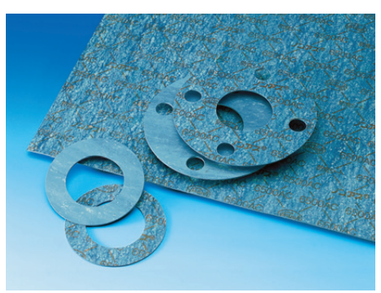
Applicable fluids: Air, water, seawater, hot water, petroleum based oil, neutral salt solution, weak acid, weak alkali, as well as general gases

Inapplicable fluids: Strong oxidizing acid, strong alkali, and various solvents

Applications: Pipe flanges, valve bonnets and other equipment used in various industries including oil refineries, chemical industries and shipyards

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 tone〉 Blue (print color: black)

Anti-corrosion Type Compressed Non-Asbestos Fiber Sheet



VALQUA No. 6500AC

With reduced amount of soluble chlorine, these Compressed Fiber Sheets have corrosion restriction effect when stainless steel flanges are used for water or water solution.

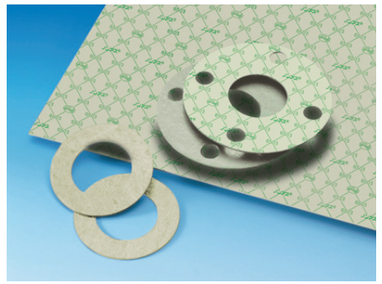
Applicable fluids: Tap water, industrial water, hot water, steam, drain air, as well as general gases

Inapplicable fluids: Strong oxidizing acid, strong alkali, and various solvents

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 tone〉 Blue (print color: orange)

White Compressed Non-Asbestos Fiber Sheet



VALQUA No. 6503

Since black components are removed in the Compressed Fiber Sheet, these are suitable gaskets to be used for applications where inclusion of black foreign substances into the fluid should be avoided.

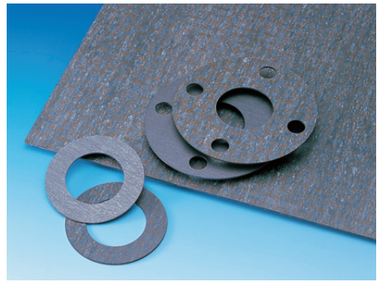
Applicable fluids: Tap water, industrial water, hot water, steam, drain air, as well as general gases

Inapplicable fluids: Strong oxidizing acid, strong alkali, and various solvents

Applications: Applications where inclusion of black foreign substances into the process fluid should be avoided such as in petrochemical industry.

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 tone〉 White (print color: green)

Graphite Based Compressed Non-Asbestos Fiber Sheet with superior handleability



VALQUA No. GE200

These sheet gaskets are composed mainly of graphite and contain reduced amount of rubber composition, wherein the handleability which has been a drawback in conventional graphite sheets is improved.

Applicable fluids: Water, seawater, hot water, steam, air, acid, alkali, salts, water solution, oils, alcohol, aliphatic solvent and its vapor, as well as various gases and liquefied gas

Inapplicable fluids: Aromatic hydrocarbons, ketones, oxidizing acids, and fluid susceptible to burn

Applications: Steam lines in oil refineries and chemical industry

Dimensions:
〈Width × length〉(mm) 1270×1270
〈Thickness〉(mm) 0.5, 1.0, 1.5, 2.0
〈Color tone〉 Black (print color: orange)

■ Design data ■

▼Recommended tightening stress

Tightening stress is defined as a pressure required under standard condition without considering an opening force due to internal fluid.

Fluid	Recommended tightening stress (MPa)
Liquid	25.5
Gas	40

▼m, y values

As for the m, y values of Compressed Non-Asbestos Fiber Sheet, the values for Compressed Asbestos Fiber Sheets defined in the Appendix 3 to JIS B 8265 can be applied.

Thickness (mm)	Gasket factor "m"	Minimum design seating stress "y" (N/mm^2)
3.0 (3.2)	2.00	10.98
1.5 (1.6)	2.75	25.50
1.0 (0.8)	3.50	44.82

▼Available ranges

Temperature and pressure classifications show individual service limit.
※For service conditions exceeding 100°C, the notes on the following page shall be observed.

VALQUA No.	Temperature (°C)	Pressure (MPa)		
		Water based	Oil based	Gas
6500/6500AC	−50～183	3.0	3.0	1.0
6502/6503/GE200	−50～214	3.0	3.0	1.0

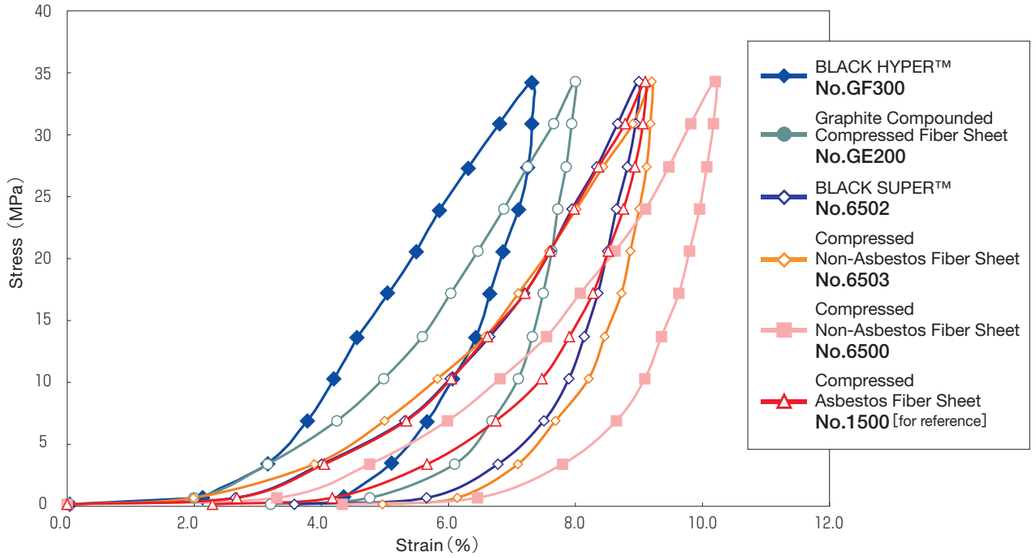
Note)
As for oil gas, solvent and corrosive fluid, separate consultation is required.

Compressed Non-Asbestos Fiber Sheet

VALQUA No.6502/6500/6500AC/6503/GE200

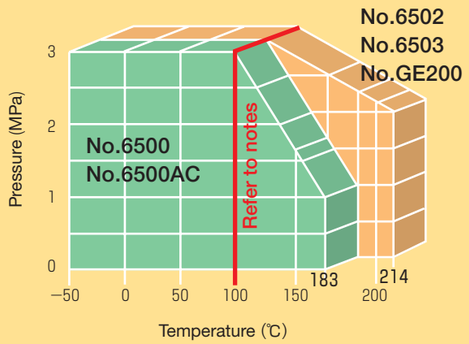
▼ Stress strain characteristics

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

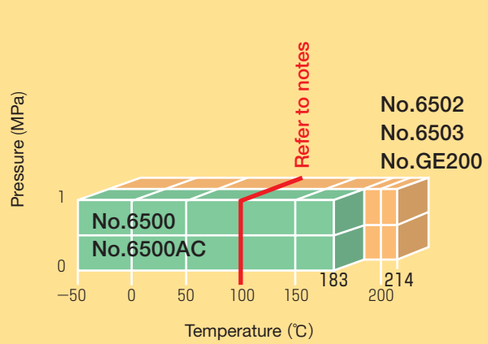


■ Fluid-wise temperature & pressure ranges ■

Water based fluids (water, hot water, steam, etc.)
Oil based fluids (general oil etc.) Note 1



Gas based fluids (air, nitrogen, inert gas, etc.) Note 2



Note (1) Oil gas, solvent and corrosive fluid are not included, thus requiring separate consultation.
(2) Inflammable gas, gas susceptible to burn and toxic gas are not included, thus requiring separate consultation.

▼ Notes

If joint sheets No.6502, No.6503, No.6500, No.6500AC and No.GE200 are used under conditions subject to temperatures exceeding 100°C, gaskets may break due to hardening, thus, the following notes shall be observed:

① Gasket thickness shall be 1.5 mm or less.
② Gasket paste shall be applied (No.5, No.5M, No.6, No.6M, seal paste).
③ Tightening stress shall be 30 MPa or higher.
④ These joint sheets shall be used for places unlikely to bear piping load, or for places facilitating replacement.
⑤ Whenever possible, use ring gaskets. Full face gaskets have more surface area, requiring additional compressive load on the gasket.

■ Comparison of physical properties ■

Item	No.GF300		No.6502		No.6503		No.6500		No.GE200		No.1500 [for reference]	
Thickness (mm)	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	2.0	1.5	3.0
Physical Properties												
Tensile strength (across grain) (MPa)	10.3	10.5	13.1	12.5	19.2	18.1	17.0	15.3	10.5	9.9	28.4	27.3
Compressibility (34.3MPa) (%)	7	6	9	10	9	6	10	10	8	8	9	8
Recovery (34.3MPa) (%)	40	37	67	64	60	61	57	55	65	56	61	55
Flexibility with grain in multiple to thickness	<2	<2	11	12	10	10	9	9	20	21	11	12
Density (kg/m^3)	2307	2214	1761	1759	1803	1857	1810	1813	1902	1921	1880	1924
Oil resistance 〈IRM903 OIL 150℃×5h〉												
Tensile strength loss (across grain) (%)	−8.9	7.6	9.2	9.6	13.0	0	16.7	−1.1	6.7	3.0	26.8	16.8
Thickness increase (%)	0.9	0.1	1.3	1.0	2.1	0.6	2.2	0.9	1.3	0.3	20.1	12.4
Weight increase (%)	0.7	0.6	4.4	3.0	4.2	1.7	3.9	2.2	4.4	1.7	24.9	10.2
Fuel oil resistance 〈JIS fuel oil B RT × 5h〉												
Thickness increase (%)	1.1	0.3	4.3	2.6	5.4	2.3	5.6	2.8	3.3	2.5	14.5	10.6
Weight increase (%)	1.8	1.2	6.7	6.0	7.0	3.2	5.6	4.0	4.9	2.8	9.4	8.2
Creep relaxation 〈ASTM F38, tightening stress 20.6 MPa〉												
100℃×22h (%)	22.3	42.8	23.5	37.8	27.3	45.0	27.5	47.0	28.7	35.3	31.0	46.1
200℃×22h (%)	45.3	72.3	41.1	65.5	43.6	60.5	52.0	78.8	43.9	53.4	39.7	53.4
Sealability 〈ϕ46×ϕ67, thickness t 1.5, tightening stress 19.6 MPa, internal pressure 0.98 MPa, N_2 gas〉												
With paste ($Pa \cdot m^3/s$)	1.7×10^{-5} or below		3.0×10^{-5}		2.0×10^{-4}		6.0×10^{-4}		1.0×10^{-4}		6.0×10^{-5}	
Without paste ($Pa \cdot m^3/s$)	4.0×10^{-4}		1.5×10^{-4}		1.0×10^{-3}		3.0×10^{-3}		7.0×10^{-4}		1.5×10^{-4}	

Note) All the above physical properties are measured examples, and not regulatory values.

Compressed Non-Asbestos Fiber Sheet

VALQUA No.6502/6500/6500AC/6503/GE200

■ Notes to be observed in design and usage ■

If used under conditions exceeding 100°C, Compressed Non-Asbestos Fiber Sheet Gasket using rubber may break due to hardening. The following summarizes the points to be observed in the design, storage and installation, in order to ensure proper use of Compressed Non-Asbestos Fiber Sheet.

▼ Notes to be observed in design

1. Determine the number and size of bolts and gasket dimensions to provide gaskets with sufficient tightening stress, and also check the flange construction and bolt arrangement to ensure uniform distribution of tightening stress.
2. Surface finish of the flange shall be about 6.3 Ra (reference: 25 S). Excessive smooth finish may cause slippage on the gasket, leading to crush.
3. Determine the construction, material and dimensions so as to prevent warpage or bowing of the flange at the time of application of internal pressure.
4. Consideration shall be given in design to prevent application of excessive thermal stress or repetitive bending stress on the joints.
5. Piping design shall not allow accumulation of drain or scale at the flange sections.
6. Consideration shall be given to prevent transmission of vibration to the joints.

▼ Notes to be observed in storage

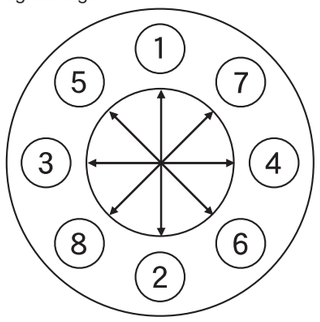
1. Store these joint sheets in a cool and dark place not subject to direct sunshine, fresh air or ozone.
2. Storage selected shall be in a clean environment, free from dust as well as from high temperature & high humidity and corrosive atmosphere.
3. If hanged on nails or the like, gaskets may suffer breakage or permanent deformation, so that, as far as practicable, they should be put in a can or wrapped in a polyethylene bag and stored in a paper box.
4. Large sized gaskets shall be put between larger plates without rolling and placed horizontal for storage.

▼ Notes to be observed before installation

1. Ensure perpendicularity of the flange and the pipe.
2. Shaft alignment of the mating flanges shall be ensured.
3. Check for any deformation of flanges.
4. When changing only gaskets for the existing equipment or at a piping joint, clean the junctions and check for any damage, and repair, if required.
5. Get off the rust at the flange surface, and repair any dents and dings.
6. Pay attention not to give damage to the gaskets during storage up to installation, or during installation work.

▼ Notes to be observed during installation work

1. When installing gas seals, refer to the following "Countermeasures against permeation leakage".
2. Install the gaskets in a clean environment so as to prevent entry of foreign matters between the gaskets and the flanges.
3. Flange bolts No.1 to 8 as shown on the figure shall be gradually tightened in this order at a time, and repeat this process in four to five steps, so as to finally ensure uniform tightening.



4. When tightening, pay attention to prevent the occurrence of crush.
5. Especially when using gaskets of 150 Lb, 1B or smaller, or those of smaller gasket width, care shall be given as gasket stress is likely to be excessive.
6. At the time of load up or restarting, check for any loose bolts.
7. If retightening of gaskets that have once experienced leakage failed in preventing leakage, replace them with new ones.

▼ Countermeasures against permeation leakage

Since permeation leakage also occurs in Compressed Non-Asbestos Fiber Sheet as in the case of conventional asbestos joints, the following points shall be observed for gas seals.

1. Apply gasket paste on the cut surface of the gasket inner diameter side. Application of gasket paste on the contact surface between the gasket and the flange is likely to cause crush, so that attention is required in tightening, and also the amount of gasket paste shall be minimized.
2. Maintain the tightening stress to be around 35 MPa. Also use ring gaskets instead of full-face gaskets, so as to ensure proper tightening stress.
3. Use gaskets with a minimum thickness as far as possible (1.5 mm or less).

VALQUA No.8590TN

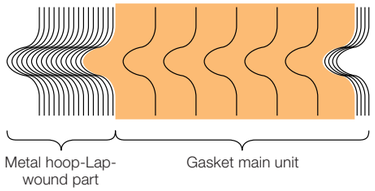
NONASUPER™ are manufactured by winding metal strips (SUS304) around the periphery of basic 3.2 mm thick spiral wound gaskets. The lap wound section of this metal strips around the periphery facilitates centering at the time of gasket installation, and also enhances the strength of the gasket main body. Provided with better sealing characteristic than conventional Compressed Asbestos Fiber Sheet, these NONASUPERs can be used with the same level of tightening force as that of Compressed Asbestos Fiber Sheet.

NONASUPER™

VALQUA No. 8590TN	These are the best suited gaskets to be used for high temperature utility lines as alternatives for Compressed Asbestos Fiber Sheet（heat resisting at 450°C）.
Applicable fluids	Water, hot water, steam
Applications	Standard pipe flanges in various factories
Dimensions	JIS 10K、10A up to 200A 〈Thicknes〉3.2mm 〈Filler color〉Cream
Composition	Hoop material : SUS304 Filler material : Non-asbestos inorganic paper

Features

- Main body made of Non-Asbestos filler having durability and heat resistance.
- Applicable to steam lines without problem.
- Can withstand impact pressure such as water hammer.
- Longer life than Compressed Fiber Sheet.



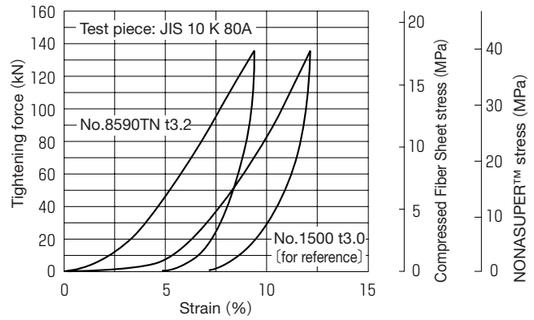
■ Design data ■

▼ Available ranges and tightening stress

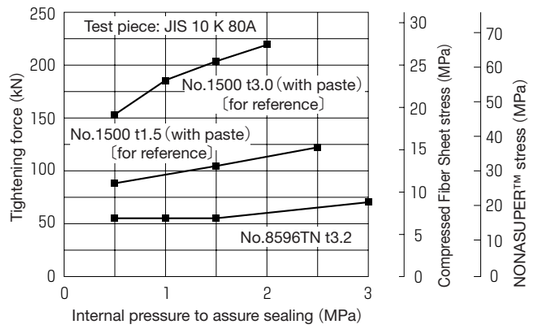
	No.8590TN
Maximum service temperature(°C)	450
Pressure rating	JIS 10K
Recommended tightening stress (MPa) (1)	30

Note (1) The tightening stress corresponds to the projected area of the gasket main body only, without including the metal strip lap-wound section.

▼ Stress strain chracteristics



▼ Sealing performance



Gasket Paste

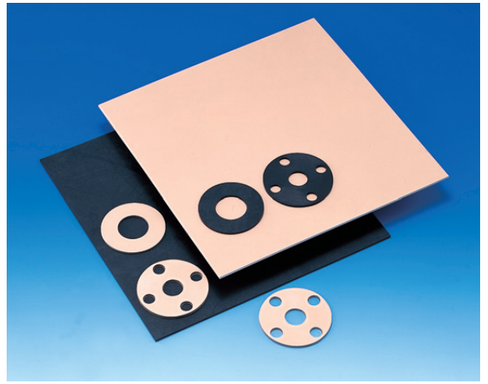
Gasket Paste is an agent employed to enhance the sealing effect of gasket contact surfaces and to facilitate peeling off gaskets when disassembling joints. This product, containing neither hazardous materials nor combustible ingredients, will not deteriorate even after long-period storage. Since this paste can be coated smoothly on Non-Asbestos Fiber Sheet gaskets, it will not damage their surfaces. Select an optimum type among a variety of products.

Product name	Description	Applicable fluid	Available temperature range (°C)	Mode of packing
Gasket Paste No.5	Black paste containing special oil-soluble adhesive compounded with fine particles of graphite.	Water based fluids such as steam, hot water, water, seawater, acid, alkali, salt solutions and alcohol	—200～200	2.5 kg in polyethylene container
Gasket Paste No. 5M	White paste containing special oil-soluble adhesive compounded with fine particles of mica.	Water based fluids such as steam, hot water, water, seawater, acid, alkali and salt solutions, where white paste is specially required	—200～200	2.5 kg polyethylene container
Gasket Paste No.6	Black paste containing special water-soluble adhesive having high oil and solvent resistance, compounded with fine particles of graphite.	Hydrocarbon based fluids such as petroleum based oil, oil gas, solvent, solvent vapor, animal & vegetable oil, LNG and general gases	—200～900	2.5 kg polyethylene container
Gasket Paste No. 6M	White paste containing special water-soluble adhesive having high oil and solvent resistance, compounded with fine particles of mica.	Hydrocarbon based fluids such as petroleum based oil, oil gas, solvent, solvent vapor, animal & vegetable oil, LNG and general gases, where white paste is specially required	—200～900	2.5 kg polyethylene container
Seal Paste	Light brown paste containing special non-drying oily adhesive, compounded with inorganic filler material and a small amount of solvent.	When handling water, air and hydrocarbons such as gasoline, kerosene, lubricating oil, natural gas, LPG, cooling medium, hydrogen sulfide, ethylene, butane, and ethane, and also where the occurrence of crevice corrosion on the flange surface shall be avoided.	—50～300	800 g metallic container
New VALFLON™ Paste	Fluororesin powder that is water-dispersed using surfactant.	When highly corrosive fluids such as strong acids and alkalis or halogens and when oxidizing fluid such as oxygen are required.	—200～300 (Oxygen gas: 100°C)	100 g in metallic tube, 1 kg in polyethylene container

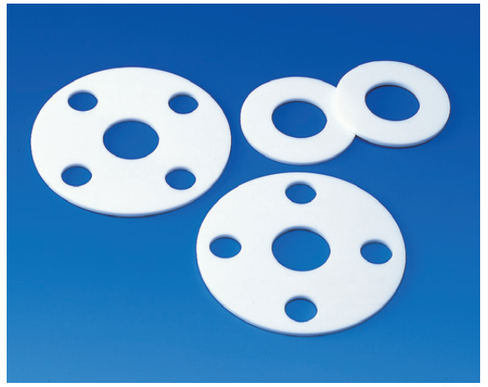
VALFLON™ Gasket

VALQUA No.7010/7010-EX/7020/7026/7GP61/7GP66

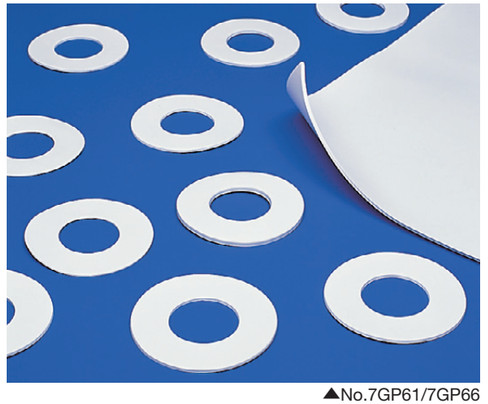
These are Sheet Gaskets made of VALFLON™ (PTFE) with excellent properties for chemical resistance and non-stick. (VALFLON is a registered trademark of NIPPON VALQUA for its fluorocarbon resin products)



▲No.7020/7026



▲No.7010



▲No.7GP61/7GP66

VALQUALON™ Gasket

VALQUA No. 7020

In order to overcome the cold flow (creep phenomenon) which is a drawback in PTFE, these gaskets are shaped by means of a special manufacturing process where inorganic filler material is compounded. Provided with heat resistance, chemicals resistance, and anti-cold flow property, they are best suited for lines handling various chemicals (high concentrated hot sulfuric acid and hot nitric acid, etc.) . However, as they are not suited for high concentrated alkali such as sodium hydroxide and hydrofluoric acid, companion products, No.7026 shall be selected instead for such applications. VALQUA No.7020 has obtained the Safety and Health Certificate of NWC (British National Water Works Association).

Black VALQUALON™ Gasket

VALQUA No. 7026

Similar to companion products, No.7020, No.7026 gaskets have excellent heat resistance, chemicals resistance, and anti-cold flow property, so that they are best suited for lines handling various chemicals. However, as they are not suited for oxidizing fluids such as high concentrated hot sulfuric acid and hot nitric acid, No.7020 shall be used instead for such applications.

VALFLON™ Pure PTFE Gasket

VALQUA No. 7010

These gaskets are made by punching virgin PTFE sheet. As these are liable to cause cold flow, gaskets should be installed in grooves or tongue and groove flanges in principle.

New VALFLON™ Pure PTFE Gasket

VALQUA No. 7010-EX

No.7010-EX gaskets are made of "New VALFLON™" material that has improved anti-creeping characteristic, while maintaining the PTFE's excellent properties of heat resistance, chemicals resistance, and non-stick. Thus, they have a long service life for heat cycles, contributing to extending the operating life of gaskets.

New VALFLON™ Soft Sheet

VALQUA No. 7GP61 (sheet)

VALQUA No. 7GP66 (gasket)

These sheets have a specially made mesh construction, while taking advantage of the PTFE's excellent properties of chemicals resistance and heat resistance.

VALFLON™ Gasket

VALQUA No.7010/7010-EX/7020/7026/7GP61/7GP66

■ Available ranges ■

VALQUA No.	Temperature (°C)	Pressure (MPa)
7010 (1)	−50～100	0.5
7010-EX	−50～150	1.0
7020 7026	−200～200	4.0
7GP66	−240～260	2.0

Temperature and pressure show individual service limit.
Note (1) As for No.7010, grooved flanges should be used in principle.

■ Standard dimensions ■

VALQUA No.	Nominal thickness (mm)	Size (mm)
7010	1.0、1.5、2.0、3.0	Maximum outer diameter 1300
7010-EX	1.5、3.0	Maximum outer diameter 1100
7020	1.0、1.5	1000×1000
	2.0、3.0	1270×1270
7026	1.5、2.0、3.0	1220×1220
7GP61	0.5、1.0、1.5	1500×1500
7GP66	2.0、3.0	Maximum outer diameter 1450

■ Design data ■

▼m, y values

VALQUA No.	Thickness (mm)	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
7010 7010-EX	1.0/1.5	3.00	19.61
	2.0	2.50	14.71
	3.0	2.00	
7020 7026	1.0	3.50	24.52
	1.5	3.20	22.55
	2.0	3.00	19.61
	3.0	2.50	
7GP66	0.5～3.0	2.50	19.61

Remarks:
The m, y values of VALFLON™ Gaskets are the same as those of fluororesin gaskets specified in JIS B 2206, while those for 7010, 7010-EX and 7GP66 are our recommended values.

▼Recommended tightening stress (1)

VALQUA No.	Recommended tightening stress (MPa)	
	Liquid	Gas
7010 (2) 7010-EX	10.0	15.0
7020 7026	20.0	24.5

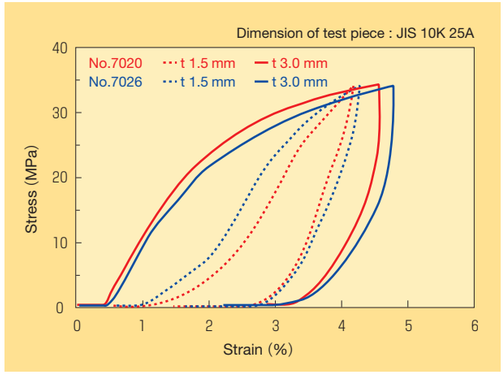
Note (1) These tightening stress are the pressures required under normal conditions, and correspond to the projected area of the gasket, where fluid pressure is not taken into consideration.
Note (2) As for No.7010, grooved flanges should be used in principle.

▼Characteristic values of VALFLON™ Gasket

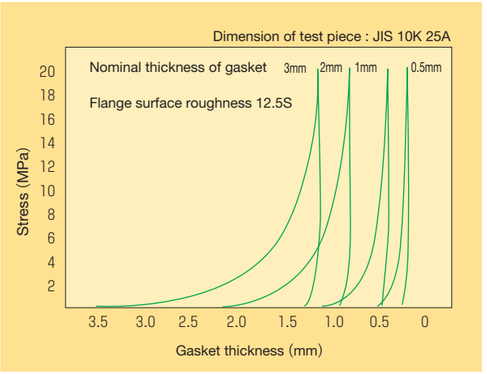
Item	No.7020		No.7026		No.7010		No.7010-EX		No.7GP66		Remarks
Thickness (mm)	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	1.5	3.0	
Density (kg/m³)	2330	2300	2070	2070	2170	2180	2210	2200	620	670	JIS K 7137
Tensile strength (MPa)	15.6	15.8	24.2	23.2	30.2	27.3	26.4	24.2	24.0	18.4	
Elongation (%)	405	415	370	286	460	445	588	574	334	366	
Compressibility (34.3MPa) (%)	4	5	4	5	12	19	20	12	69	71	JIS R 3453
Recovery (34.3MPa) (%)	69	54	67	63	64	51	63	48	15	16	
Creep relaxation (20.6MPa) 100°C×22h (%)	37.2	55.0	42.8	60.8	75.9	88.4	63.7	79.6	51.9	68.3	ASTM F38
200°C×22h (%)	66.7	81.0	79.3	85.5	92.4	97.3	86.0	90.8	59.3	75.3	

Remarks: The above values are measured ones, and not regulatory values.

▼Stress strain characteristics of VALQUALON™(No.7020/7026)



▼Stress strain characteristics of VALFLON™ Soft Sheet (No.7GP66)



■ Notes to be observed in design and usage ■

▼ Notes to be observed in design

- Determine the number and size of bolts and gasket dimensions to provide gaskets with sufficient tightening stress, and also check the flange construction and bolt arrangement to ensure uniform distribution of tightening stress.
- Being liable to suffer cold flow, these have to be used in locations permitting tightening control including periodic retightening. Since the gaskets are composed mainly of thermoplastic PTFE, retightening shall be performed not under hot temperature condition, but under cold temperature condition after initial heating. As for No.7010, grooved flanges should be used in principle.
- Determine the construction, material and dimensions so as to prevent warpage or bowing of the flange at the time of application of internal pressure.
- Consideration shall be given in design to prevent application of excessive thermal stress or repetitive bending stress on the joints.
- Piping design shall not allow accumulation of drain or scale at the flange section.
- Consideration shall be given to prevent transmission of vibration to the joints.

▼ Notes to be observed in storage

- Store these products in a cool and dark place not subject to direct sunshine.
- Storage selected shall be in a clean environment, free from dust as well as from high temperature & high humidity and corrosive atmosphere.
- If hanged on nails or the like, gaskets may suffer breakage or permanent deformation, so that, as far as practicable, they should be put in a can or wrapped in a polyethylene bag and stored in a paper box.
- Large sized gaskets shall be put between larger plates without rolling and placed horizontal for storage.

▼ Notes to be observed before installation

- Check perpendicularity of the flange and the pipe.
- Shaft alignment of the mating flanges shall be ensured.
- Check for any deformation of flanges.
- When changing only gaskets for the existing equipment or at a piping joint, clean the connecting section and check for any damage, and repair, if required.
- Get off the rust at the flange surface, and repair any dents and dings.
- Pay attention not to give damage to gaskets during storage up to installation, or during installation work.

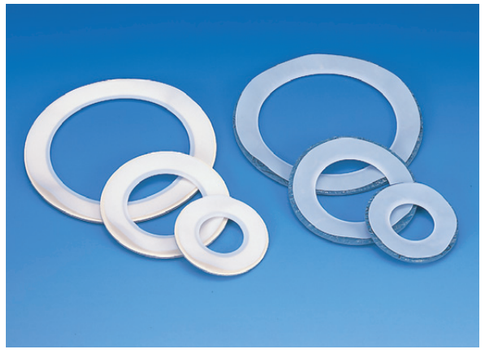
▼ Notes to be observed during installation work

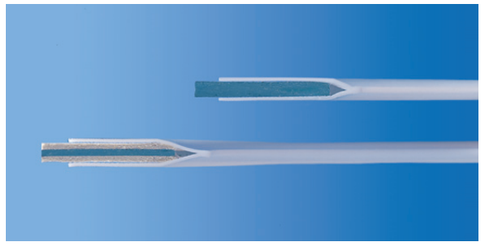
- Install the gaskets in a clean environment so as to prevent entry of foreign matters between the gaskets and the flanges.
- If gasket paste is to be used, apply a minimum amount of "VALFLON Paste" uniformly. Also care shall be exercised after application of paste, to prevent adhesion of dust and the like.
- Flange bolts shall be gradually tightened at a time, and repeat this process in four to five steps, so as to finally ensure uniform tightening.
- When tightening, pay attention to prevent the occurrence of crush. Especially when using gaskets of 150 Lb, 1B or smaller, or those of smaller gasket width, care shall be given as gasket stress is likely to be excessive.
- At the time of load up or restarting, be sure to carry out retightening.
- If retightening of gaskets that have once experienced leakage failed in preventing leakage, replace them with new ones.

VALFLON™ Envelope Gasket

VALQUA No.N7030/N7031/N7035

VALFLON™ (PTFE) Envelope Gasket using Compressed Non-Asbestos Fiber Sheet and Flexible Graphite in the core. According to the construction of the core, three types are available, that is, N type, S type and H type, and further three types of envelope configuration are also available.





VALFLON™ Envelope Gasket

VALQUA No.
N7030 (N)
N7031 (N)
N7035 (N)

General use Envelope Gasket using Compressed Non-Asbestos Fiber Sheet in the core.

VALFLON™ Envelope Gasket

VALQUA No.
N7030 (S)
N7031 (S)
N7035 (S)

High temperature & high pressure use Envelope Gasket for preventing the flow of PTFE jacket, where Non-Asbestos Felt Sheets are attached on both sides of the Compressed Non-Asbestos Fiber Sheet to form the core.

VALFLON™ Envelope Gasket

VALQUA No.
N7030 (H)
N7031 (H)
N7035 (H)

Envelope Gasket that can be used under condition subject to still higher temperature, where Non-Asbestos Felt Sheet are attached on both sides of the VALQUAFOIL™ (expanded graphite) Sheet incorporating thin stainless steel sheet to form the core.

▼Types

VALQUA No.	N type	S type	H type
N7030 Series	VALFLON™ (PTFE) Jacket Compressed Non-Asbestos Fiber Sheet	VALFLON™ (PTFE) Jacket Non-Asbestos Felt Sheet Compressed Non-Asbestos Fiber Sheet	VALFLON™ (PTFE) Jacket Non-Asbestos Felt Sheet Thin stainless steel sheet VALQUAFOIL™(expanded graphite)Sheet
N7031 Series (1)	VALFLON™ (PTFE) Jacket Compressed Non-Asbestos Fiber Sheet	VALFLON™ (PTFE) Jacket Non-Asbestos Felt Sheet Compressed Non-Asbestos Fiber Sheet	VALFLON™ (PTFE) Jacket Non-Asbestos Felt Sheet Thin stainless steel sheet VALQUAFOIL™(expanded graphite)Sheet
N7035 Series	VALFLON™ (PTFE) Jacket Compressed Non-Asbestos Fiber Sheet	VALFLON™ (PTFE) Jacket Non-Asbestos Felt Sheet Compressed Non-Asbestos Fiber Sheet	VALFLON® (PTFE) Jacket Non-Asbestos Felt Sheet Thin stainless steel sheet VALQUAFOIL™(expanded graphite)Sheet

Remarks : As special purpose VALFLON™ Envelope Gaskets, products for monomers, for radiation resisting use, and for outer edge welded type are available
Further information is available on request.
Note (1) No.N7031 Series has a PTFE outer cover with one lap joint.

■ Available ranges ■

VALQUA No.	Temperature (°C)	Pressure (MPa)
N7030 (N) N7031 (N) N7035 (N)	−100～150 (1)	1.5
N7030 (S) N7031 (S) N7035 (S)	−100～200 (1)	2.0
N7030 (H) N7031 (H) N7035 (H)	−100～260	3.0

Temperature and pressure show individual service limit.
Remarks: Make use of the above figures as a guide for selecting the gaskets.
Note (1) In case the service temperature exceeds 120°C, be sure to tighten uniformly so as not to apply piping stress on these gaskets. For applications subject to frequent thermal variations or pressure changes, or where maintenance is not facilitated, WHITETIGHT™ (No.7590 Series) is recommendable.

■ Standard dimensions ■

VALQUA No.	Nominal thickness (mm)	Size (mm)
N7030 (N)	1.6, 2.8, 3.8	1000
N7031 (N)		300～3000
N7035 (N)		1000
N7030 (S)	2.9, 3.2, 5.4	1000
N7031 (S)		300～3000
N7035 (S)		1000
N7030 (H)	4.0、5.6	950
N7031 (H)		
N7035 (H)		

■ Design data ■

▼m, y values

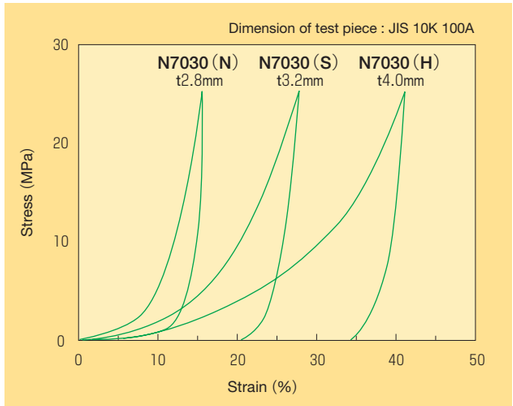
VALQUA No.	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
N7030 Series	3.5	14.71
N7031 Series	4.0	19.61
N7035 Series	3.5	14.71

Remarks:
These m, y values are the same as those of fluororesin gaskets specified in JIS B 2206.

▼Recommended tightening stress

VALQUA No.	Recommended tightening stress (MPa)	
	Liquid	Gas
N7030 Series N7031 Series	15.0	20.0
N7035 Series	20.0	24.5

▼ Stress strain characteristics of VALFLON™ Envelope Gaske(No.N7030)



VALFLON™ Envelope Gasket

VALQUA No.N7030/N7031/N7035

■ Notes to be observed in design and usage ■

▼ Notes to be observed in design

- Determine the number and size of bolts and gasket dimensions to provide gaskets with sufficient tightening stress, and also design the construction so as to ensure uniform distribution of tightening stress.
- Determine the construction, material and dimensions so that the flange is not likely to cause rotation.
- Consideration shall be given in design to prevent application of excessive thermal stress or piping stress on the joints.
- Piping design shall not allow accumulation of drain or scale at the flange section.
- Consideration shall be given to prevent transmission of vibration to the joints.
- Although the likelihood of occurrence of cold flow in the VALFLON™ (PTFE) has been reduced by adopting flexible core materials, prolonged operation or heat cycles may cause bolts to be loosened. Therefore, these gaskets have to be used in locations permitting periodic checks of loose bolts and also allowing appropriate tightening force to be applied.
- When installing these gaskets onto titanium flanges, check to see if fluids to be handled contain chlorine ions, as even a trace amount of chlorine ions may cause crevice corrosion to develop on the titanium surface in contact with the gaskets. To prevent the occurrence of this crevice corrosion, titanium-palladium alloy is recommended.
- The inner diameter of VALQUA No.N7035 Series has a square shape, which serves to eliminate accumulation of liquids, if the gaskets are properly dimensioned to meet the flange inner diameter. For further details, please contact us, as gaskets can be dimensioned to meet the flange inner diameter.
- Even when resin, glass or hard rubber lined flanges comply with JIS flange standards, their inner diameter or the outer diameter in contact with the gaskets are different from the standards. It is therefore necessary to determine the gasket dimensions in conformity with the size of each flange. Further information in this regard is available on request. Also products are available on request, where the joint sheet has a core made of corrugated metallic sheet.

▼ Notes to be observed in storage

- Store these products in a cool and dark place not subject to direct sunshine.
- Storage selected shall be in a clean environment, free from dust as well as from high temperature & high humidity and corrosive atmosphere.
- If hanged on nails or the like, gaskets may suffer breakage or permanent deformation, so that, as far as practicable, they should be put in a can or wrapped in a polyethylene bag and stored in a paper box.
- Large sized gaskets shall be put between larger plates without rolling and placed horizontal for storage.
- If Non-Asbestos Felt got wet with aqueous liquids, its crush strength decreases. It is therefore necessary to keep it dry in a polyethylene bag, and also not to tighten when wet.

▼ Notes to be observed before installation

- Check perpendicularity of the flange and the pipe.
- Shaft alignment of the mating flanges shall be ensured.
- Check for any deformation of flanges.
- When changing only gaskets for the existing equipment or at a piping joint, clean the connecting section and check for any damage, and repair, if required.
- Get off the rust at the flange surface, and repair any dents and dings.
- Pay attention not to give damage to gaskets during storage up to installation, or during installation work.

▼ Notes to be observed during installation work

- Install the gaskets in a clean environment so as to prevent entry of foreign matters between the gaskets and the flanges.
- If gasket paste is to be used, apply a minimum amount of "VALFLON™ Paste" uniformly. Also care shall be exercised after application of paste, to prevent adhesion of dust and the like.
- Flange bolts shall be gradually tightened at a time, and repeat this process in four to five steps, so as to finally ensure uniform tightening.
- As the VALFLON™ (PTFE) outer cover is slippery, crush may occur, if an excessive torque has been applied at the time of tightening or if it is not uniformly tightened. And this is particularly the case for smaller diameter ones, so that care should be exercised in tightening so as not to apply gasket stress exceeding 49.0 MPa.
- A small gap between flanges present at the time of gasket replacement would cause the VALFLON™ (PTFE) outer cover to touch the outside diameter of raised face or the flange inside, and fold over. Tightening in this condition may be a cause of leakage. In order to prevent such fold over of the VALFLON™ (PTFE) outer cover, the gasket-outer edge welded type (ODS type) is available. Further information in this regard is available on request.
- At the time of tightening gaskets, air contained in the core material may be discharged, so that be careful not to mistake it for leakage when a leakage test is performed using soap water. Our recommendation is to check leakage sometime after tightening the gaskets.
- Insufficient tightening force may lead to permeation of soap water for airtightness test or rain water, causing the Non-Asbestos Felt Sheet to soften and squeezed out from the gaskets. In such a case, gasket stress decreases, which may result in leakage.
- At the time of load up or restarting, be sure to carry out retightening.
- If retightening of gaskets that have once experienced leakage failed in preventing leakage, replace them with new ones.

Cord Seal™ 〈Soft〉

VALQUA No.7GS66A/7GS62A/7GS64N

Cord Seal™ <Soft> is a marsh mallow shaped free-size sealing material, which has been modified to be flexible and rich in toughness, while maintaining the PTFE's excellent chemicals and heat resistance. Three types with different cross sections are available: ●oval type ●flat type ●round type.

Cord Seal™ 〈Soft〉 [Oval type]

VALQUA No. 7GS66A

String shaped products with an oval cross section [string type] and adhesive to improve workability.

■ Standard dimensions ■

Cross section

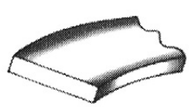
Nominal dimension〔width (mm)〕	Thickness (mm)	Length (mm)
3	1.5	30
6	3.0	15
9	4.0	8
12	5.0	5
16	6.0	
20		

Cord Seal™ 〈Soft〉 [Tape type]

VALQUA No. 7GS62A

Belt shaped products (1 to 3 mm thick) with a flat cross section [tape type] and adhesive.

■ Standard dimensions ■



Cross section

Nominal dimension〔width (mm)〕	Thickness (mm)	Length (mm)
20	1	15
30		
50		
20	2	5
30		
50		
20	3	5
30		
50		

Cord Seal™ 〈Soft〉 [Rope type]

VALQUA No. 7GS64N

Rope shaped products with a round cross section [Rope type] without adhesive.

Cross section

■ Standard dimensions ■

Nominal dimension〔diameter (mm)〕	Length (m)
2	40
4	20
6	10
8	7
10	5
12	

■ Available ranges ■

〔for No.7GS66A〕

	Nominal dimension〔width (mm)〕		
	6	9	12
Temperature (°C)	−240～260		
Pressure (MPa) Gas	2.0		
Pressure (MPa) Liquid	4.9		

Temperature and pressure show individual service limit.

■ Selection guide ■

- The smaller the cross section size, the higher the sealing pressure, in so far as the flange surface is in good condition.
- The widths after tightening of Cord Seal™ <Soft> **No.7GS66A** and **No.7GS64N** will be about 1.5 to 2.5 times the nominal dimension. Thus, select the products with a width about one half or less the contact width of the gaskets to be used. The following table provides a measure showing the relationship between the flange nominal dimension and the nominal dimension of the Cord Seal™ <Soft> **No.7GS66A**.

Flange nominal dimension	～500A	500～1000A	1000～1500A	1500A～
Nominal dimension of Cord Seal™ <Soft>	3～9	6～12	9～12	12～20

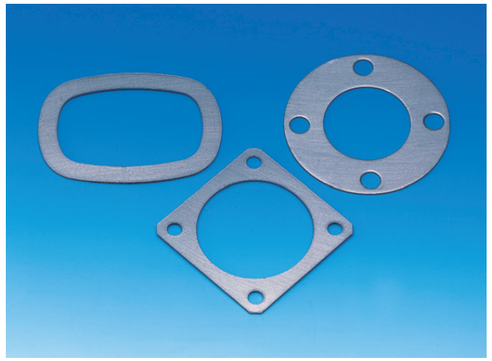
■ Applications ■

- Gaskets for large diameter equipment which is liable to have rough finished flange surface, increased strain, or insufficient tightening force.
- Gaskets adopting FRP, glass, glass lining, resin lining, rubber lining, ceramics or non-penetrant graphite, to be used for towers & tanks, ovens, heat exchangers and pressure vessels.
- Gaskets for duct flanges and pipe flanges.
- Gland packing for valves.

VALQUAFOIL™ Gasket

VALQUA No.VF-30/VF-35E/VFT-30/VFT-35E

Making use of the characteristics of the pure graphite sealing material VALQUAFOIL™, these gaskets are excellent in heat and chemicals resistance as well as radiation resistance, and are applicable to wide temperature ranges from very low to high temperatures. Gaskets with PTFE sheet lamination on both sides are also available. ("VALQUAFOIL®" is our registered trademark for our Flexible graphite)



VALQUAFOIL™ Gasket

VALQUA No. VF-30 (VF Sheet)

VF-30 Gasket is made by forming VALQUAFOIL™ into sheet, which is then punched into a specified flat shape.

VALQUAFOIL™ Gasket

VALQUA No. VF-35E (VF Sheet with thin stainless steel sheet)

This gasket is made by attaching VALQUAFOIL™ Sheets on both sides of a thin stainless steel sheet (0.05 mm thick), which is then punched into a specified flat shape.

VALQUAFOIL™ Gasket

VALQUA No. VFT-30 (VF Sheet)

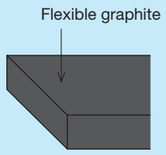
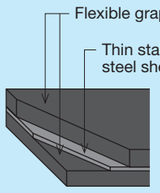
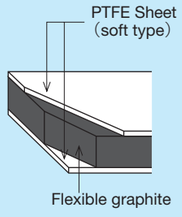
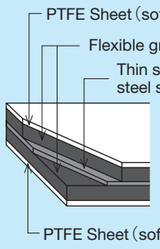
With a view to enhancing the sealing property, No.VFT-30 gasket is made by laminating PTFE sheets (soft type) on both sides of No.VF-30, which is then punched into a specified flat shape. Even with a low tightening force, sufficient sealing property is expected, together with adhesion suppression on the flange surface.

VALQUAFOIL™ Gasket

VALQUA No. VFT-35E (VF Sheet with thin stainless steel sheet)

With a view to enhancing the sealing property, No.VFT-35E gasket is made by laminating PTFE sheets (soft type) on both sides of the No.VF-35E, which is then punched into a specified flat shape. Even with a low tightening force, sufficient sealing property is expected, together with adhesion suppression on the flange surface.

▼Types

No.VF-30	No.VF-35E	No.VFT-30	No.VFT-35E
			

Remarks: In addition to the above, also available are VALQUAFOIL® Gathered Tape (No.VF-50), VALQUAFOIL® Flat Tape with Adhesive (No.VF-60), and VALQUAFOIL® Gathered Tape with Adhesive (No.VF-70). Further information in this regard is available on request.

■ Available ranges ■

VALQUA No.	Temperature (°C)	Pressure (MPa)
VF-30	−240～400	2.0
VF-35E		5.0
VFT-30	−240～300 (1)	2.0
VFT-35E		5.0

Temperature and pressure show individual service limit.
Remarks: Not applicable to oxidizing acids such as hot, concentrated sulfuric acid and concentrated nitric acid.
Note (1) VFT gaskets may stick at temperatures exceeding 250°C.

■ Standard dimensions ■

VALQUA No.	Nominal thickness (mm)	Size (mm)
VF-30	0.4、0.8、1.0	980×1000
	1.2	730×1000
	1.6、3.0	600×1000
VF-35E	0.8、1.6、3.0	1000×1000
VFT-30	0.5、0.8、1.0	1000×10000 (1)
	1.5	1000×1000
VFT-35E	0.8、1.6、3.0	1000×1000

Note (1) Products as long as 10 m are also available for VFT-30 with thicknesses 0.5, 0.8 and 1.0 mm. Further information in this regard is available on request.

■ Design data ■

▼m, y values

VALQUA No.	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)	
		Liquid (steam) (1)	Gas (2)
VF-30	2.0	26.0	39.2
VF-35E		29.4	
VFT-30		26.0	26.0
VFT-35E		29.4	29.4

Note (1) In accordance with the description in JPI-7R-70-88.
Note (2) Shows our recommended tightening force corresponding to the gasket projected area.

▼Recommended tightening stress

VALQUA No.	pressure (MPa)	
	Liquid	Gas
VF-30	26.0	40.0
VF-35E	30.0	
VFT-30	26.0	26.0
VFT-35E	30.0	30.0

Note (1) The recommended tightening stress are the pressures required under normal conditions, and correspond to the projected area of the gasket, where fluid pressure is not taken into consideration.

▼Characteristic values of VALQUAFOIL™ Gasket

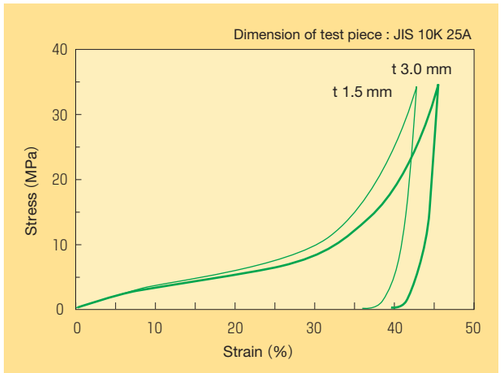
Item	No.VF-30		No.VF-35E (1)		Remarks
Thickness (mm)	1.6	3.0	1.6	3.0	
Density (kg/m³)	1067	1054	1216	1143	JIS R 3453
Tensile strength (MPa)	3.8	3.8	15.6	10.3	
Compressibility (34.3 MPa) (%)	45	43	42	42	
Recovery (34.3 MPa) (%)	11	12	12	13	
Creep relaxation (20.6 MPa) 100°C×22h (%)	7.3	12.4	9.5	9.2	ASTM F38
200°C×22h (%)	10.7	14.4	10.2	16.4	

Remarks: The above values are measured ones, and not regulatory values.
Note (1) These characteristic values correspond to those incorporating a thin stainless steel sheet.

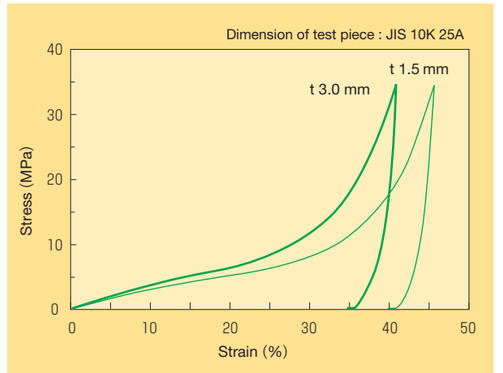
VALQUAFOIL™ Gasket

VALQUA No.VF-30/VF-35E/VFT-30/VFT-35E

▼ Stress strain characteristics of VALQUAFOIL™ (No.VF-30)



▼ Stress strain characteristics of VALQUAFOIL™ (No.VF-35E)



■ Notes to be observed in design and usage ■

▼ Notes to be observed in design

- Determine the number and size of bolts and gasket dimensions to provide gaskets with sufficient tightening stress, and also check the flange construction and bolt arrangement to ensure uniform distribution of tightening stress.
- In case of considering as an alternative for Compressed Fiber Sheet, be careful about the pipe length, as the compressibility will be larger than the Compressed Fiber Sheet.
- Determine the construction, material and dimensions so as to prevent warpage or bowing of the flange at the time of application of internal pressure.
- Consideration shall be given in design to prevent application of excessive thermal stress or repetitive bending stress on the joints.
- Piping design shall not allow accumulation of drain or scale at the flange section.
- Consideration shall be given to prevent transmission of vibration to the joints.

▼ Notes to be observed in storage

- Handle these products with care, as their sheet surface is liable to be damaged.
- Store these products in a cool and dark place not subject to direct sunshine.
- Storage selected shall be in a clean environment, free from dust as well as from high temperature & high humidity and corrosive atmosphere.
- If hanged on nails or the like, gaskets may suffer breakage or permanent deformation, so that, as far as practicable, they should be put in a can or wrapped in a polyethylene bag and stored in a paper box.
- Large sized gaskets shall be put between larger plates without rolling and placed horizontal for storage.

▼ Notes to be observed before installation

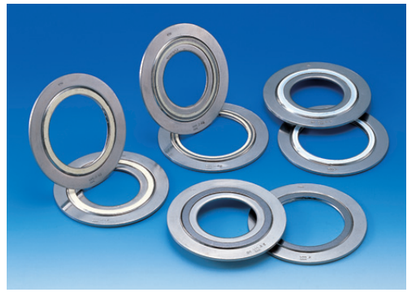
- Check perpendicularity of the flange and the pipe.
- Shaft alignment of the mating flanges shall be ensured.
- Check for any deformation of flanges.
- When changing only gaskets for the existing equipment or at a piping joint, clean the connecting section and check for any damage, and repair, if required.
- Get off the rust at the flange surface, and repair any dents and dings.
- Pay attention not to give damage to gaskets during storage up to installation, or during installation work. Particular care is needed as they are more liable to be damaged than Compressed Fiber Sheet.

▼ Notes to be observed during installation work

- Install the gaskets in a clean environment so as to prevent entry of foreign matters between the gaskets and the flanges.
- If gasket paste is to be used, apply a minimum amount of the paste uniformly. Also care shall be exercised after application of paste, to prevent adhesion of dust and the like.
- Flange bolts shall be gradually tightened at a time, and repeat this process in four to five steps, so as to finally ensure uniform tightening.
- When tightening, pay attention to prevent the occurrence of crush. Especially when using gaskets of 150 Lb, 1B or smaller, or those of smaller gasket width, care shall be given as gasket stress is likely to be excessive.
- At the time of load up or restarting, be sure to carry out retightening.
- If retightening of gaskets that have once experienced leakage failed in preventing leakage, replace them with new ones.

Spiral Wound Gasket

VALQUA No.8590 Series/ No.8590L Series

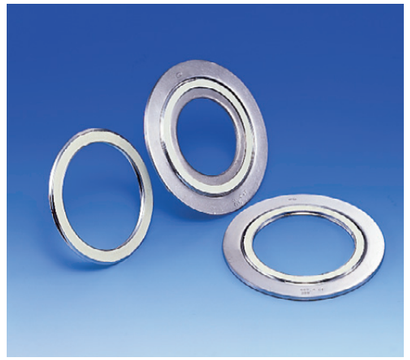


Non-Asbestos Spiral Wound Gaskets use Non-Asbestos inorganic paper, VALQUAFOIL™ (expanded graphite) and VALFLON™ (PTFE) tape as filler materials, and exhibit good elasticity by means of a V-shaped hoop.
("VALQUAFOIL™" is our registered trademark for our expanded graphite)
("VALFLON™" is our registered trademark for our fluororesin products)

▼Types

Name	Filler material	Basic type	With inner ring	With outer ring	With inner & outer rings
CLEANTIGHT™ **No.8590 Series**	Non-asbestos inorganic paper	**No.8590**	**No.8592**	**No.8591**	**No.8596**
Lined CLEANTIGHT™ **No.8590L Series**	Non-asbestos inorganic paper, VALQUAFOIL™ tape	**No.8590L**	**No.8592L**	**No.8591L**	**No.8596L**
BLACKTIGHT™ **No.6590 Series** (1)	VALQUAFOIL™ tape	**No.6590**	**No.6592**	**No.6591** (1)	**No.6596**
WHITETIGHT™ **No.7590 Series** (1)	VALFLON™ tape	**No.7590**	**No.7592**	**No.7591** (1)	**No.7596**

Note (1) Since No.6591 and No.7591 may cause radial buckling in the inner diameter side depending on service conditions, employ gaskets with inner & outer rings as far as possible.



CLEANTIGHT™

VALQUA No. 8590 Series

These Spiral Wound Gaskets use non-asbestos based inorganic paper instead of conventional asbestos filler, and are more economical compared to other products employing non-asbestos fillers (VALQUAFOIL™ or VALFLON™).

Features

- They have heat resistance comparable to that of asbestos fillers.
- The filler is cream, without using any coloring agent.
- They can be used with the same design (m, y values, etc.) as the conventional VALQUATIGHT™ (spiral wound gaskets using special asbestos paper for fillers).
- They are more economical compared to other products employing non-asbestos fillers(VALQUAFOIL™ or VALQUALON™).
- Also available are products complying with nuclear power specifications.

Applications

Suited as gaskets at junctions for pipe flanges, heat exchangers, towers & tanks, valve bonnets and other equipment that handle high temperature & high pressure fluids used in various industries including oil refining, chemical, power, gas and shipbuilding.

Lined CLEANTIGHT™

VALQUA No. 8590L Series

These are Spiral Wound Gaskets where VALQUAFOIL™ tape is wound in the middle of the CLEANTIGHT™ gaskets. Inclusion of wound VALQUAFOIL™ tape enhances airtightness, while heat resistance is also greatly improved by means of oxidization prevention effect on graphite due to non-asbestos based inorganic paper.

Features

- Better airtightness than CLEANTIGHT™
- Heat resistance comparable to asbestos products, 600°C

Applications

Almost the same as those for CLEANTIGHT™, but better suited for applications specially requiring airtightness and heat resistance.

Spiral Wound Gasket

VALQUA No.6590 Series/ No.7590 Series

BLACKTIGHT™

VALQUA No. 6590 Series

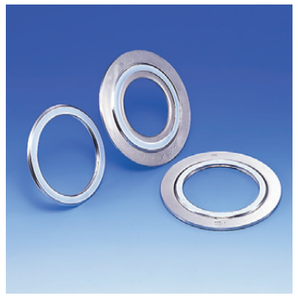
Using pure graphite (expanded graphite) sealing material, VALQUAFOIL™, as filler material, these Spiral Wound Gaskets have excellent sealing property and also good in response to heat and pressure cycles.

Features

- Excellent airtightness greatly improves sealing performance against gas in general and vacuum.
- Excellent response to heat and pressure cycles reduces the frequency of retightening.
- They also have excellent radiation resistance (products complying nuclear power specifications are available).
- They exhibit excellent sealing property at very low temperatures. (No.6596VC type has been developed for very low temperature use. Further information is available on request.)

Applications

Suited as gaskets at junctions for pipe flanges, heat exchangers, towers & tanks, valve bonnets and other equipment used in various industries including oil refining, chemical, power, gas, shipbuilding and iron making, and in particular best suited as gaskets for use handling high temperature & high pressure steam, as well as very low temperature fluids such as LNG, liquid nitrogen and liquid hydrogen.



WHITETIGHT™

VALQUA No. 7590 Series

Using VALFLON™ (PTFE) tape having excellent chemicals resistance as filler material, these Spiral Wound Gaskets have precedence over other filler materials in sealing corrosive fluids and airtightness, thus are suited as gas in general and vacuum seals.

Features

- Together with excellent corrosion resistance and proper selection of hoop materials, they can be applied to almost all fields of applications.
- Excellent airtightness greatly improves sealing performance against gas in general and vacuum.

Applications

Suited as gaskets at junctions for pipe flanges, heat exchangers, towers & tanks, valve bonnets and other equipment used in various industries including oil refining, chemical, power, gas, shipbuilding and iron making. And in particular best suited as gaskets for seals for corrosive fluids and oxygen which can not be handled by other types of spiral wound gaskets, as well as for gas in general and vacuum seals.

■ Design data ■

▼For standard pipe flanges

For JIS pipe flanges＝10K、16K、20K、30K、40K、63K
For JPI and ANSI pipe flanges
＝Classes 150, 300, 400, 600, 900, 1500, 2500
Gaskets complying with other standards such as ASME and MSS are also available.

▼For non-standard pipe flanges

Gaskets for each type of equipment such as heat exchangers, pressure vessels, valve bonnets are also available, as shown in the table.

Gasket thickness	Manufacturing ranges (mm)
6.4mm (W)	300～4000
4.5mm (V)	10～3000
3.2mm (T)	10～1500
1.6mm (P)	10～150

* Round type gaskets are available.

Remarks:
The sign "( )" shows thickness classifications.
In case of products with gasket thickness of 1.6 mm, only the basic type with hoop made of SUS316 are available.

▼Component metallic materials

The following materials are available for hoops and inner & outer rings. Other materials, if requested, may be available depending on separate consultation.

Metallic material	
Carbon steel (1)	SUS321
SUS304	SUS347
SUS304L	Titanium
SUS316	Nickel
SUS316L	Monel metal

Note (1) Carbon steel is used only for inner & outer rings.

■ Available ranges ■

VALQUA No.	Temperature (°C)	Pressure (MPa)
8590 Series	−200～500＊	30
8590L Series	−200～600	
6590 Series	−270～450	
7590 Series	−260～300	20

Temperature and pressure show individual service limit.
Remarks: The above temperature ranges vary depending on the material used for the hoops and the inner & outer rings.
＊Temperatures 500 to 600°C may be allowed depending on service conditions. In case of using 8590 Series for temperatures exceeding 500°C, the following shall be observed:
① Adequate tightening shall be performed initially. Further information is available on request.
② Their sealing property is equal to that of spiral wound gaskets using asbestos fillers. For applications requiring higher airtightness, No.8590L series are recommendable.

■ Design data ■

▼m, y values

The m, y values of Non-Asbestos Spiral Wound Gaskets are the same as those defined in the Appendix 3 to JIS B 8265.

Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
3.00	68.94

In case of low pressure gaskets, the bolt loading obtained by the above m and y values may not offer sufficient sealing performance. It is thus recommended to adopt the tightening stresses given in the table below, which are to be applied to the projected area (total contact area) of gaskets as minimum tightening pressures. That is, first, calculate the tightening forces (Wm1 and Wm2) using the Appendix 3 to JIS B 8265, and also obtain the tightening forces from the below given recommended tightening stresses and the total contact areas. Then, choose the bigger one between the above two tightening forces and apply it as the minimum tightening force.

Types (filler materials)	No.6590 Series (VALQUAFOIL™ tape)	No.8590 Series (Non-Asbestos inorganic paper)	No.7590 Series (VALFLON™ tape)
Tightening stress (N/mm²) per gasket contact area	49.0	68.6	34.3

Remarks: Separate consultation is required, where flange deformation is anticipated for large diameter gaskets.

Metal Jacketed Gasket

VALQUA No.N510 Series/ N520 Series

These gaskets are composed of carefully selected cushion materials such as non-asbestos millboard, ceramic fiber, compressed non-asbestos sheet and PTFE sheet with external metal jacket of carbon steel, stainless steel, copper, etc. They are widely used on piping flanges, joints of machinery and heat exchangers because they can be fabricated not only to a regular round shape but also to other irregular shapes such as oval, rectangular, etc. with additional partition or partitions to seal multi-pass heat exchangers. An increased demand has recently been seen for a special type having attached expanded graphite tapes on both sealing faces to increase sealability.

Non-Asbestos Metal Jacketed Gasket

VALQUA No. N510 (double-jacketed corrugated)

These gaskets are composed of carefully selected cushion materials such as non-asbestos millboard, ceramic fiber, compressed non-asbestos sheet and PTFE sheet with two sheets of corrugated thin metal jackets. A complete sealing can be assured with low seating stress. A labyrinth effect can also be expected from corrugation.

Non-Asbestos Metal Jacketed Gasket

VALQUA No. N520 (double-jacketed)

These are flat metal jacketed Gaskets whose core is made of non-asbestos millboard and covered with two metallic sheets on its outside.

Non-Asbestos Metal Jacketed Gasket (with VALQUAFOIL™ adhered)

VALQUA No. N6510 N6520

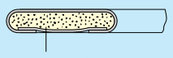
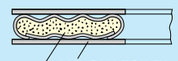
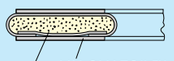
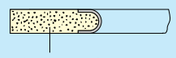
VALQUAFOIL™ is adhered on both sides of No.N510/No.N520 to enhance sealing performance.

Non-Asbestos Metal Jacketed Gasket

VALQUA No. N520-C (grommet-finished)

Cut surface on the inner diameter side of sheet gaskets made of Compressed Non-Asbestos Fiber Sheet and the like is covered with a thin metallic sheet (grommet-finished), which contributes to permeation leakage prevention and erosion prevention.

▼Types

No.N510	No.N520	No.N6510	No.N6520	No.N520-C
				
Non-asbestos cushion material	Non-asbestos cushion material	VALQUAFOIL™ Non-asbestos cushion material	VALQUAFOIL™ Non-asbestos cushion material	Non-asbestos cushion material

Remarks: Excepting for products attached with VALQUAFOIL™, gasket paste (seal paste or No.6M) shall be used in principle.

■ Available ranges ■

VALQUA No.	Temperature (°C)	Pressure (MPa)
N510	Depending on cover metal ＊	7.0
N520		
N6510	−240～400	
N6520		
N520-C	Depending on core material	

＊As for maximum service temperatures for component metallic materials, refer to "Maximum service temperatures for gasket metallic materials (for reference)" on page 27.

▼Component metallic materials

Major metallic materials include low carbon steel, copper, stainless steel (304,304L, 316, 316L, 321, 347, etc.), 5Cr-0.5Mo steel, monel metal, titanium, nickel, aluminum, aluminum bronze, and lead.

■ Standard dimensions ■

Any forms are available. As for dimensions, products with a maximum diameter of about 3,000 mm can be manufactured, while still larger ones may also be fabricated at site upon request. It is also possible to manufacture highly reliable products with minimized junctions of cores of gasket (patented manufacture) to be used for heat exchangers and the like. Further information in this regard is available. In case of No.520-C, limiting dimensions depend on core materials used.

Metal Jacketed Gasket

VALQUA No.N510 Series/ N520 Series

■ Design data ■

▼m, y values

VALQUA No.	Cover material	Gasket factor "m"	Minimum design seating stress "y" (N/mm²)
N510 Series	Soft aluminum	2.50	20.01
	Soft copper or brass	2.75	25.50
	Iron or soft steel	3.00	30.99
	Monel or 4 - 6% chrom	3.25	37.95
	Stainless steels	3.50	44.82
N520 Series (2)	Soft aluminum	3.25	37.95
	Soft copper or brass	3.50	44.82
	Iron or soft steel	3.75	52.37
	Monel	3.50	55.11
	Monel or 4 - 6% chrom	3.75	62.08
	Stainless steels	3.75	62.08

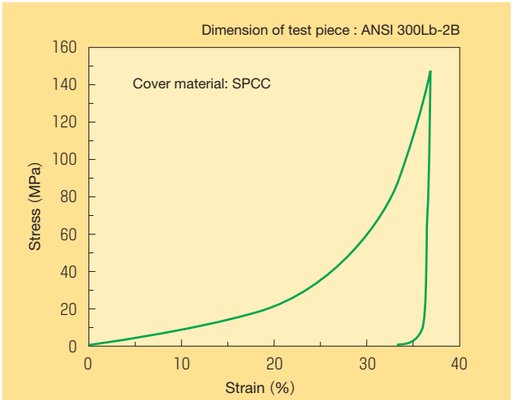
Note (1) The minimum design seating stress "y" correspond to values obtained when applied with gasket paste.
Note (2) For No.520-C, the m, y values of core materials are applied.

▼Recommended tightening stress

VALQUA No.	Cover material	Recommended tightening stress (MPa)	
		Liquid	Gas (1)
N520	SPCC	30	100
	Cu	45	140
	SUS304	70	200
	Al	20	60

Note (1) The above shows pressures without application of gasket paste. When gasket paste is used, the values for liquid apply.
Note (2) In case of N520-C, refer to the recommended tightening stress for the core material.

▼Stress strain characteristics of Non-Asbestos Metal Jacketed Gaskets (No.N520)



▼Maximum service temperatures for gasket metallic materials (for reference)

Material	Maximum service temperature (°C)
Lead	100
Brass	260
Aluminum	260
Copper	400
SUS 304	427
SUS 316	816
Pure iron, low carbon steel	538
Titanium	1,093

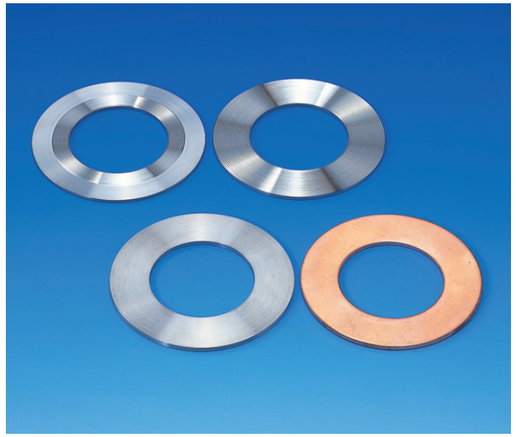
Material	Maximum service temperature (°C)
5Cr-0.5Mo steel	621
SUS 410	649
Silver	649
Nickel	760
Monel metal	816
SUS 321	816
SUS 347	816
Inconel	1,093
Hastelloy	1,093

Remarks:
Since the above maximum service temperatures are based on air with a certain constant temperature, they vary to a great extent depending on the type of liquid, pressures and mode of use.

Metallic Serrated and Flat Gasket

VALQUA No.540 Series/ 6560 Series/ 560 Series/ 6540H Series

These gaskets are manufactured from cold rolled metal plate, and include flat gaskets made of metallic sheet which is processed into a specifield dimension and shape, and serrated gaskets with concetric grooves to improve sealing property.



▼Types of products

VALQUA No.	Name	Cross section
560 Series	Metallic Flat Gasket	
6560 Series	Metallic Flat Gasket with VALQUAFOIL™ attached	VALQUAFOIL™ VF-30
540 Series	Serrated Gasket	
6540H Series	Serrated Gasket with VALQUAFOIL™ attached	VALQUAFOIL™ VF-30

■ Available ranges ■

VALQUA No.	540 Series	6560 Series	560 Series	6540H Series
temperature	Depending on component metallic materials *			
Pressure (MPa)	14.0			

* As for maximum service temperatures for component metallic materials, refer to "Maximum service temperatures for gasket metallic materials (for reference)" on page 27.

Temperature and pressure show individual service limit.
Remarks:
Heat resisting temperature of products with VALQUAFOIL™ attached is 400°C. Applications subject to temperatures exceeding 400°C require separate consultation.

▼Component metallic materials

Metallic materials include soft steels, pure iron, stainless steels (304, 304L, 316, 316L, 321, 347, 310S), 5Cr-0.5Mo steel, copper, monel metal, titanium and nickel.

■ Applications ■

These are used as joints in the form of either raised face flange, tongue and groove flange or male and female flange for towers, tanks, heat exchangers, autoclaves and valve bonnets for high temperature & high pressure steam and in process lines.

Upon placing order

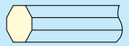
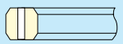
Products with any given dimensions can be manufactured based on information provided concerning material, shape and dimensions. Gaskets of various dimensions made of oxygen free copper are also available which are to be used for knife-edged shape flanges (ICF, UFC flanges, etc.) in use for semiconductor related facilities and vacuum equipment.

Ring Joint Gasket

VALQUA No.550 Series

These gaskets are made of single metal to be used for pipe flanges in the lines handling high temperature & high pressure steam, as well as for ring joint flanges of valve bonnets.

▼Types of products

VALQUA No.	Name	Cross section
550-ZO Series	Oval cross section shape	
550-ZS Series	Octagonal cross section shape	
550-ZA Series	API-RX cross section shape	
550-ZP Series	API-BX cross section shape	

■ Manufacturing ranges ■

▼Dimensional standards

Dimensions specified in JPI, ASME, API, MSS and the like for ring joint flanges are our standard.

▼Component metallic materials

Metallic materials include low carbon steel, pure iron, stainless steels (304, 304L, 316, 316L, 321, 347, 310S), 5Cr-0.5Mo steel, copper, monel metal, titanium and nickel.

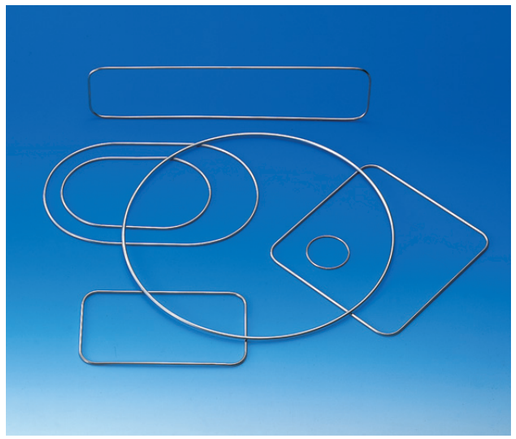
■ Applications ■

Widely used as gaskets for pipe flanges, pressure vessels, towers, tanks and valve bonnets for handling high temperature & high pressure steam, gas, oil and solvent used in oil refining, chemical, power and shipbuilding and the like.

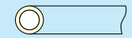
Metal Hollow O-ring

VALQUA No.3640/3641

Metal Hollow O-rings are made of thin metal pipe processed into circle or other specified shapes, whose both ends are butt-welded. As they can offer sealing with a relatively low tightening force and also compact gasket joints can be designed, they are used in various types of equipment for high temperature & high pressure, as well as high vacuum applications.



▼Types of products

VALQUA No.	Name	Cross section
3640	Basic design	
3641	Balanced type	

■ Available ranges ■

VALQUA No.	temperature	Pressure
3640	Depending on component metallic materials*	High vacuum ~ 7 MPa
3641		Vacuum ~ 300 MPa

* As for maximum service temperatures for component metallic materials, refer to "Maximum service temperatures for gasket metallic materials (for reference)" on page 27.

■ Applications ■

They are used as gaskets for equipment in various industries including aerospace equipment, vacuum equipment, semiconductor-related facilities, nuclear power -related facilities, electronic devices, agitators, melt spinning and hydraulic units.

Pipe symbol	Pipe dia (mm) × pipe thickness (mm)	SUS304	SUS316	SUS321	Incoloy800	Max.permissible dimension of outer diameter(mm)
J	0.9×0.15			○		8～100
L	0.9×0.25		○			
G	1.6×0.15			○		11～200
A	1.6×0.25	○	○	○	○	
M	1.6×0.35			○		
B	1.6×0.5	○		○	○	
H	2.4×0.15			○		25～350
C	2.4×0.25	○	○	○	○	
N	2.4×0.35			○		
D	2.4×0.5	○	○	○	○	
E	3.2×0.25	○		○	○	40～1500
O	3.2×0.35			○		
F	3.2×0.5	○	○	○	○	
P	3.2×0.8			○		
I	4.8×0.5	○		○		200～2000
K	6.4×0.8	○		○		400～2500

○ Materials in stock

Remarks: In these Metal Hollow O-rings, the inner weld beads made at the time of metal pipe butt-welding are uniformly finished.

▼Component metallic materials

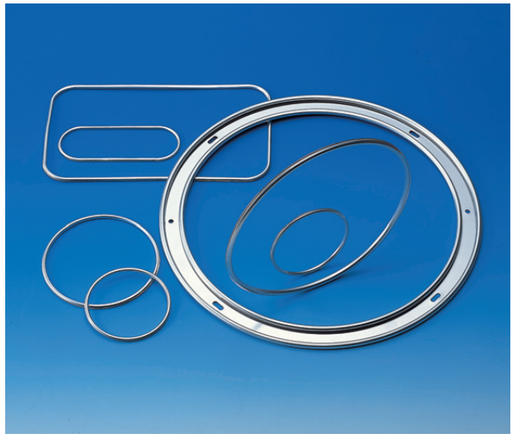
	Material
Pipe	Stainless steel (SUS304)
	Stainless steel (SUS316)
	Stainless steel (SUS321)
	Stainless steel (SUS316L)*
	Incoloy
Coating material	VALFLON™ (PTFE)
	Plated silver
	Plated nickel
	Plated copper
	Plated gold

* Only the pipe diameter ϕ0.9 is available.

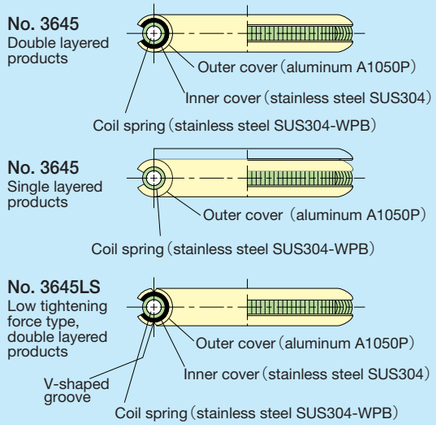
Trypack™ (Metal C-ring Gasket with spring)

VALQUA No.3645/ 3645LS

Metal C-rings are made of a coil spring as an elastic element, which is covered with a thin metallic sheet such as aluminum sheet. Being elastic and rich in recovery and also able to offer sealing at low tightening forces, they can be used in the fields handling high temperature, ultra high vacuum, as well as in applications subject to very low temperature and high pressure, where rubber based O-rings can not be adopted.



▼Types of products



Products with the following component materials are also available.

Outer cover	Stainless steel, nickel, silver, copper, tantalum
Inner cover	Inconel
Coil spring	Inconel, nimonic

Available ranges

temperature (1) (°C)	−270～250
Pressure (MPa)	Ultra high vacuum ~ 7

Temperature and pressure show individual service limit.
Note (1) The temperature ranges are for aluminum, and vary depending on component material used.

Manufacturing ranges

Cross sectional diameter (mm) (1)	Inner diameter (mm)
3.8	25～1500
5.6	150～2000

Note (1) Any given diameters are available, including 1.7, 2.6, 8.0 and 10.0.

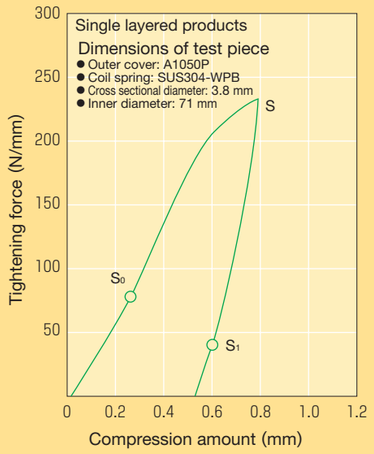
Applications

Used for semiconductor-related facilities, nuclear power-related facilities, electronic industry, laser equipment, joints, valves, injection molding machines, etc.

Design data

Cross sectional diameter (mm)	Inner diameter (mm)	Groove depth (mm)	Required tightening force (N/mm)			
			Aluminum	Silver & copper	Nickel & tantalum	Stainless steel & titanium
1.7	5～50	1.4	200	220	250	290
2.6	10～100	2.1	220	250	340	400
3.8	25～1500	3.0	250	310	490	590
5.6	150～2000	4.5	320	390	640	780
8.0	175 and over	7.0	340	490	—	—
10.0	175 and over	9.0	390	590	—	—
Flange surface roughness (Ra)			0.8	0.4	0.2	0.2

▼Compression recovery characteristics of Trypack™ (No.3645)



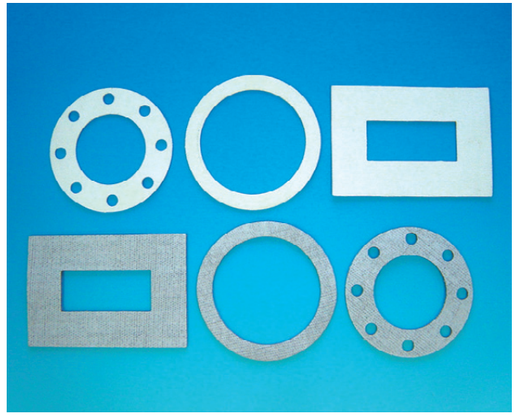
- Permissible leakage ··· He 1 x 10^{-11} Pa·m^3/s
- Air sealing initiating point ··· S_0 78.4N/mm
- Air sealing limiting point ··· S_1 44.1N/mm
- Recovery amount ··· 0.2 mm

※S_0 is the point where leakage becomes below the permissible amount, while S_1 is the limit where leakage is maintained below the permissible amount.

VALQUATEX Gasket

VALQUA No.N214/ N314

VALQUATEX is fabric which uses non-asbestos material such as ceramics instead of conventional asbestos. VALQUATEX Gaskets punched out from VALQUATEX are used for flanges of equipment manhole or exhaust gas ducts.



▼Types of products

No.N214	This type of gasket is made from a rubberised glass fiber fabric finished to the required flat shape.
No.N314	This type of gasket is made from a rubberised metal wire-reinforced ceramic fiber fabric finished to the required flat shape.

Available ranges

VALQUA No.	N214	N314
temperature (°C)	400	800

Temperature and pressure show individual service limit.
Remarks:
Because of insufficient sealing property, these gaskets should be used in locations where leakage to some extent is permitted.

Manufacturing ranges

- Products with any given shape and dimensions can be manufactured based on consultation.
- Upon request, products with surface treatment using graphite are available. (it facilitates peeling off gaskets when disassembling joints)

Rubber Sheet

VALQUA No.2010 (NBR/CR/EPDM) / 4010/ 5010

These gaskets are made by punching synthetic rubber sheets of various materials, and are used for low pressure applications where adequate tightening force is not available.

Available ranges

VALQUA No.	Rubber material	Available ranges	
		temperature (°C)	Pressure (MPa)
2010	Nitrile rubber (NBR)	−30～120	0.5
	Chloroprene rubber (CR)	−30～120	
	Ethylene propylene rubber (EPDM)	−40～150	
4010	Fluoro rubber (FKM)	−15～200	
5010	Silicone rubber (VMQ)	−60～200	

Remarks: The above temperatures should be used as a measure.

Manufacturing ranges

Thickness (mm)	1.0、1.5、2.0、3.0、4.0、5.0
Size (mm)	Maximum diameter 1000

Upon placing order

Sheet or punched gaskets can be manufactured based on information provided concerning material, shape and dimensions.

Table Indicating Non-Asbestos Gland Packing (applications & performance)

	Classification	VALQUA mfg No.	Application										Color tone	Page
			Valve		Rotary pump			Reciprocating motion machine			Rotating machine				
			Temperature (°C)	Pressure (MPa)	Temperature (°C)	Pressure (MPa)	Speed (m/s)	Temperature (°C)	Pressure (MPa)	Speed (m/s)	Temperature (°C)	Pressure (MPa)	Speed (m/s)		
Non-Asbestos Gland Packing	Carbon fiber based	No.6201			200	1.0	20				200	4.9	5	Black	39
		No.6232	260	10.3				260	9.8	5				Black	39
		No.6234			200	1.0	15				200	4.9	5	Grey	39
		No.6262			260	1.6	20				260	4.9	5	Black	39
		No.6267	350	15.5										Black	39
		No.6345	600[1]	25.9	600[1]	2.0	20	600[1]	14.7	5	600[1]	14.7	5	Black	39
		No.6399	300	25.9				300	24.5	5				Black	40
		No.6399H	300	43.1				300	39.2	5				Black	40
		No.6399L	260	25.9										Black	40
	VALFLON™ based	No.7202E			260	1.6	16	260	4.9	5	260	4.9	5	Black	40
		No.7202W			260	1.6	16	260	4.9	5	260	4.9	5	White	41
		No.7202	260	5.1	260	1.6	20	260	4.9	5	260	4.9	5	Black	40
		No.7203	260	10.3	260	2.0	20	260	9.8	5	260	9.8	5	Black	41
		No.7232	260	5.1	260	1.6	5	260	4.9	1	260	4.9	1	White	41
		No.7233	260	10.3										White	41
		No.7262			260	1.6	5				260	4.9	1	White	41
	Special fiber based	No.8132			260	1.0	10	260	4.9	1	260	4.9	1	White	42
		No.8133	260	10.3										White	42
		No.8133L	260	10.3										White	42
		No.8137	260	15.5	120	0.8	8[2]	260	14.7	1	260	14.7	1	White	42
		No.8201	260	10.3	260	2.0	16	260	14.7	5	260	14.7	5	Brown	42
		No.8201 (NL)	260	10.3	260	2.0	8	260	14.7	1	260	14.7	1	Brown	42
	Graphite based	No.VF-10	650[1]	43.1										Black	43
		No.VF-20	650[1]	43.1										Black	43
		No.VF-20L	650[1]	43.1										Black	43
		No.VF-20LF	650[1]	43.1										Black	43
		No.VFC-25	650[1]	43.1										Black	44
		No.VF-22			600[1]	2.5	25	600[1]	14.7	5	600[1]	14.7	5	Black	43
		No.VF-25L	650[1]	25.9										Black	43
		No.VFT-22	300	10.3										Grey	44
	General use graphite based	No.VC-22[3]	350	10.3	300	1.0	8							Grey	44
		No.VC-23[3]			600[1]	1.0	10				600[1]	4.9	1	Black	44
		No.VC-25[3]	650[1]	25.9										Black	44
		No.VC-26[3]	350	25.9										Grey	44
	Metal based	No.1110	350	25.9	350	2.0	20	350	24.5	5	350	24.5	5	Grey	42

Major application　Available range

Note 1) Heat resisting temperatures depend on the fluid used.
Note 2) In case of lubricated products.
Note 3) Economical products.

Table for Selection of Non-Asbestos Gland Packing for Valve Stems

◎ : Recommended products
○ : Combination recommended products
☆ : For adapter packing only

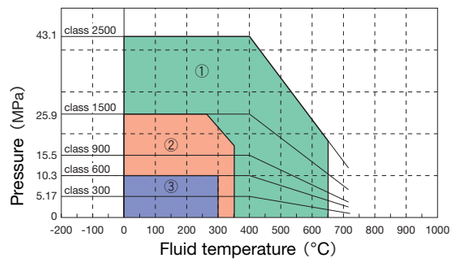
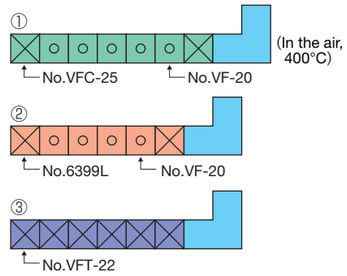
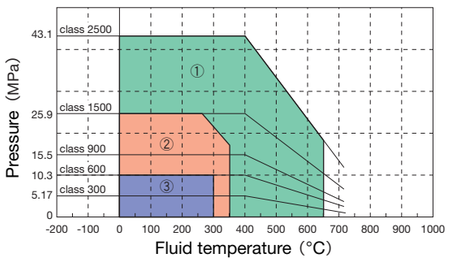
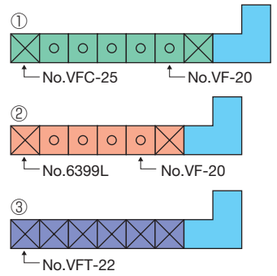
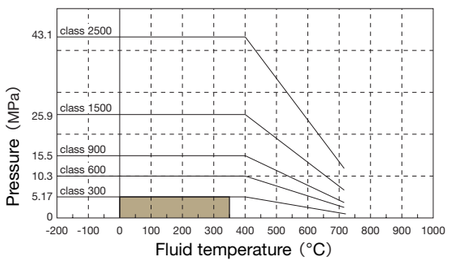
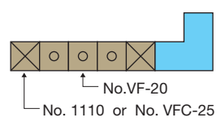
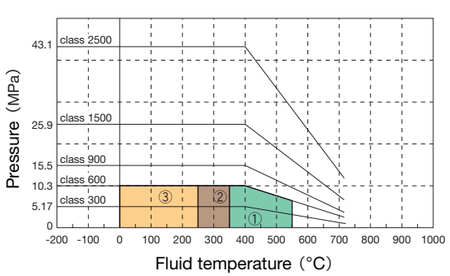
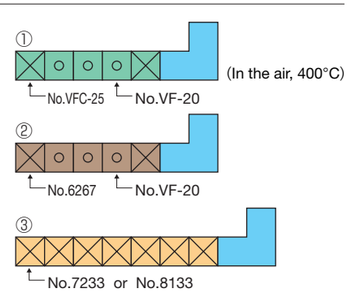
		VALQUA No.											
		No.8133[1]	No.6232	No.7233[2]	No.VFT-22	No.8137	No.6399L	No.VF-25L	No.VF-10 No.VF-20 No.VF-20 L No.VF-20 LF	No.6267	N0.1110	No.6345	No.VFC-25
Temperature limit (°C)		260	260	260	300	260	260	650 〈400[4]〉	650 〈400[4]〉	350	350	650 〈400[4]〉	650 〈400[4]〉
Pressure limit (MPa)		10.3	10.3	10.3	10.3	15.5	25.9	25.9	43.1	15.5	25.9	25.9	43.1
pH		2～3	0～14	0～14	0～14	2～13	0～14	0～14	0～14	0～14	5～9	0～14	0～14
Correspondence to ANSI rating Class	Class 2500												5)
	Class 1500										5)	5)	
	Class 900												
	Class 600									5)			
	Class 300												
	Class 150												
Water based fluid	Fresh water, seawater, heated water				◎	◎	◎		○		☆	☆	☆
	Superheated steam, Saturated steam				◎	◎	◎		○		☆	☆	☆
Oil based fluid	Animal & vegetable oil, mineral oil, heavy fuel oil				◎	◎	◎		○		☆	☆	☆
	Heat transfer oil (except HTS)				○			○	○	○	☆	☆	☆
Solvent	Alcohol based solvent			◎	◎	◎			○	☆		☆	
	Aromatic based solvent			◎	◎	◎			○	☆		☆	
	Ketone & ester			◎	◎	◎			○	☆		☆	
Corrosive fluid	Weak acid & alkali		◎		◎	◎	◎		○	☆		☆	
	Strong acid (except oxidizing acid)			◎	◎				○	☆		☆	
	Oxidizing acid & oxidizing agent 3)			◎									
	Strong alkali		◎	◎	◎		◎		○	☆		☆	
Gas based fluid	Nonflammable gas & inflammable gas								○	☆		☆	
	Gas susceptible to burn			◎									
	Liquefied gas								○		☆	☆	

Remarks : This selection table lists up products recommended by us for various conditions, and does not necessarily mean that non-marked items can not be used. It should also be noted in advance that, depending on the service conditions, abrasion powder may be mixed into the working fluid.

Notes 1) For gas based fluid, 8133L should be used.
2) For gas based fluid, 7233 (O), 7233 (SO) should be used, while for gas susceptible to burn, 7233 (FO).
3) 7233 is the only one applicable to oxidizing acid.
4) Temperature limit in air.
5) In case of combining with VF-10, VF-20, VF-20L, VF-20LF.

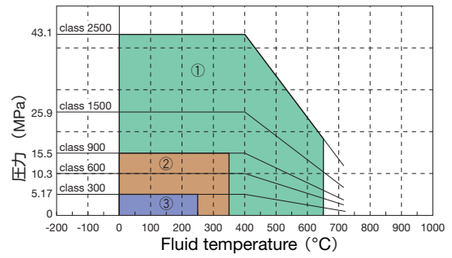
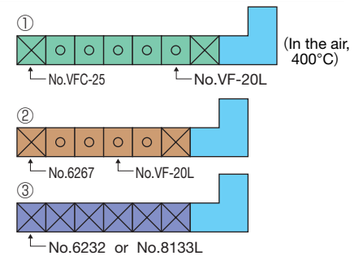
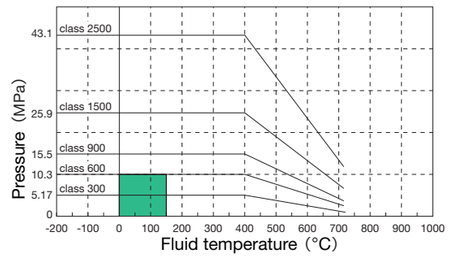
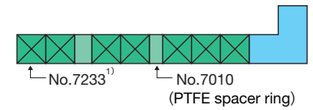
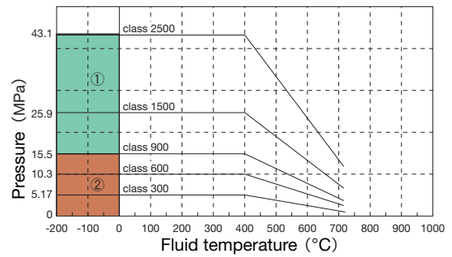
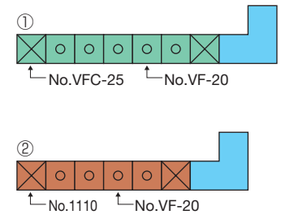
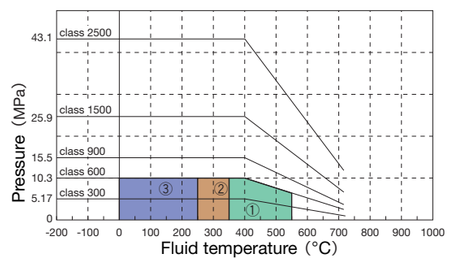
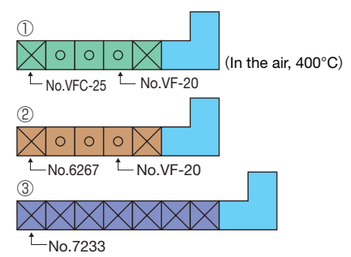
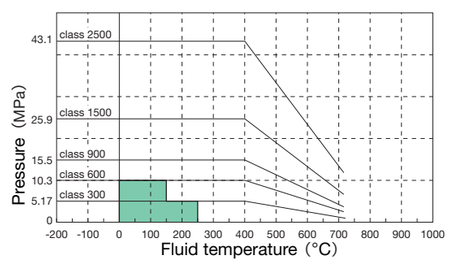
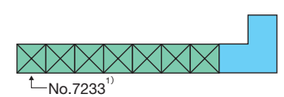
WARNING : Properties / applications shown throughout this brochure are typical. Your specific application shoud not be undertaken without independent study and evaluation for suitability. For specific application recommendations consult Valqua. Failure to select the proper sealing products could result in property damage and / or serious personal injury. Performance date 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 compling this brochure, we assume no resposibility for errors. Specifications subject to change without notice. This edition cancels all previous issues. Subject to change without notice.

Fluid-wise Application Sheet for Non-Asbestos Gland Packing for Valve Stems

	Applicable fluid	Rating: ANSI	Example of combination
Water based fluid	Fresh water Seawater Industrial water Hot water Boiler feed water Slurry Saturated steam Superheated steam Drain Neutral salt solution Sodium chloride Sodium nitrate Sodium sulfide, ...etc.		
Oil based fluid	General mineral oil Gasoline Diesel oil Naphtha Heavy oil Kerosene Tar Crude oil Fuel oil Oil gas Animal & vegetable oil		
	Heat transfer oil (except HTS such as sodium nitrate)		
Solvent based fluid	Aromatic hydrocarbon, B.T.X. etc. Alcohols Ketones Ethers Amines		

Remarks: The above rating figure is prepared on the basis of the upper limit for butt-welded valves according to ANSI B16.34 Special class.

✻Actual selection may be different from the above exmple,due to consideration of past results, intergration and discountinuation of the product.

	Applicable fluid	Rating: ANSI	Example of combination
Gas based fluid	Nonflammable gas Carbon dioxide Nitrogen & air Argon, etc. Inflammable gas Methane & ethane Propane Acetylene Hydrogen, etc.		
	Gas susceptible to burn. Oxygen & ozone, etc.		 Note 1) Lubricant treated 7233 (FO) Remarks: Be sure to use PTFE spacer ring at the same time.
	Liquefied gas LPG & LNG, liquefied nitrogen, etc.		
Corrosive fluid	Organic acid Acetic acid & lactic acid, etc. Alkalis Sodium hydroxide, etc.		
	Strong acid Sulfuric acid & nitric acid Hydrochloric acid & phosphoric acid Chromic acid Corrosive gas Chlorine & bromine Iodine & hydrogen sulfide Sulfur dioxide, etc.		 Note 1) Lubricant treated 7233 (O)

✻Actual selection may be different from the above exmple,due to consideration of past results, intergration and discountinuation of the product.

Table for Selection of Non-Asbestos Gland Packing for Rotary Pump Shafts

◎ : Recommended products
☆ : For adapter packing only

		VALQUA No.											
		No.7262	No.8132	No.6234	No.7202E	No.7202W	No.7202	No.6262	No.8201	No.7203	No.VF-22	No.6345	No.1110
Temperature limit (°C)		260	260	200	260	260	260	260	260	260	650 〈400[1)]〉	650 〈400[1)]〉	350
Pressure limit (MPa)		1.6	1.0	1.0	1.6	1.6	1.6	1.6	2.0	2.0	2.5	2.0	2.0
Speed limit (m/s)		5	10	15	16	16	20	20	16	20	20	20	20
Permissible PV value (MPa·m/s)		4.9	6.4	11.7	12.3	12.3	12.3	14.7	14.7	14.7	24.5	14.7	19.6
pH		0~14	2~13	2~12	0~14	0~14	0~14	0~14	2~13	2~13	0~14	0~14	2~13
Attack to shaft		Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Fair	Good	Excellent	Excellent	Fair
Water based fluid	Clean water, refreshing beverage					◎							
	Fresh water, seawater, sewage water		◎	◎				◎			◎	☆	
	Slurry liquid, muddy water								◎	◎		☆	
	Heated water, boiler feed water, low pressure steam						◎	◎	◎	◎	◎	☆	☆
Oil based fluid	Mineral oil, animal & vegetable oil		◎	◎	◎	◎	◎						
	Heat transfer oil										◎		
	Crude oil & heavy fuel oil								◎	◎			☆
Solvent	Alcohol based solvent		◎		◎	◎	◎				◎	☆	
	Aromatic hydrocarbon				◎	◎	◎				◎	☆	
	Ketones & ethers				◎	◎	◎				◎	☆	
Corrosive fluid	Weak acid & alkali		◎	◎									
	Strong acid (except oxidizing acid)				◎	◎	◎	◎			◎	☆	
	Oxidizing acid & oxidizing agent	◎											
	Strong alkali				◎	◎	◎	◎			◎	☆	
	Pulp liquid						◎		◎	◎		☆	
Others	Refrigerants (chlorofluorocarbons)				◎	◎	◎				◎	☆	☆
	low temperature liquefied fluid				◎	◎	◎				◎	☆	☆

Note 1) Temperature limit in the air

Table for Selection of Non-Asbestos Gland Packing for Equipment

◎ : Recommended products
☆ : For adapter packing only

		VALQUA No.																	
		No.7232	No.6234	No.8132	No.6262	No.7202E	No.7202W	No.7202	No.8201 (NL)	No.7203	No.8201	No.6232	No.8137	No.VF-22	No.6399	No.6345	No.6399H	No.1110
Temperature limit (°C)		260	260	260	260	260	260	260	260	260	260	260	260	650 〈400[1)]〉	300	650 〈400[1)]〉	300	350
Pressure limit (MPa)		4.9	4.9	4.9	4.9	4.9	4.9	4.9	9.8	9.8	9.8	9.8	14.7	14.7	24.5	14.7	39.2	24.5
Speed limit (m/s)		1	5	1	5	5	5	5	1	5	5	5	1	5	5	5	5	5
pH		0~14	2~12	2~13	0~14	0~14	0~14	0~14	2~13	2~13	2~13	0~14	2~13	0~14	0~14	0~14	0~14	5~9
Attack to shaft		Excellent	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Fair	Good	Fair	Good	Excellent	Excellent	Good	Good	Fair	Fair
Application classification: Reciprocating motion	Plunger pump								◎	◎	◎		◎	◎	◎	☆	☆	☆
	Soot blower											◎		◎	◎	☆	☆	☆
	Expansion joint			◎										◎	◎	☆	☆	☆
Application classification: Rotating motion	Agitator	◎	◎	◎		◎	◎	◎	◎	◎	◎		◎	◎		☆		☆
	Screw feeder								◎	◎			◎	◎		☆		☆
	Dryer	◎	◎			◎	◎	◎		◎				◎		☆		
	Gear pump, ...etc				◎			◎	◎	◎	◎		◎	◎		☆		☆
Water based fluid	Clean water, seawater		◎	◎		◎	◎	◎					◎	◎	◎	☆	☆	☆
	Sewage water, muddy water								◎	◎	◎		◎	◎	◎	☆	☆	
	Heated water, boiler feed water, low pressure steam		◎		◎	◎	◎	◎	◎	◎	◎	◎		◎	◎	☆	☆	☆
Oil based fluid	Mineral oil, animal & vegetable oil			◎						◎	◎		◎				☆	☆
	Heat transfer oil													◎		☆		
	Crude oil & heavy fuel oil								◎	◎	◎		◎				☆	☆
Fine particle etc.	Fine particle									◎	◎		◎				☆	
	Slurry liquid								◎	◎	◎		◎			☆	☆	
	Polymer	◎							◎				◎		◎		☆	☆
Gas in general	Air, gas	◎	◎			◎	◎	◎						◎		☆		
	Solvent vapor, etc.	◎	◎	◎		◎	◎	◎					◎	◎	◎	☆	☆	

Note 1) Temperature limit in the air

Constructions and Features

▲ No.6201

▲ No.6232

▲ No.6234

■ Carbon fiber based ■

For water & oil pumps

VALQUA No. 6201

Coil packing made of carbonized fabric yarn, processed with PTFE dispersion and lubricating oil, then braided into a square cross section and finished with PTFE, fine graphite and lubricating oil.

- Serviceable for relatively versatile fluids.
- Permissible PV value and shaft speed limit are allowed.
- Shaft wear due to packing is reduced.

For general use valves & reciprocating motion machines

VALQUA No. 6232

Coil packing made of carbon fiber yarns, processed with PTFE dispersion and lubricating oil, then braided into a square cross section and finished with PTFE, fine graphite and lubricating oil.

- Good compatibility with shafts offers excellent sealing property even at low tightening pressures.
- Suitable for almost all fluids excepting for strong oxidizing fluids.

For water & oil pumps, and rotating machines

VALQUA No. 6234
*Patented product

Coil packing made of carbonized fabric yarn processed with PTFE dispersion and covered with PTFE film, braided into a square cross section, then its surface finished with PTFE dispersion, inorganic filler and lubricating oil.

- Handleability is greatly improved, while hard to burn up.
- PTFE film prevents generation of abrasion powder of carbon fiber.
- Serviceable for relatively versatile fluids.

For chemical pumps

VALQUA No. 6262

Coil packing made of carbon fiber yarns, processed with PTFE dispersion and lubricating oil, then braided into a square cross section and finished with PTFE, fine graphite and lubricating oil.

- Permissible PV value and shaft speed limit are allowed.
- Shaft wear due to packing is reduced.
- Suitable for almost all fluids excepting for strong oxidizing fluids.

For high temperature & high pressure valves for treating water & oil based fluids

VALQUA No. 6267

Coil packing made of carbon fiber yarns, processed with graphite, then braided into a square cross section and finished with graphite.

- Packing exclusive for adapters, to be used in combination with graphite packing.
- Suitable for valve shaft seals for handling water & oil based fluids, nonflammable and inflammable gases as well as liquefied gas.

For seals of exhaust heat duct joints, dampers and dryer doors

VALQUA No. 6345

Coil packing made of high grade carbon fiber yarns, processed with graphite, then braided into a square cross section and finished with graphite.

- Inexpensive Non-Asbestos product used for seals of dampers and dryer doors.
- Composed of carbon fiber and graphite, these have a high fiber strength and are excellent in elasticity and heat resistance.
- The amount of organic materials used being reduced, there is little smoke released at the time of heating.

▲ No.6399

▲ No.6399H

▲ No.7202

▲ No.7202E

For plunger pumps

VALQUA No. 6399

Coil packing made of high strength carbon fiber yarns, processed with PTFE dispersion, then braided into a square cross section and finished with PTFE and fine graphite.

- With high fiber strength as well as excellent durability and elasticity, these are suited for shaft seals of reciprocating motion machines for handling water & oil based fluids, and solvent vapors.

For plunger pumps

VALQUA No. 6399H

Endless packing similar to No.6399, but molded tight into specified dimensions.

- These are suited for shaft seals of high pressure reciprocating motion machines for handling water & oil based fluids, and solvent vapors.
- These are normally used in combination with carbon bushes, No.6399 and No.8201.
- These can also be used as adapter packing for valve shaft seals.

For control valves

VALQUA No. 6399L

Coil packing made of high strength carbon fiber yarns, processed with PTFE dispersion, then braided into a square cross section and finished with PTFE and lubricating oil.

- These can be directly used as adapter packing for control valve shaft seals.
- For control valves with Class 1500 or below, these can be used alone.

■ VALFLON™ based ■

For high shaft speed pumps and rotary equipment for handling versatile chemical fluids

VALQUA No. 7202

Coil packing made of PTFE yarn, integrated with graphite and lubricating oil, then braided tight into a square cross section.

- With a construction considering elasticity and wear resistance, these are suited for large-diameter machines and for locations subject to high load.
- With excellent heat conductivity and chemicals resistance, these are best suited for high shaft speed rotating shafts for handling water & oil as well as chemical fluids.
- Shaft wear due to packing is negligible.
- Products with a dimension 6.5 mm or larger are available.

For high shaft speed pumps and rotary equipment for handling versatile chemical fluids

VALQUA No. 7202E

Coil packing made of PTFE fiber including graphite and lubricating oil, braided tight into a square cross section.

- With excellent heat conductivity and chemicals resistance, these are best suited for high shaft speed rotating shafts for handling water & oil as well as chemical fluids.
- Shaft wear due to packing is negligible.

Constructions and Features

▲ No.7202W

▲ No.7203

▲ No.7232

▲ No.7262

For high shaft speed pumps and rotary equipment for handling versatile chemical fluids

VALQUA No. 7202W

Coil packing made of PTFE fiber including white filler and lubricating oil, braided tight into a square cross section.
- ▶ These are excellent in thermal expansion resistance, heat conductivity, and chemicals resistance.
- ▶ Shaft wear due to packing is negligible.
- ▶ These can be used for higher peripheral speed applications than 100% PTFE gland packing.
- ▶ These comply with the Food Sanitation Law, and the Regulations concerning Food & Additives.

For rotating shafts of agitators and the like

VALQUA No. 7203

Coil packing made of PTFE fiber yarns integrated with graphite and lubricating oil and of aramid fiber yarns, processed with PTFE and lubricating oil so as to form the corner section made of aramid fiber, then braided tight into a square cross section.
- ▶ This is a high performance hybrid packing that is featured with the strength of aramid fiber and with the lubrication property of graphite-integrated PTFE fiber yarn.
- ▶ Having characteristics similar to those of No.7202, but these No.7203 are best suited for shaft seals in use for rotating machines and reciprocating machines subject to still higher pressure and load.
- ▶ Products with a dimension □6.5mm or larger are available.

For corrosive fluids

VALQUA No. 7232

Coil packing made of PTFE fiber yarns, processed with PTFE dispersion, then braided into a square cross section.
- ▶ Being made of 100% PTFE, these are resisting to almost all fluids.
- ▶ Thus, these are best suited for shaft seals of rotating machines such as agitators handling corrosive fluids. Depending on service conditions, they may also be applied as shaft seals for valves and reciprocating motion machines.
- ▶ No.7232 (SO) should be used when low torque or gas sealing property is required.
- ▶ These comply with the Food Sanitation Law, and the Regulations concerning Food & Additives.

For corrosive fluid valves

VALQUA No. 7233

Coil packing made of PTFE fiber yarns, processed with PTFE dispersion, then braided into a square cross section.
- ▶ Being made of 100% PTFE, these are resisting to almost all fluids.
- ▶ Thus, these are best suited for chemical use valve shaft seals for handling corrosive fluids.
- ▶ When low torque or gas sealing property is required, use the following products which are treated with lubricating oil:
  No.7233 (O) for general gas based fluids
  No.7233 (SO) for low temperature use of inflammable gas and liquefied gas
  No.7233 (FO) for gas susceptible to burn such as oxygen and ozone.
- ▶ These comply with the Food Sanitation Law, and the Regulations concerning Food & Additives.

For low & medium shaft speed pumps and rotary equipment for handling corrosive fluids

VALQUA No. 7262

Coil packing made of PTFE fiber yarns, processed with PTFE dispersion and lubricating oil, then braided into a square cross section.
- ▶ Flexible and compatible with shafts, these are excellent in sealing property.
- ▶ Being highly excellent in chemicals resistance, these are best suited for pumps handling corrosive fluids.

▲ No.8132

▲ No.8137

▲ No.8201

▲ No.1110

■ Metal based ■

For high temperature & high pressure valves

VALQUA No. 1110

Spiral type packing made of aluminum ribbon treated with graphite and lubricating oil, then formed into a square cross section.
- ▶ These are suitable for adapter packing to prevent extrusions of soft packing.

■ Special fiber based ■

For low & medium shaft speed pumps and rotary equipment

VALQUA No. 8132

Coil packing made of blended yarn of aramid fiber and of artificial inorganic fiber treated with PTFE dispersion, braided into a square cross section, then finished soft with PTFE dispersion and lubricating oil.
- ▶ These are flexible and compatible with shafts.
- ▶ Being white in color, these can be used for fluid applications where black color should be avoided.
- ▶ These are best suited as a Non-Asbestos alternative for No.7132.
- ▶ These can be used as shaft seals of pumps for handling water based and oil based fluids as well as weak acid and weak alkaline fluids. These are further used as shaft seals of rotating machines such as mixers and agitators where contamination is not desirable.

For general use valves

VALQUA No. 8133

Coil packing made of blended yarn of aramid fiber and of artificial inorganic fiber treated with inorganic filler, braided into a square cross section, then finished with PTFE dispersion.
- ▶ These are white clean packing without using lubricating oil.
- ▶ These can be used as shaft seals of general use valve for handling water based and oil based fluids.

For general use valves

VALQUA No. 8133L

Coil packing made of blended yarn of aramid fiber and of artificial inorganic fiber treated with inorganic filler, braided into a square cross section, then finished with PTFE dispersion and lubricating oil.
- ▶ With low shaft resistance and excellent sealing property, these are best suited for valves.
- ▶ With characteristics nearly similar to those of No.8133, these are best suited in particular as general use valve shaft seals for handling gas based fluids.

For general applications

VALQUA No. 8137

Coil packing made of blended yarn of aramid fiber and of artificial inorganic fiber treated with PTFE dispersion, braided into a square cross section, then finished with PTFE dispersion.
- ▶ These are white clean packing without using lubricating oil.
- ▶ These are excellent in cost per performance.
- ▶ These can be widely used for general use valves as well as for shaft seals of agitators and plunger pumps.

For pumps and rotating & reciprocating motion machines

VALQUA No. 8201

Coil packing made of aramid fiber yarns treated with PTFE dispersion and lubricating oil, then braided into a square cross section.
- ▶ With excellent wear resistance and unparallel durability, No.8201 packing has come one step closer to a maintenance free product.
- ▶ These exhibit an excellent performance as rotating shaft seals for handling slurry and high viscosity fluids.

For low speed rotating shafts and reciprocating motion machines

VALQUA No. 8201 (NL)

Coil packing made of aramid fiber yarns treated with PTFE dispersion, then braided into a square cross section.
- ▶ With excellent wear resistance and unparallel durability, No.8201 (NL) packing has come one step closer to a maintenance free product.
- ▶ These exhibit an excellent performance as low speed rotating shaft seals for handling slurry and high viscosity fluids.
- ▶ Free from lubricating oil, these can be used for locations where contamination due to oil should be avoided.

Constructions and Features

▲ No.VF-20

▲ No.VFC-25

▲ No.VFT-22

■ Flexible graphite based ■

For high temperature & high pressure valves

VALQUA No. VF-10

Packing made of soft and highly elastic graphite, exhibiting excellent chemicals resistance and favorable sealing property.
- ▶These can withstand continuous service under widely changing temperature ranges and provide adequate sealing property even with a low tightening force.
- ▶In combination with adapter packing, these are applicable to various types of fluids including water based, oil based, chemical based and gas based fluids.

For high temperature & high pressure valves

VALQUA No. VF-20

Coil packing made of expanded graphite yarn reinforced with Inconel wire and braided into a square cross section.
- ▶Being highly excellent in heat resistance, chemicals resistance and radiation resistance, as well as having favorable sealing property and maintenance freeness, these are applied in various industrial fields.
- ▶These are used as valve shaft seals for water, steam, oil, acid, alkali, heat transfer oil, solvent and gases (excluding oxygen, oxidizing agent, strong oxidizing acid).
- ▶These are normally used in combination with adapter packing such as No.6399L and VFC-25.

For high temperature & high pressure valves

VALQUA No. VF-20L

No.VF-20, but treated with lubricating oil.
- ▶Although characteristics being almost similar to those of No.VF-20, these have reduced shaft friction and improved sealing property.

For high temperature & high pressure valves

VALQUA No. VF-20LF
*Patented product

No.VF-20, but with unique surface treatment.
- ▶Almost free from lubricating oil, these have a reduced amount of heat loss under high temperature conditions, and exhibit stable low friction for a long period of time.

For high speed rotation and reciprocating motion machines

VALQUA No. VF-22

Coil packing made of expanded graphite yarn and braided into a square cross section.
- ▶Being free from metal wires as a reinforcing material, these are best suited as sealing material of sliding sections of high speed rotating machines.
- ▶These are excellent in heat resistance, chemicals resistance and radiation resistance.
- ▶For application in reciprocating motion machines, these are used in combination with adapter packing such as No.1110.

For high temperature & high pressure valves

VALQUA No. VF-25L

Coil packing made of expanded graphite yarn reinforced with Inconel wire and braided into a square cross section, again clad with Inconel wire on its surface to increase strength, then further treated with lubricating agent.
- ▶No.VF-25L can be used alone as a single unit.
- ▶These are suitable for fluids such as water, steam, oil, acid, alkali, heat transfer oil, solvent and gases (excluding oxygen, oxidizing agent, strong oxidizing acid).

For general use valves

VALQUA No. VFT-22
*Patented product

Coil packing made of expanded graphite yarn clad with PTFE film, and braided into a square cross section, that is, gland packing that makes use of the features of each material.
- ▶Expanded graphite being the major material, these are excellent in sealing property and durability.
- ▶The surface being clad with PTFE, stem friction is low.

For general use valves

VALQUA No. VFC-25
*Patented product

Coil packing made of yarn integrated with expanded graphite, carbon fiber and Inconel, braided into a square cross section, then processed on its surface with unique treatment.
- ▶Being free from exposed metal wire, these show low abrasion on the stem.
- ▶These are excellent in sliding performance.
- ▶These are exclusively used as adapter packing.
- ▶Only molded products are available.

■ Flexible graphite based general use grade ■

General use grade products made of expanded graphite are clearly different from normal Non-Asbestos products in the sense that these are offered at reasonable prices, while the product performance is maintained comparable to that of conventional asbestos based products.
These are best suited for utility lines and the like, where conventional asbestos based general use products have been adopted, and where high sealing performance is not required. On the other hand, because of the inherent characteristics of the products, these are not recommendable for critical safety related equipment such as in the process lines and the like.

For general use valves and pumps

VALQUA No. VC-22

Coil packing made of expanded graphite yarn braided into a square cross section, then processed with PTFE dispersion.
- ▶These are alternatives for asbestos based general use products used as shaft seals of pumps and valves for handling water, oil and solvent.

For pumps and rotating machines

VALQUA No. VC-23

Coil packing made of expanded graphite yarn reinforced with carbon fiber, braided into a square cross section, then processed with graphite and lubricating oil.
- ▶These are alternatives for asbestos based general use products used as shaft seals of pumps, rotating machines and valves for handling water, oil and solvent.

For high temperature & high pressure valves

VALQUA No. VC-25

Coil packing made of expanded graphite yarn clad with metal wire, braided into a square cross section, then processed with graphite and lubricating oil.
- ▶These are alternatives for asbestos based general use products used as shaft seals of valves for handling water, oil and solvent.

For high pressure valves

VALQUA No. VC-26

Coil packing made of expanded graphite yarn clad with metal wire, braided into a square cross section, then processed with PTFE dispersion.
- ▶These are alternatives for asbestos based general use products used as shaft seals of valves for handling water, oil and solvent.

Gland Packing for Nuclear Power Use

VALQUA No.6399LAE
(carbon fiber based control valve packing for nuclear power use)

VALQUA No.VF-10AE
(VALQUAFOIL™ for nuclear power use)

VALQUA No.VF-20LAE
(VF braid for nuclear power use)

VALQUA No.VFC-25AE
(VF braid adapter packing for nuclear power use)

A large number of gland packing is used in nuclear power industries.
In our Gland Packing for nuclear power use, concentrations of components such as halogen ions, sulfur and fusible metal alloys are strictly controlled, while their materials are carefully selected to avoid radiation deterioration.
And this Gland Packing is manufactured under the special target quality and the severe quality assurance system.
Upon placing order of the Gland Packing for nuclear power use, separate consultation is needed.

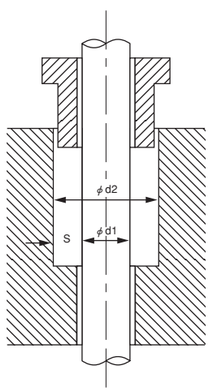
Service conditions (within the conditions prevailing in ABWR, APWR)
Service temperature limit: 363°C
Service pressure limit: 18.9 MPa

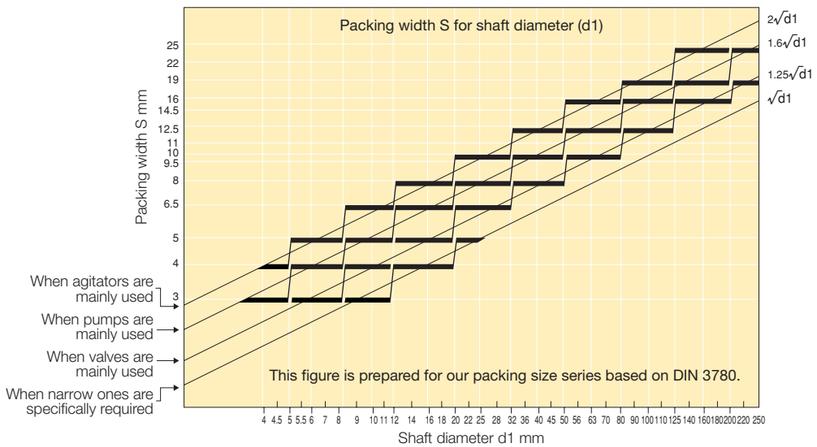
■ Manufacturing Ranges ■

Nominal dimensions	3	4	5	6	6.5	8	9.5	10	11	12.5	14.5	16	19	20	22	25
No.6201	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.6232	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.6234				○	○	○	○	○	○	○	○	○	○	○	○	○
No.6262	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.6267	○	○	○		○	○	○	○	○	○	○	○	○		○	○
No.6345							○	○	○	○	○	○	○		○	○
No.6399	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.6399L	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.7202E			○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.7202W	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.7202					○	○	○	○	○	○	○	○	○	○	○	○
No.7203					○	○	○	○	○	○	○	○	○	○	○	○
No.7232	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.7233	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.7262	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.8132	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.8133		○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.8137	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.8133L (1)		○	○		○	○	○		○	○	○	○	○	○	○	○
No.8201	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.8201NL	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
No.VF-10	Only molded products are available.															
No.VF-20	○		○		○	○	○		○	○	○	○	○		○	○
No.VF-20L	○		○		○	○	○		○	○	○	○	○		○	○
No.VF-20LF	○		○		○	○	○		○	○	○	○	○		○	○
No.VF-22				○	○	○	○	○	○	○	○	○	○	○	○	○
No.VF-25	○		○		○	○	○		○	○	○	○	○		○	○
No.VF-25L	○		○		○	○	○		○	○	○	○	○		○	○
No.VF-25LF	○		○		○	○	○		○	○	○	○	○		○	○
No.VFC-25	Only molded products are available. (When coils are required, separate consultation is needed)															
No.VFT-22	○	○	○		○	○	○	○	○	○	○	○	○	○	○	○
No.VC-22	△		△		△	□	□		□	□	■	■	■		■	■
No.VC-23		△		△	△	□	□	□	□	□	■	■	■	■	■	■
No.VC-25	△		△		△	□	□		□	□	■	■	■		■	■
No.VC-26	△		△		△	□	□		□	□	■	■	■		■	■
No.1110	●	●	●		●	●	●	●	●	●	●	●	●	●	●	●

Remarks 1) ○ : 3 m/box, ● : 3.65 m/box, △ : 60 m/box, □ : 30 m/box, ■ : 10 m/box
2) No.6399H is available only in the form of ring products.
3) No.6345 is available only in the form of coils.
4) No.VC-22, VC-23, VC-25 and VC-26 are available only in the form of coils.
Note (1) Because of manufacturing reasons, rectangular products with a cross section of 3 mm x 5 mm are available.

■ Relationship between shaft diameter, stuffing box inner diameter and packing width ■





■ Fluid pressure and number of rings ■

The number of rings of packing to be used is determined on the basis of pressure of fluid to be handled. The number of rings presented here indicates as a measure the length of packing to be applied, on condition that a proper packing width has been selected. It should also be noted that, as the number of rings varies depending on the packing material selected and fluid conditions (type, temperature, peripheral speed), as well as environmental conditions, the figures shown here should be treated as reference information.

▼In case of valve stem seal

ANSI Class	Liquid pressure (MPa)	No. of rings
150	2.0 or below	4
300	Above 2.0 to 5.1	6 (5)
600	Above 5.1 to 10.3	7 (5)
900	Above 10.3 to 15.5	8 (6)
1500	Above 15.5 to 25.9	10 (6)
2500	Above 25.9 to 43.1	12 (7)

Remarks: The figures in ( ) show the number of rings when combined with No.VF-20 and VF-20L. The number of rings in ( ) minus "2", the number of rings of the adapter packing is equal to the number of rings of No.VF-20 and VF-20L.

▼In case of rotary pump shaft seal

Liquid pressure (MPa)	No. of rings
Above 0.1 to 0.5	3～5
Above 0.5 to 1.0	4～6
Above 1.0 to 2.0	5～8
Above 2.0	6～9

■ Standard tightening stress of valve stem gland packing ■

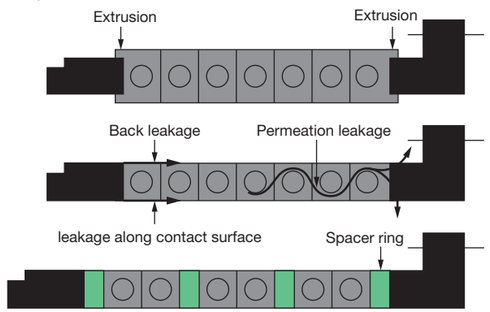
The standard tightening stress shown here as a measure are the values to satisfy the ANSI hydraulic pressure test.

▼Necessary tightening stress of gland packing for Non-Asbestos valve stems Unit: MPa

Major application	VALQUA No.	ANSI Class 150	300	600	900	1500	2500
General use	8133/8133L	19.6		24.5			
	VFT-22	24.5					
For corrosion resistance use	7233	19.6					
For high temperature & high pressure use	6345+VF-20	24.5			39.2		
	VFC-25+VF-20	24.5			39.2		58.8
For control valves	6339L+VF-20L	19.6			34.3		
	VFC-25+VF-20LF	19.6			34.3		39.2

■ Utility of spacer rings ■

Spacer rings have the advantages of preventing the extrusion of packing and also of effectively avoiding the occurrence of permeation leakage and back leakage. For the purpose of preventing the extrusion of packing, spacers are usually inserted on both sides of packing, while for avoiding the permeation leakage, they are inserted between pieces of packing.
Also in the case of using spacer rings to prevent permeation leakage when two or more types of packing are combined, it is effective to insert spacer rings between them.
Major materials for these spacer rings include PTFE, PVDF as an elementary substance, filled PTFE, and joint sheet. Spacer rings having thicknesses of 1 to 3 mm are normally adopted.



■ Recommendation of molded rings ■

Molded rings not only contribute to the reduction of time required for assembling, but also play a critical role in maintaining favorable sealing property. When coil type packing is used as it is, tightening force is hard to be conveyed to the depth. As a consequence, a substantial difference will arise between the gland follower side and the bottom side of the stuffing box, which may cause stress relaxation, resulting in a cause of leakage. Particularly, in the case of a pump where tightening force is relatively small compared to the valve, the back face of packing can not be well accustomed to the stuffing box, leading to back leakage.
It is thus recommended to adopt molded rings to make full advantage of packing performance.

■ Anti-corrosion treatment of packing ■

Graphite based packing may accelerate corrosion of mating metal surface in contact with this packing. This is due to a potential difference between the graphite (C) contained in the packing and the metal, that is, the graphite functions as a cathode material with respect to the activated anode of the counterpart, and increases the current density.
In order to restrict such an activation of metals, our graphite based packing has appropriate amounts of anode inhibiter and cathode protector for protecting metals. It is thus possible to prevent corrosion under wide variety of service conditions.

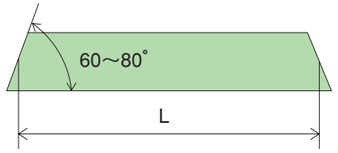
1 Determination of size

- For the purpose of obtaining stable performance, it is recommended to use molded rings. Molded rings not only contribute to the reduction of time required for assembling, but also play a critical role in maintaining favorable sealing property. When coil type packing is used as it is, tightening force is hard to be conveyed to the depth. As a consequence, a substantial difference will arise between the gland follower side and bottom side of the stuffing box, which may cause stress relaxation, resulting in a cause of leakage.
- Check the shaft diameter and the stuffing box inner diameter. If coil type packing is unavoidably used, select appropriate packing with the same nominal packing size as the width of stuffing box.
- If packing with a suitable size is unavailable for a given stuffing box, a 9.5 mm wide for example, select a packing with a nominal size of 10 mm, and adjust the size in the following way. That is, first lay down the packing on a flat plate, and uniformly press it by rolling a round bar, so that it may be 0.5 mm smaller than the width of the stuffing box, namely 9.0 mm in this case, and use it.

2 Cutting

In case of using coil type packing, set the length per one ring of packing as in the following, and cut it at an appropriate angle so as to allow no gap when aligning them together.

L=1.62 to 1.65 (d+D)
where,
L : length per one ring of packing (mm)
d : shaft diameter (mm)
D : Stuffing box inner diameter (mm)



3 Installation of packing

- Remove all the old packings. A packing tool, if used, will facilitate the work, but care shall be exercised so that the tool may not give damage to the shaft.
- At the time of installation, make sure of the number and combination of the packing.
- Install one ring at a time. Seat each ring firmly, making sure it is fully seated before the next ring is installed. Joints of successive rings should be staggered and kept 90° to 120° apart.

4 Tightening and adjustment

In case of pumps

- After installation of packing, tighten nuts alternatively on the symmetrical position so as to avoid uneven tightening, with a standard tightening stress shown of about 1 to 2 MPa.
- Apply liquid and wet the packing sufficiently and check if it is well lubricated with leaking liquid before retightening. In this case, do not tighten or unfasten the nuts rapidly, but uniformly adjust each nut by turning it by one or one half pitch of the nut head (i.e., 1/6 to 1/12 rotation) under visual check.

In case of valves

- After installation of packing, tighten nuts alternatively on the symmetrical position so as to avoid uneven tightening, with a standard tightening stress shown in the Design Data on page 46.
- Retighten, if leakage occurs. In this case, tightening after reducing the inner pressure to zero will be effective. Also take care so as to avoid uneven tightening or too much tightening.

5 Notice for storage

- **Do not degrade packing**
  Since some packing materials will be affected by direct sunshine, oxygen and ozone in the air, and high temperature or humidity, store the packing in a cool and dark place as far as possible to avoid deterioration. Anti-corrosion treated packing, in particular, shall not be stored in an acid atmosphere or humid environment, or in a location subject to high temperature.
- **Prevent adhesion of dust**
  Foreign substance like dust may adhere on the products during storage or carelessness in handling. Dust, once adhered, can not be removed completely with ease, and will give damage to the shaft, leading to leakage. Thus, adequate care is needed.

Upon placing order

In case of coil products
Specify the product No., then the nominal size and the quantity needed. For specially treated products, also specify lubricating oil treated products-O, silicone oil treated products-SO and fluoro oil treated products-FO.
(Ex)1. VALQUANo.7233:
10 mm - 3 m, one roll
2. VALQUANo.7233-FO:
10 mm - 3 m, one roll

In case of molded rings
Specify the product No., then the ring dimensions (inner diameter x outer diameter x height) and the number of rings.
The following are available only in the form of molded rings:

No.VFC-25, No.VFC-25AE, No.6399H, No.6399LAE, No.VF-10, No.VF-10AE, No.VF-20LAE

VALQUA No.101C/105C/105CS

Flame resisting carbonized fiber is made by heat treatment of polyacrylonitrile (PAN) fiber having a special copolymerization. With excellent flame resistance and heat resistance as well as tough elasticity, it is well comparable with high grade asbestos fiber based textile. Because of its low heat conductivity, flame resisting carbonized fiber is widely used as sealing material and flame & heat resisting material as a matter of course, and also as heat insulating material. Heat resisting temperature limit when used as a sealing material is 250°C.

Features

- Even in direct contact with strong flame, flame resisting carbonized fiber becomes red hot, but will not be fused nor adhered.
- It has excellent heat insulation efficiency, with its heat conductivity being smaller than that of glass fiber or of the same order as wool.
- It is excellent in heat resistance (maximum service temperature: 250°C).
- Also excellent in chemicals resistance, its weight loss in organic solvent is negligible, while in inorganic chemicals, as low as 2 to 3%.
- Unlike glass fiber or asbestos fiber, it has draping property and soft touch, thus easy in handling.

Yarn

VALQUA No. 101C

Applications
Heat resisting seal and the like

Standard dimensions

Nominal size (mm)			Weight
φ 3	φ 5	φ 6.5	1.0 kg roll
φ 8	φ 9.5		
φ 12.5	φ 16	φ 19	
φ 22	φ 25		

Cloth

VALQUA No. 105C

Applications
Cladding material for heat insulation & cold insulation of pipe and ducts, heat insulating material around engines and boilers, heat resisting curtains & covers for heat insulation purpose, cladding material for air conditioning ducts and bellows, cloth for heat resisting protective equipment, as well as aprons, hoods and the like.

Standard dimensions

Nominal thickness (mm)	Dimensions	Reference weight (g/m²)	Weave
1.2	1,000mm×30m	670	Plain weave

Spatter resisting special cloth

VALQUA No. 105CS

Surface of flame resisting carbonized fiber cloth is clogged with special inorganic filler. No.105CS has good spattering resistance and prevents adhesion of spatter, breakage and hole. It is thus used as cloth best suited for protective equipment to be in direct contact with flame or with splashing chemicals.

Applications
Protective cloth for weld spark, protective sheet for welding, heat shielding curtain for welding, fire curtains and the like.

Standard dimensions

Nominal thickness (mm)	Dimensions	Reference weight (g/m²)	Weave
1.0	980mm×30m	720	Diagonal weave
1.5	950mm×30m	950	Plain weave

Heat-Resistant Glass Fiber Textile

VALQUA No.102G/ 105G/ 105GF/ 112G/ 112GA/ 112GC

With the use of bulking treated yarn, these are better in flexibility and heat resistance (heat resisting temperature of 350°C) than conventional glass cloth, and are best suited for cladding material to be used in heat insulation & cold insulation work as alternative textile for high grade asbestos textile.

Features

- These are nonflammable material with heat resistance equal to or better than asbestos fiber class AAA.
  (maximum service temperature of 350°C; for applications requiring temperatures exceeding 350°C, separate consultation is advised)
- These are excellent heat insulating materials, with heat conductivity one half or below of that of asbestos cloth.
- Their tensile strength is high, as much as several times higher than that of asbestos under normal temperatures.

Packing

VALQUA No. 102G

Applications
Heat resisting sealing material, door packing and the like.

■ Standard dimensions ■

Nominal size (mm)	length (m)	Reference weight (g/m²)
6.4 square	30	53
7.9 square		83
9.5 square		117
12.7 square		200
15.9 square		317
19.0 square		467
22.0 square		584
25.4 square		734

Remarks: Round type is also available.

Cloth

VALQUA No. 105G (cloth)
105GF (cloth with heat resisting metal wire)

Applications
Cladding material for heat insulation & cold insulation of pipe and ducts, heat insulating material around engines and boilers, heat resisting curtains & covers for heat insulation purpose, cladding material for air conditioning ducts and bellows, cloth for heat resisting protective equipment, as well as aprons, hoods and the like.

■ Standard dimensions ■

Nominal size (mm)	Width (mm)	Length (m)	Reference weight (g/m²)	Weave
0.5	1,000	50	450	Diagonal weave
0.7			490	
1.7		30	920	Plain weave
2.7			1,750	

Remarks: No.105GF is available with its nominal thickness of 1.5 t only.

Ribbons

VALQUA No. 112G (ribbon)
112GA (ribbon with aluminum on one side)
112GC (ribbon with adhesive on one side)

Applications
Cladding material for heat insulation & cold insulation of pipe and ducts, heat insulating material around engines and boilers, heat resisting curtains & covers for heat insulation purpose, furnace lining, water resisting cladding tape, furnace conveyor covers, thermocouple protecting material, maintenance material for high temperature work and the like. equipment, as well as aprons, hoods and the like.

■ Standard dimensions ■

Nominal size (mm)	Width (mm)	length (m)	Reference weight (g/m²) 25 wide	32 wide	38 wide	50 wide	65 wide	75 wide	100 wide	Weave
0.4	50, 75	50	—	—	—	17	—	29	34	Diagonal weave
0.7	100		—	—	—	26	—	38	52	
1.7	25, 32, 38, 50	30	22	30	34	45	59	68	90	Plain weave
2.7	65, 75, 100		42	53	64	85	106	128	170	

Remarks: No.112GA and No.112GC are available in three types, i.e., with their nominal thicknesses of 0.7, 1.7 and 2.7 mm respectively.

Ceramic Fabric Textile

VALQUA No.101S/ 102SF/ 102S/ 105S/ 105SN/ 112S/ 112SN

Made of ceramic fiber (super heat resisting inorganic fiber) and excellent in flexibility and high temperature heat resistance, these are used as various types of sealing materials, as well as heat insulating material, shielding material and protective material. Since a small amount of organic fiber is included in the manufacturing process, some amount of smoke is generated at the initial stage of heating, while No.105SN cloth and No.112SN ribbon (liver) are smoking prevention treated. As core material of cloth and ribbon yarn, stainless wire is normally used, but others include glass fiber.

Features

- These are excellent in heat resistance and fire resistance.
  (maximum service temperature: 1,260°C, while 600°C for No.102SF)
- These have low heat conductivity and are excellent in heat insulation property.
- These are flexible and excellent in workability.
- These are also excellent in chemical stability.

Cloth

VALQUA No. 105S (cloth)
105SN (smoking prevention treated cloth)

Applications
High temperature curtains, high temperature sealing material, gaskets, various types of high temperature heat insulating material, protectors against weld spark and the like.

■ Standard dimensions ■

VALQUA No.	105S	105SN
Color tone	White	Liver
Weave	Plain weave	Plain weave
Reinforcing material	Stainless wire	Stainless wire
Maximum service temperature (°C)	1,260	1,260
Ignition loss (%)	＜28	＜10
Thickness (mm)	2	1.8
Width (mm)	1,000	1,000
Reference weight (g/m²)	＞900	＞720
One roll length (m)	30	30

Ribbons

VALQUA No. 112S (ribbon)
112SN (smoking prevention treated ribbon)

Applications
High temperature sealing material, various types of high temperature heat insulating material, and the like.

■ Standard dimensions ■

VALQUA No.	112S				112SN			
Color tone	White				Liver			
Weave	Plain weave				Plain weave			
Reinforcing material	Stainless wire				Stainless wire			
Maximum service temperature (°C)	1,260				1,260			
Ignition loss (%)	＜28				＜10			
Thickness (mm)	2				1.8			
Width (mm)	25	50	75	100	25	50	75	100
Reference weight (g/m²)	22	45	67	90	18	36	54	72
One roll length (m)	30				30			

Yarn and rope

VALQUA No. 101S (yarn)

Applications
Various types of high temperature heat insulating material, textile material and the like.

102SF (braided yarn)

Applications
High temperature sealing material, various types of high temperature heat insulating material, and the like.
Components
Core: ceramic fiber, cladding : glass fiber

102S (braided rope)

Applications
High temperature sealing material.

■ Standard dimensions ■

VALQUA No.	101S	102SF
Color tone	White	
Reinforcing material	—	Stainless wire
Maximum service temperature (°C)	1,260	600
Ignition loss (%)	＜25	

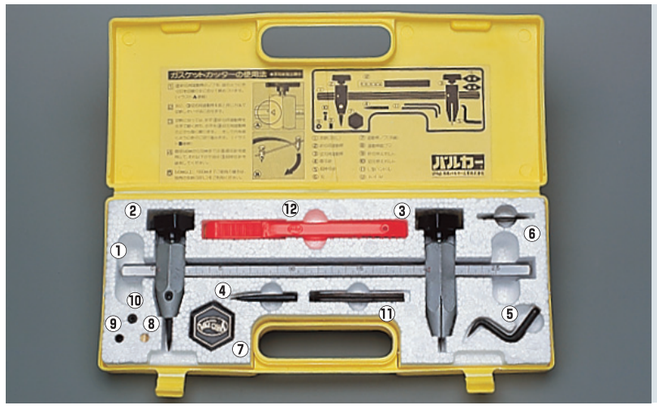
VALQUA No.	101S 102SF
Nominal diameter (mm)	length
φ 6	Length Any length, but one meter or over
φ 9	
φ 12.5	
φ 16	
φ 19	
φ 22	
φ 25	
φ 30	
φ 38	
φ 50	

VALQUA No.	102S (with stainless wire)
Nominal diameter (mm)	length
6.4	30m
9.6	
12.7	
15.9	
19.0	
22.0	
25.0	

Remarks:
No.101S (yarn), φ3 is also available.

Gasket Cutter

VALQUA No.CUTTER



① Supporting iron (300L)
② Floating pole for needle core
③ Floating pole for cutter blade
④ Straight core needle
⑤ Bending type core needle
⑥ Blade
⑦ Knob for floating pole (spare)
⑧ Straight stud for floating pole
⑨ Pressure bolt for needle core
⑩ Pressure bolt for cutter blade
⑪ L-shaped handle
⑫ Grinding stone

Features

- This is a set of convenient tools to simply cut out flange gaskets on a construction site or in an assembly work shop.
- The supporting iron has scale marks on its own, which allows easy and accurate dimensioning.
- By using a supporting iron (500L) which is sold separately, it is possible to cut out gaskets as large as 1,000 mm.
- It is really recommended to keep this tool as an indispensable workshop item not only in a maintenance department of a chemical plant, oil refinery or iron plant, but also in an assembly shop of machine or equipment manufacturer as well as in a pipe laying company.

■ Cutting ranges ■

Minimum diameter : 50 mm

Maximum diameter : 540mm

By using a supporting iron (500 L) which is sold separately, it is possible to cut out gaskets as large as 1,000 mm.

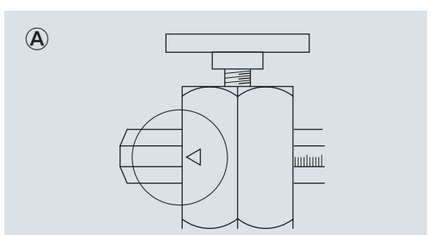
■ Upon placing order of parts ■

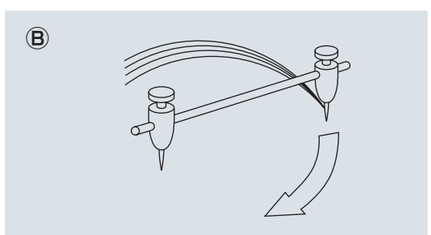
Parts worn after long years of operation shall be replaced with spare parts. Order of single item is also accepted when certain items are missing.

(As for cutter blades ⑥ , one replacement set consisting of five blades is available)

■ Instructions for use ■

1. First, insert the straight core needle ④ or the bending type core needle ⑤ at the bottom of the floating pole for needle core ②, and fix it using the pressure bolt for needle core ⑨. In this case, use the bending type core needle ⑤ if the cut diameter is up to 50 mm, while the straight core needle ④ for cut diameter larger than 50 mm.
2. Then, at the groove of the floating pole for cutter blade ③, attach the blade ⑥ with two pressure bolt for cutter blade ⑩.
3. Penetrate the supporting iron ① into the floating pole for needle core ② and the floating pole for cutter blade ③.
4. Set the part marked with "◁" of the floating pole for needle core ② at the scale zero of the supporting iron ① as shown in Figure A, and tighten firm with the knob.
5. Then, also shift the part marked with "◁" of the floating pole for cutter blade ③ to a desired position on the Supporting iron ① determined by the radius of the gasket to be cut, and tighten firm with the knob.
6. Before cutting, place the material on a sheet of plywood board or a corrugated paper that is put on a flat base or a floor. Then, put the gasket cutter as shown in Figure B, hold with your left hand the floating pole for needle core ②, and lightly dig in the straight core needle ④ or the bending type core needle ⑤. Now, holding light with your right hand the floating pole for cutter blade ③, rotate it to go cutting forward while slightly pushing as if to make a circle.





Packing Tool

VALQUA No.TOOL

VALQUA Packing Tool is an indispensable special tool that allows easy and accurate removal of packing to improve work efficiency.

Packing hook (packing withdrawal tool)

Construction

① Flexible shaft
A special, soft shaft made of triple-wound steel wires, which is so constructed so as to allow easy manipulation at a packing space, very small and in the depth of the stuffing box located also at a narrow space.

② Cork screw
A well hardened sharp screw, so made as to break into packing.

Instructions for use

Screw in the cork screws (No.11 to 13) into the flexible shafts (No.1 to 3), and fasten them tight using a wrench, then screw in two shafts at two points on the opposite peripheral sides of packing as shown in the figure. Now, the packing will come out easily by pulling the handle (Figure A). To remove an adapter, screw in the male screw at the tip of the flexible shaft into a tap hole of the adapter, then pull it out.

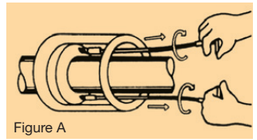
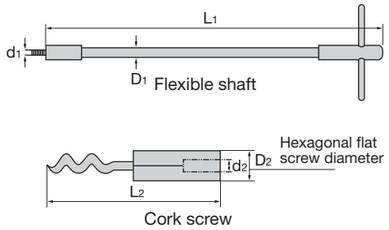


Figure A



Flexible shaft					Cork screw					Full length (mm)	Available groove depth (mm)
No.	Screw size d1 (mm)	Shaft size D1 (mm)	Length L1 (mm)	Q'ty	No.	Screw size d2 (mm)	Hexagonal flat screw dia D2 (mm)	Length L2 (mm)	Q'ty		
No.1	4	5	200	2	No.11	4	6	45	3	245	7 or over
No.2	6	6	240	2	No.12	6	8	50	3	290	9 or over
No.3	8	8	300	2	No.13	8	12	75	3	375	12 or over

Packing damper (packing insertion tool)

Construction

The packing damper made of power spring steel has at its end an R-shaped metal, which fits well into the packing space and the diameter of the sliding parts of the rod and shaft, so as to ensure uniform insertion of packing.

Instructions for use

Using the dampers (No.21, 22) that are compatible with the packing groove and the diameter of the sliding parts, carefully push the packing along its periphery for each turn as shown in Figure B, and install it at a proper position.

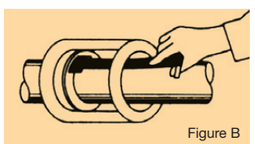
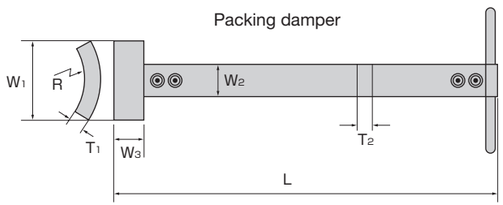


Figure B



■ Dimensions of damper ■

No.	W1 (mm)	W2 (mm)	W3 (mm)	T1 (mm)	T2 (mm)	R (mm)	L (mm)	Available groove depth (mm)	Available range (shaft dia) (mm)
No.21	30	16	15	6	0.8	20	185	6～20	40～100
No.22	50	19	20	9	1.0	35	240	9 or over	75 or over

■ Application table ■

	Packing hook	Packing damper	Remarks
Application	For removal of packing adapter	For installation of packing adapter	Braid packing, rubber V packing, PTFE V packing, adapter & spacer made of resin and metal, lantern ring, etc.
Objective	Soft packing adapter (1)		Packing using braided wire, rubber, rubber with cloth, PTFE, plastic; adapter spacer made of resin and metal, lantern ring, etc.

Note (1) In case of metal adapters, tap out in advance so as to be compatible with the male screw at the tip of the flexible shaft. At two positions, in the center of periphery.